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# Version history

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### **CA 7** FATE AND BEHAVIOUR IN THE ENVIRONMENT

Data on the fate and behaviour of trifloxystrobin (CGA 279202) in soil, water, sediment and an were submitted within the EU Dossier (Baseline Dossier), which resulted in the Annex I inclusion under Directive 91/414/EEC in 2003. In the Supplemental Dossier for renewal of approval of triflexystreem presented here only those environmental fate studies are described in sections 7.1 to 7.5 which were not submitted within the Baseline Dossier. However, for a better understanding of the behaviour of trifloxystrobin in soil, water and sediment, short summaries including the results of all environmental fate studies are given additionally in this summary in sections CA 7.1, CA 7.1.3.1 ap CA 7.2.

The studies concerning the fate and behaviour of trifloxystrobin on the environment were conducted using two different radiolabel positions, [14C-GP] and [14C-TP], as well as unabelled triflexystropin. These radiolabel positions are sufficient to define the route of degradation of trifloxystrobin. The structure of trifloxystrobin and the positions of the different radiolabels are as follows:





In addition, studies have been performed with the radiolabelled and unlabelled major degradation products CGA 357261, CGA 321113, CGA 373466, CGA 381318, NOA 413161, NOA 413063, CGA 357276 and NOA 409480:



# BAYER Bayer CropScience Document MCA: Section 7 Fate and behaviour

# Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin



In original reports study authors may have used different names or codes for degradation products of trifloxystrobin. In this summary, a single grame of a single code is used for each degradation product. A full list containing structural formula, various names, short forms codes and occurrences of degradation products is provided as Document N3.

# CA 7.1 S Fate and behaviour in soil

Triflox strobin (*EE*) is rapidly degraded in soil to the major degradation products carbon dioxide, CGA 321113 (*EE*) NOA 41316 (*ZE*) and CGA 357276 (*E*), and non-extractable residues. In presence of light, the major *E*/Zasomers (in this summary referred to as "photodegradation products") CGA 357261 (*ZE*), CGA 373466 (*ZE*), CGA 381318 (*ZZ*) NOA 413163 (*EE*) and NOA 409480 (*Z*) of trifloxystrobin (*EE*) and its major degradation products CGA 321113 (*EE*), NOA 413161 (*ZE*) and CGA 357276 (*E*) are observed, as well as the major volatile degradation product CGA 107170. However, the degradation of the observed as well as the major volatile degradation under typical conditions in the environment and photodegradation plays only a minor role in the overall fate of trifloxystrobin. More details for the route and rates of degradation of trifloxystrobin and its major degradation products in soil are given in section CA 7.1.1 and section CA 7.1.2, respectively.



### CA 7.1.1 Route of degradation in soil

The route of degradation of trifloxystrobin in soil was studied using two different radiolabel positions, [<sup>14</sup>C-GP] and [<sup>14</sup>C-TP]. The studies have been performed in a number of soils in the laboratory at different temperatures and soil moistures, and under semi-field conditions (lysimeters and field plan). The maximum occurrences of degradation products in percentage of applied radioactivity N% ARY are Final, 7 April 2003).

Under aerobic conditions in the dark in the laboratory, trifloxystropin (EE) was degraded to carbon dioxide with a range of 4.3 to 63.5% AR for the [14G=GP]-label and a maximum amount of 56.6% AR for the [14C-TP]-label. Besides the formation of carbon dioxide, three major degradation products were identified with the following maximum amounts: (CGA 321113(EE) with 96.8% AR, NOA 413161 (ZE) with 13.6% AR (dark samples of soil photolysis) and CGA 357276 (E) with 5.6% AR. Non-extractable residues (NER), ranged from \$8 to 29.4% or the [140-GP], abel and reached a maximum amount of 26.8% AR for the  $f^{14}C-TP$  -label. CGA 357256 (E) is newly addressed as soil degradation product in this Supplemental Dossier.

Under anaerobic conditions in the Park in the aboratory, CGA 321 Dr3 (Eb) was dentified as the single major degradation product with a maximum amount of 97.0% AR. Formation of carbon dioxide was very low with a maximum mount of 0.4% AR. NER reached maximum apount of 6.8% AR.

Under photolytic conditions in the laboratory the rate of degradation of trifloxystrobin (EE) was mainly influenced by biotic processes, but the route of degradation differed with regard to E/Z isomerization (in this summary referred to as "Photodogradation products"), Trifloxystrobin (EE) isomerized to its major End isomer CGA 357261 (ZE) with max 15.5% AR and to its minor E/Z isomer CGA 397262 (ZZ) with max. 5.1% AR The maximum amount of 5.1% AR of CGA 357262 (ZZ) was found only at one single sampling interval and was below 5% AR at all following sampling intervals. Trifloxystrobin (*EE*) and its *E/Z* (somer's were degraded to the major degradation product CGA 321113 (EEV with max 57.6% AR and its major E/Z isomers CGA 373466 (ZE) with max. 42,3% AR and CGA 3812518 (ZZ) with max. 6.2% AR by microbial ester cleavage and E/Z isomorization. Further microbiat degradation red to the major photodegradation products NOA 413463 (*EE*) with max  $\sim 6.0\%$  RR and NOA 409480 (*Z*) with max. 9.3% AR. Furthermore, the major volatile degradation product CGA 107170 was formed with a maximum amount of 7.9% AR by deavage of the bridge between the momatic ring systems. Formation of carbon dioxide was low with a maximum amount of 9.9% R. NER reached a maximum amount of 26.1% AR. CGA 38 CF18 (Z), NOA 409480 (Z) are newly addressed as soil degradation products and CGA 107170 (volatile) with regard to an in this Supplemental Dossier.

Under semi-field conditions in presence of Aght, the degradation products CGA 357261 (ZE), CGA 3/57262 (ZZ), CGA 3/21113 (EE), CGA 3/3/466 (ZE), NOA 413161 (ZE) and NOA 413163 (EE) The proposed legradation pathway of trifloxystrobin in soil is shown in Figure 7.1.1-1. were identified as the most important ones.







### CA 7.1.1.1 Aerobic degradation

The route of degradation of trifloxystrobin in soil under aerobic conditions in the laboratory and inder semi-field conditions (lysimeters and field plot) was evaluated during the Annex I inclusion using two radiolabel positions, [14C-GP] and [14C-TP], and was accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following studies are included in the Baseline Dossier:

Annex Point / Reference No	Author(s)	Ś	Year	Document No S
KCA 7.1.1.1 /01		A.	2 1997	N-033098-014
KCA 7.1.1.1 /02			1997	M-03Q147-00-1
KCA 7.1.1.1 /03		A Q	¢1997 🔗	M-033394-01-1
KCA 7.1.1.1 /04			1997	M-033459-01-0
KCA 7.1.1.1 /05			1997	M-033453-01-1
KCA 7.1.1.1 /06		;	01997 <sup>"0</sup>	M_033705_01-1 ( °
KCA 7.1.1.1 /07			1988	M-051722-04
KCA 7.1.1.1 /08		Y W M OY	1997	M-039523-02-1

No additional studies are submitted within this Supplemental Dossier for the affloxy strobin renewal of approval. The degradation product CGA357276 is newly addressed as soil@egradation product in this Supplemental Dossier because it was formed above the new identification toggers in aerobic soil degradation study M-033394-01-1 (Baselthe Dossier, KCA 7.1.1.1./03). A summary of the route of degradation of trifloxystrobin in soil is given in action CA 7.1.1 and rigure 7.1.1. 

### Anacrobic degradation CA 7.1.1.2

CA 7.1.1.2 Anagrobic degradation of trifloxyshobin in soil onder maerobic coorditions in the dark in the laboratory was evaluated during the Annex Vinclusion using on radio abel position, [14C-GP], and was accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following , L study is included in the Baseline Dossier:

	$\sim$				
Annex Point / Ref	erence No	Author(s)		Year	Document No
KCA 7.1.1.2 /01			& A	1996	M-033427-01-1
		av v			

No additional studies are subplitted within this Supplemental Dossier for the trifloxystrobin renewal of





### CA 7.1.1.3 Soil photolysis

The route of degradation of trifloxystrobin in soil under photolytic conditions in the laboratory we evaluated during the Annex I inclusion using two redicted to the state of evaluated during the Annex I inclusion using two radiolabel positions, [14C-GP] and [14C-TP] and was accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following studies are included in the Baseline Dossier: 1Ĉ6

			× , , ,	
Annex Point / Reference No	Author(s)	Ú,	<b>Y</b> ear	Document No
KCA 7.1.1.3 /01		V	Q 1997	M-033490-014
KCA 7.1.1.3 /02		s O Y	1997	M-039420-00-1
		A	N A Y	

Two additional studies have been performed for trifloxystrobin and are submitted within this Supplemental Dossier for the trifloxystrobing renewal of approval using two radiolabel positions,  $[^{14}C-GP]$  and  $[^{14}C-TP]$ . A summary of the route of degradation of triffexystrobin in soil is given in section CA 7.1.1 and Figure 7.1.1-1.

Report:	KCA 7.1.1.3 /03 (S. P.) 1992 , O , S & S & O
Title:	Photodegradation of [Phenyl (B)-U-14C]-CGA-279202 of a Loamy Sand under
	Artificial Suplight Irradiation
Report No:	31-95 AV AV AV AV AV AV AV
Document No:	M-049459-01-1 N N N N N N N N N N N N N N N N N N
Guidelines:	- US EPA Pesticide Assessment Guidelines, Subdivision N, Section 161-3
GLP:	Yes A A A A A A A A A A A A A A A A A A A
Justification:	New data guideline requirement:
	Degradation products NOA 409486 (soil) and CGA 107170 (volatile) formed
	Saboyonhe new identification triggers &

Executive Summary

The photolytic route and rate of degradation of [14C+TP]trthoxystrobin were studied in one soil under exposure to simulated Gunlight in the laboratory for 30 days at  $25 \pm 1$  °C and a soil moisture of 75% of 0 the field capacity atQ/3 bar

Ô	A.		×	K)	-	_0*		
<sub>@</sub> .Soil	R'	Ĵ,	Source	í í	🖇 Te	ture (USDA)	pН	OC [%]
North Car	olina O	Ьo	uisburg,	USÅ	~	loamy sand	7.3	0.3
.4	Or .	~O`	5	Ê,	Øĩ			

A study application rate of approximately 28 mg per kg soil dry weight was applied.

30 days of incubation under exposure to simplified sunlight were equivalent to 32.0 and 49.5 days in Phoenix (Arizona, USA) and Athens Greece, respectively. For comparison, additional samples were incubated in the dark.

Mean material balances Panged from 85.8 to 99.2% of applied radioactivity [% AR] for irradiated samples and from 98.7 to 1020% AR for dark samples.

The praximum amount of carbon dioxide was 1.3 and 2.7% AR at study end (DAT-30) in irradiated and dark samples, respectively. The maximum amount of volatile organic compounds was 9.6 and 0.7% AR at DAT-30 in irradiated and dark samples, respectively. The volatile degradation product CGA 107170 was identified in irradiated samples with a maximum amount of 7.9% AR at DAT-30.

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Extractable residues decreased from study start (DAT-0) to DAT-30 from 97.5 to 73.4% AR in irradiated samples and from 96.8 to 88.9% AR in dark samples.

Non-extractable residues remained constant from DAT-0 to DAT-30 at approximately irradiated samples and increased from 1.8 to 6.2% AR in dark samples.

ţø<sup>©</sup>, The amount of trifloxystrobin in the soil extracts decreased from DAT to DAT-30 from 12.7% AR in irradiated samples and from 96.8 to 11.5% AR in dark samples, thus not indicating a significant difference in the rate of degradation. However, the route of degradation of trifloxystrobin differed between irradiated and dark samples with regard to E/Z isoperization.

In irradiated samples, trifloxystrobin (EE) isometized to its E/Z isometric CGA 355261 (ZE) (max. 9.3% AR at DAT-21), CGA 357262 (ZZ) (max. 4.1% AR at DAT-21) and CGA 331409 (EZ) Gnax. 3.4% AR at DAT-14). Trifloxystrobin (EE) and its EZ isomers were degraded to CGA 321113 (EE) (max. 17.2% AR at DAT-2) and its E/Z isomer COA 373466 (ZE) (max. 24.8% AR at DAT-30) by microbial ester cleavage and E/Z isomerization. Furthermore, (max. 93% AF at DAT-21) was formed.

In dark samples, trifloxystrobin (EE) was degraded to CGA AR 🕅 DAT-7) and NOA 413161 (ZE) (max. 13.6% AR at DAT-30).

n

The DT<sub>50</sub> values were calculated using single first order kinetice resulting in experimental half-lives for trifloxystrobin of 2.1 and 2.3 days in the irradiated and dark samples, respectively. Thus, the net photodegradation rate constant was calculated to 0.038 day<sup>-1</sup> resulting in a net photolytic half-life of 18.2 days. Based on the experimental  $DT_{50}$  value of 2.1 days for irradiated samples, the  $DT_{50}$  value of trifloxystrobin under environmental conditions is calculated to De e.g. 4.5 and 6.9 solar summer days at Phoenix and Athens, respectively.

It is concluded that the degradation of trifle ystrobin is driven by microbial degradation under typical conditions in the environment and phototegradation plays only a minor role in the overall fate of trifloxystrobjn.

GA279202 AS-VIII-53-ivity: Inical Putity: 97,9% AS-VIII-53-(46,00) Cimes Putity: 97,9% AS-VIII-53-(46,00) Cimes Putity: 97,9% AS-VIII-53-(46,00) Cimes Putity: P

### 2. **Test Soil**

One soil was used (see Table 7.1.1.3-1), which was sampled freshly from the field and sieved to a particle size of  $\leq 2$  mm.

### Results / Units Parameter Soil Designation North Carolina Geographic Location Louisburg City North Carolina State **b**≸A Country Soil Taxonomic Classification no information available Soil Series nomformation available ( Textural Class (USDA) loamy Sand [50 µm@ $2 \,\mathrm{mm}$ [2 μm)¥ 50 km Silt 10%Clay ∕µḿ pН クマ Organic Carbon 0.3 Organic Matter 1 0 Cation Exchange Capacity [med 100 g] 3.9 Water Holding Capacity at 1/Obar (# 8.3% Bulk Density (disturbed) 1.20 [ @cm O Mcrobia Wiability [CFU/g DAT-0 DAT-30, imadiateDsample DAT-30, dark sample % organic matter = Worganic CFU@olony@orming units DAT days after treatment DW: dry weight SDA United STUDY DESIG

### Physico-chemical properties of test soil Table 7.1.1.3-1:

# B.

### **Experimental Conditions** 1.

The flow-through test system for phototytic Degradation in soil consisted of a proprietary soil photolysis apparatus containing a water-jacketed chamber with 12 steel plates. The chamber was closed with a quartz glass cover and a flow of humidified air was maintained. The air-flow output was connected to a series of trapping solutions (toluene, ethylene glycol and 2 N potassium hydroxide) for adsorption of volatile organic compound (VOC) and carbon dioxide.

For preparation of the test systems, 7 g dry weight equivalents of the sieved soil (equilibrated at 25 °C and a soil mosture of 75% field capacity (FC) at 1/3 bar) were weighed into each steel plate, resulting in a soil layer of approximately 2 mm thickness. For the DAT-0 samples, the soil was weighed directly into soil extraction vials.

The study application rate (SAR) was approximately 2.8 mg per kg soil dry weight, resulting in a SAR of 19.5 µg [<sup>14</sup>C-TP]trifloxystrobin per steel plate or soil extraction vial.

The test item was applied dropwise onto the soil surface of the respective steel plates or soil extraction vials in 75  $\mu$ L acetonitrile using a syringe.

The irradiated test systems were incubated with a 12-hour light / 12-hour dark artificial sunlight cycle for 30 days at  $25 \pm 1^{\circ}$ C and a soil moisture of 75% FC at 1/3 bar in a Suprest<sup>®</sup> unit containing a Xenon lamp simulating natural sunlight. The light emission was filtered with a 290 nm cut-off UV-filter, which eliminated all wavelengths < 290 nm. The intensity of the Xenon lamp was determined at the beginning and the end of the overall test period using a radiometer and photodetector assembly and was calculated as 765 W/m<sup>2</sup> for 300 to 2450 nm. The radiation intensity and exposure time under experimental conditions can be related to fatural solar radiation at e.g. Phoenix (Artizona, USA), representing extraordinary conditions, or Athens (Greece) At this light antensity, it takes 11% and 7.3 hours in the Suntest<sup>®</sup> unit to equal one solar summer day at Phoenix and Athens, respectively. Therefore, the equivalent of 30 solar days is achieved by this design using a 12 hour light / 12 hour dark cycle for approximately 28.2 and 18.3 days for Phoenix and Athens, respectively.

The dark test systems were incubated in the dark for 30 days at  $25 \pm 1^{\circ}$  and a soil projective of 75% FC at 1/3 bar in an incubator.

# 2. Sampling

Six sampling intervals were distributed over the entire incubation period of 30 days. Duplicate samples (steel plates or soil extraction vials) were processed and analysee 0, 2, 0, 14, 21 and 30 days after treatment (DAT) for both irradiated and dark samples. Trapping solutions for adsorption of VOC and carbon dioxide were sampled and replaced at each sampling interval. In the irradiated test system, the toluene trapping solutions were also sampled and replaced on DATS and DAT-12. Microbial viability of the soil was determined at DAT-6 and DAT-30

# 3. Analytical Procedures

The radioactivity content of the toluche, ethylene glycol and 2N potassium hydroxide trapping solutions was determined by liquid scintillation counting (LSC).

The entire soil of each sample was extracted six times using a sonicator bath, three times using acetonitrile water<sub>pH4</sub> 4.0 ( $\nu/\nu$ ) and three times using acetonic/2 M acetic acid 4/1 ( $\nu/\nu$ ). After each extraction step, extract and soil were separated by centifugation and decantation. The radioactivity content of the combined acetonitrile soil extracts and the combined acetone soil extracts was determined by LSC. Aliquots of the soil extracts were filtered, concentrated and analysed by reversed phase HPLC/radiodetection. The limit of detection for HPLC/radiodetection analysis of the soil extracts was 003% AR.

Non-extractable residues were determined by compustion/LSC.

Test item and degradation products were identified by HPLC and 2D-TLC co-chromatography with reference items and by HPLC-MS.

The degradation kinetics of the test item was determined using single first order kinetics. Input datasets were the mean residual amounts found at each sampling interval.  $DT_{50}$  values were calculated from the resulting parameters

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### II. **RESULTS AND DISCUSSION**

Results indicated that the anticipated standardized conditions were maintained over the duration of the laboratory study.

### A. DATA

### Photodegradation of trifloxystrobin in soil North Carolina (mean Table 7.1.1.3- 2: expressed as % AR)

			L	,0×	*	Ĩ	S 4
C	Мала		U <sup>r</sup>		T O	·~~~	
Compound	Mean	0,00,4	L A		L. L.		30 📯
trifloxystrobin (EE)	irradiated	97.3	_49.5 <sub>@</sub>	40:0	28.2 s	27.36	120,7
	dark	<b>96</b> .8	\$ 53.1 <sup>°</sup>	25.0	26.9 Č	25.0	<u>î</u> ĭ.5
CGA 331409 (EZ)	irradiated	n.d. 🖑	10	<u>3</u> .1 C	· 3.4 <sup>°</sup>	\$2.9	🔿 1.6 🔊
	dark 🔬	n.d	_~ya.d	<sup>™</sup> n.d⊥	and.	n.d. 🖏	n Q
CGA 357262 (ZZ)	irradiated	°∕n,d.	0 <sup>7</sup> 2.14	Ğ <sup>3</sup>	گٍ 4.0 ک	4:4	A.S.2
	dard	×n.d.	nd	n.d. 🐧	, n.d	@d.	n.d.
CGA 357276 (E)	irradiated	ĕ n.d.∀	₩.d. ^	$\sum_{n.d}$	pr.el.	\$n.d. (	n.d.
	Cark ©	ntad.	🔊 n.d. న	դ.֎	On.d. (	ĭ n.đ.̂∀	0.9
CGA 357261 (ZE) +	Grradiated	9ñ.d. 🧳	× 13.0	<u></u> <u>3.5</u>	° 17.2~	1 <b>8.5</b> <sup>1</sup>	9.4
NOA 409480 (Z) <sup>1</sup>	🎽 dark 🔌	🔉 n.d.	1.3	n.d. Ø	n,d.	Q.1	n.d.
CGA 321113 (EE)	irradiated,	næ	Q7.2	153	×15.1	b 13.9	16.2
	🔒 dark 🖉	d.		72.3	<b>~%67.2</b> ~~	64.1	56.1
CGA 373466 (ZE)	Arradiated	On.d.	1,2Q'	&16.4	15.Ø	16.9	24.8
S C	ř <u>d</u> árk <sub>Q</sub>	n.dC	×1 <sup>8</sup> .9	0 0.4	Q,8	0.8	0.3
NOA 413161 (SE)	inadiated	n.d.	Ön.d.	n.d.	n.d.	n.d.	n.d.
	, ∬ <sup>∀</sup> dark <sup>™</sup>	N.d. ≽	n.d	@.d. ~	≫ 1.1	1.3	13.6
Non-Extractable	irradiated	of 1.7 y	1.3	🔊 1.4 🔌	2.2	2.0	1.6
Residues 🔊 🔬	dark 🏷	<u>1</u> .	~0.9 Ö	° 2,₽	4.2	4.1	6.2

O

n.d.: not detected, n.a.: not analysed, DAT-days after treatment <sup>1</sup> Resolving into two photodegradation products by TLC with approximately equal proportions and therefore a maximum amount of 9.3% AR at DAT-21 for each photodegradation product. A

«

Table 7.1.1.3 Photodegradation of tiffloxystrobin in soil North Carolina – distribution of Solatiles (expressed as % AR) Ş (A) n

X,

	$0$ $\delta$		$\sim$	N					
4	ð				DAT				
Traps	Mean	d 2 🖉	<sup>ເ</sup> ັ້7 🔊	્ષ્ર્	12	14	21	30	Cumulative
Tofuene <sup>1</sup>	irradiated	0.4	1.F	~ <b>0</b> .5	1.5	0.9	0.3	3.1	7.9 <sup>1</sup>
A CONTRACTOR	🗸 dark	s fûd.	Ø.1 ๙	N/A	N/A	0.1	n.d.	n.d.	0.3
Ethylene Glycol	irradiated	Ön.d.	™0.3_0	N/A	N/A	0.1	n.d.	1.1	1.7
, O	dark	0.1	0Q	N/A	N/A	0.2	n.d.	n.d.	0.4
Potassium	virradiated	0.3	0.2	N/A	N/A	0.3	0.3	0.2	1.3
Hydroxide	dark	<i>‱</i> 0.3 <sup>^</sup>	<sup>♀</sup> 0.5	N/A	N/A	0.6	0.5	0.8	2.7
Daily, Total 🖉	irradiated O	0.7	1.6	0.5	1.5	1.4	0.7	4.5	10.9
N S	dark	0.4	0.7	N/A	N/A	1.0	0.5	0.8	3.4

n.d. not detected, NoA: not applicable, DAT: days after treatment

GA 107170 was identified as volatile degradation product in toluene trap of irradiated test system.



### B. MATERIAL BALANCE

Mean material balances ranged from 85.8 to 99.2% of applied radioactivity [% AR] for irradiated samples and from 98.7 to 102.3% AR for dark samples.

### С. EXTRACTABLE AND NON-EXTRACTABLE RESIDUES

Extractable residues decreased from study start (DAT-30) from 97.5 to 73.4% AR in irradiated samples and from 96.8 to 88.9% AR in dark samples. Non-extractable residues remained constant from DAT-0 to DAT-30 at approximately 20 AR in irradiated amples and increased from 1.8 to 6.2% AR in dark samples.

### D. VOLATILES

D. VOLATILES The maximum amount of carbon dioxide was 1 3 and 27% ASP at DOXT-30 in irreduced and dark samples, respectively. The maximum amount of clatife organic compounds was 9.6 and 67% AR at DAT-30 in irradiated and dark samples respectively. The volatile degradation product CGA 197170 was identified in irradiated samples with a maximum amount of 7.9% AR at DAQ-30.

The results are included in the summary of the route of degradation of trifloxystropin in soil given in section CA 7.1.1 and Figure 70.1- k. The degradation of CGA 10700 in air is addressed in section CA 7.3.1.

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### DEGRADATION OF PARENT COMPOUND E.

The amount of trifloxy stroby in the soil extracts decreased from DAT-0 to DAT-30 from 97.5 to 12.7% AR in irradiated samples and from 96.8 to 11.5% AR in dark samples, thus not indicating a significant difference in the rate of degradation. However, the route of degradation of trifloxystrobin differed between irradiated and dark samples with forgard to E/Z isomerization.

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In irradiated samples, trifloxystobin (EE) is merized to its E/Z somers CGA 357261 (ZE) (max. 9.3% AR at DAT-21), CGA 357262 (ZZ) (max. 4.1% AR at DAT-21) and CGA 331409 (EZ) (max. 3.4% AR at DAT-14 Triflowystrobin (EE) and is E/Z isomers were degraded to CGA 321113 (EE) (max. 17.2% AR a DAT 2) and its E/2 somet CGA 373466 (ZE) (max. 24.8% AR at DAT-30) by microbial ester cheavage and LZ isomerization. Furthermore, NOA 409480 (Z) (max. 9.3% AR at DAT-21) was formed

In dark samples, trifloxystrobin (*EE*) was degraded to CGA 321113 (*EE*) (max. 72.3% AR at DAT-7) and NOAA13161 (*ZE*) (max. 53.6% AR at DAT-30)?

The experimental  $DT_{50}$  values of trifloxystrobin in irradiated and dark samples were calculated using single first order (SFO) kinetics (see Table 7.1.1.3- 4).

			SFO <sup>1</sup>	4 4	
	<b>DT</b> 50	Rate	DT <sub>50</sub> under	🦻 Net Photode	gradation K
	(exp.)	Constant	natural conditions	Rate Consta	nt 🏹 🕅 T50 🖉 🛛
Test System	[days]	[day <sup>-1</sup> ]	🕅 [days]	[da\) / (	daysi 🗸 🗸
Irradiated	2.1	0.34	4,8 (Phoenix, USA)	Ø.038 #	Q8.2 0 K
			∠6.9 (Athens, Gegece)	Ly L	° Oʻ "Vʻ
Dark	2.3	0.30 🗸	no conversion		D D

# Table 7.1.1.3- 4: Photodegradation kinetics of trifloxystrobin in soil North Carolina

<sup>1</sup> SFO: single first order

<sup>2</sup> net photodegradation rate constant = rate constant of gradiated samples -rate constant of dark samples

# H CONCLUSION

Trifloxystrobin was rapidly degraded in soil (experimental half life of 21 days) when being exposed to simulated sunlight in the laboratory. The experimental half-life of date samples was 2.3 days, resulting in a net experimental photolytic half-life of 182 days

The rate of degradation of trifloxystrobin (EE) was therefore mainly fafluenced by biotic processes, but the route of degradation (see Figure 7.1.1 of for degradation pathway) differed with regard to E/Z isomerization (in this summary referred to as "photodegradation products") in irradiated samples, trifloxystrobin (EE) isomerized to its major E/Z isomer CGA 357261 (ZE). Trifloxystrobin (EE) and its E/Z isomer were degraded to the major degradation product CGA 324,113 (EE) and its major E/Z isomer CGA 353466 (ZE) by microbial ester cleavage and E/Z isomerization. Further microbial degradation of CGA 373466 (ZE) by microbial ester cleavage and E/Z isomerization. Further microbial degradation of CGA 373466 (ZE) led to the major photodegradation product NOA 409480 (Z). Furthermore, the major volatile degradation product CGA 107170 was formed by cleavage of the bridge between the aromatic ring systems. In dark samples, thiloxystrobin (EE) was degraded to the major microbial degradation products CGA 321113 (EE) and NOA413161 (ZE). Formation of carbon dioxide was low.

It is concluded that the degradation of trylloxy trobin of driven by microbial degradation under typical conditions in the environment and photodegradation plays only a minor role in the overall fate of trifloxystrobin

The results are in good agreement with the proposed photodegradation pathway of trifloxystrobin on soil known from studie included in the Baseline Dossier. The photodegradation product NOA 409480 and the volatile degradation product CA 107170 are newly addressed in soil and air in this Supplemental Dossier, respectively, because they were formed above the new identification triggers.

The results are included in the summary of the route of degradation of trifloxystrobin in soil given in section CA 71.1 and Figure 7.1.1-1.



# Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.1.3 /04; ; ; ; 2013
Title:	[Benzeneacetic-phenyl-UL- <sup>14</sup> C]Trifloxystrobin: Phototransformation on Soil 🖉
Report No:	EnSa-12-0699
Document No:	M-462074-01-1
Guidelines:	- SETAC Procedures for Assessing the Environmental Ease and Ecotoxicity of
	Pesticides
	- OECD DRAFT Test Guideline: Phototransformation of Chemicals on Soil
	Surfaces
	- US EPA OCSPP Test Guideline No. 835.2410 Q
	- Canadian PMRA Guideline DACO 8.2.3.3.1
GLP:	Yes A Q o A L O
Justification:	New data / guideline requirement:
	Identification of degradation product M2 formed above the new identification
	triggers in soil photolysis study M-039410-67-1 Baseline Dossier,
	KCA 7.1.1.3 /01)

# **Executive Summary**

The photolytic route and rate of degradation of [ $^{14}C$ -GP]trifloxystrobin were studied in one soil under exposure to simulated sunlight in the laboratory for 11 clays at 20.1  $^{\circ}C$  and a soil moisture of 52.5% of the maximum water holding capacity:  $^{\circ}C$   $^{\circ}C$ 

	<b>W</b>				•	
Soil	ŝ (	ာိ် သူSou	ree o	Texture (USDA)	<b>фН *</b>	OC [%]
	4a j	Burscheid	Germany	S silt loam	6.3	1.8
* pH value was derived fr	om aquieoi	us 0.01 M CaC	l2 suspension			

A nominal study application rate of 30.6 µg per test system (10.5 mg per kg soil dry weight) was applied based on a single field application rate of trifloxystrobin of 310 g per hectare.

11 days of incubation under exposure to simulated sunlight were equivalent to 30.8 and 47.8 solar summer days in Phoenix (Abizona USA) and Athens (Greece), respectively. For comparison, additional samples were incubated in the dark.

Mean material balances were 99.6% of applied radio activity [% AR] (range from 95.3 to 103.5% AR) for irradiated samples and 101.9% AR (range from 96.0 to 04.9% AR) for dark samples.

The maximum amount of carbon dioxide was 4.3 and 0.6% AR at study end (DAT-11) in irradiated and dark samples, respectively. Formation of volatile organic compounds was insignificant as demonstrated by values of  $\leq 0.1\%$  AR at all sampling intervals for both irradiated and dark samples.

Extractable residues decreased from 103.4% AR at study start (DAT-0) to 85.6 and 98.4% AR at DAT-11 in irradiated and dark samples, respectively.

Non-extractable residues micreased from 0.1% AR at DAT-0 to 9.2 and 2.3% AR at DAT-11 in irradiated and das samples, respectively.

The amount of trifloxystrobin in the soil extracts decreased from 101.0% AR at DAT-0 to 4.2 and 3.5% AR at DAT-11 in intradiated and dark samples, respectively, thus not indicating a significant difference in the rate of degradation. However, the route of degradation of trifloxystrobin differed between irradiated and dark samples with regard to E/Z isomerization.

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**Document MCA: Section 7 Fate and behaviour in the environment** Trifloxystrobin

In irradiated samples, trifloxystrobin (EE) isomerized to its E/Z isomers CGA 357261 (ZE) (max. 5.1% AR at DAT-4), CGA 357262 (ZZ) and CGA 331409 (EZ) (both max. 1.1% AR at DAT-4@nd DAT-7). Trifloxystrobin (EE) and its E/Z isomers were degraded to CGA 321113 (EE) max 57.4% AR at DAT-2) and its E/Z isomers CGA 373466 (ZE) (max. 35% AR at DAT-1), CGA 381318 (ZZ) (max. 6.2% AR at DAT-11) and CGA 373465 (EZ) (max. 33% AR at DAT-11) By microbial ester cleavage and E/Z isomerization. Furthermore, NOA 413163 (EE) (max. Q.4% AR at DAT-11), CGA 357276 (E) (max. 1.7% AR at DAT-11) and its E/Z isomer NOA 409080 (Z) (max. 3.5% AR at DAT-11) were formed. The total unidentified residues amounted to a maximum of 3.1% AR with no one component exceeding 1.6% AR at any sampling interval.

In dark samples, trifloxystrobin (EE) was degraded to CGA 321118 (EE) (max. 99.6% AR at DAT-1. and NOA 413161 (ZE) (max. 0.6% AR at DAT-101). The total unidentified residues amounted to a maximum of 2.0% AR with no one component exceeding 1.6% AR at any sampling interval.

The DT<sub>50</sub> and DT<sub>90</sub> values were calculated using single first order kindres, resulting in experimental half-lives for trifloxystrobin of 1.3 and 1.7 days in the invadiated and dark samples, respectively. Thus, the net photodegradation rate constant was calculated to 0.16 day 1 resulting in a net photolytic half-life of 4.6 days. Based on the experimental  $DT_{50}$  value of 4.3 days for fradiated samples, the  $DT_{50}$ value of trifloxystrobin under environmental conditions is calculated to be e.g. 5.6 solar summer days at Phoenix and Athens, respectively.

It is concluded that the degradation of triflexystrobin is driven by microbial degradation under typical conditions in the environment and photodegradation phays only a minor role in the overall fate of

The degradation product M2 formed above the new identification triggers in intradiated samples of soil photolysis study Mr 33410-01-1 Baseline Dossier, KCA 7.1 d.3 /01), was identified as NOA 413163.

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# 2. Test Soil

One soil was used (see Table 7.1.1.3- 5), representative for an agricultural use area. No prant protection products were used for the previous 5 years. The soil was sampled freshly from the field (upper horizon of 0 to 20 cm) and sieved to a particle size of  $\leq 2$  mm. Soil collection and bandling were in accordance to ISO 10381-6.

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Parameter	🕅 Result	s / Enits	
Soil Designation	<i>A</i>	à Xu	4a Q 6
Geographic Location	A A	6° 64	
City			
State &	Q° North-	Rhine Westphal	\$*****
Country	🗶 🖉 Germa	hy 👌 🖉	
GPS Coordinates		Ő	
Soil Taxonomic Classification (USD	🖉 🔬 boamy,	mixed mesic,	Spic Argudalf
Soil Series	No into	rmation availab	le 🖉 🔊
Textural Class (USDA)	silt Ioa	m 🏹 🖉	
Sand $[50 \ \mu m_{\chi}^2 \ mm_{\chi}^2]$	\$ \$\$%	\$ & <sub>\$</sub>	? «.
Silt $2 \mu m^{2} 50 \mu m$			0 <sup>y</sup>
			<u>Å</u>
pH (soil/water $1/1$ )			, and the second s
nH (saturated name)		s s	)
pH (soil/1 N KG $1/1$ )			
Organic Cathon (combustion)	× × × 1.8%	×	
Organic Matter 1 0 0 0 4		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
Cation Exchange Capacity [m@/100 a]	11.0	<u>V</u>	
Water Holding Capacity	\$ \$ A	<i>.</i> ,	
maximum [g H & ad HQ g soil DW]			
at 0.1 bar (pFQ.0)	26.9%		
Bulk Densit (disturbed) [g cm <sup>3</sup> ]	P1.01		
Microbial Bioma [mg microbial carbon per k	g@bil DWG* 488		
DW: Ary weight	* 0°		
USDA: United States Department of Agricultur	res		
	×Q ¥		
The second se	1		



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#### B. **STUDY DESIGN**

#### **Experimental Conditions** 1.

The static test system for photolytic degradation on soil consisted of a quarte glass vessel 36 mm inner diameter, 35 mm height, inner surface area 10.2 cm<sup>2</sup>) with a glass neck attached to the side of the wall. Each vessel was closed with a round quartz glass cover. Additionally, the glass peck of each vessel was equipped with a trap attachment (permeable for oxygen), containing odd lime for? absorption of carbon dioxide and a polyurethane (PU) form plug for adsorption of volatile organic compounds (VOC).

For preparation of the test systems, 3 g dry weight equivalents of the sieved soil were weighed into each vessel, resulting in a soil layer of approximately 3 mm thickness, Soil moisture was adjusted to  $55 \pm 5\%$  of the maximum water holding capacity (MWHC) for the individual test systems by addition of de-ionized water.

The study application rate (SAR) was based on a field application rate of 300 g per hectore giver in soil photolysis study M-033410-01-1 (Baseline Dossier, KCA 7.1.1 4/01), resulting in anominal SAR of 31.6 µg [14C-GP]trifloxystrobin percest system (10.5 mg per kg soil dry weight).

1 m The test item was applied dropwise onto the soil surface of the respective test systems in 50 µL methanol using a pipette. After evaporation of the application solvent, the test vessels (except DAT-0 samples) were closed with quartz glass covers and equipped with an attachments.

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The irradiated test systems were continuously gradiated for 11 days at 2007 °C and asoil moisture of 52.5% MWHC in a Suntest<sup>®</sup> unit containing a Xenon long simulating natural sunlight. The light emission was filtered with a 290 nm cut-off UV-filter, which Oliminated all wavelengths < 290 nm. The intensity of the Kenon lamp was determined at the beginning and the end of the overall test period using an irradiance monthor and was ealculated as 1006 W/m<sup>2</sup> for 300 to 2450 nm. The radiation intensity and exposure time under experimental conditions can be related to natural solar radiation at e.g. Phoenix (Arizona, USA), representing extraordinary conditions, or Athens (Greece). At this light intensity, it cakes 8.6 and 5.5 hours in the Sumest® und to equal one solar summer day at Phoenix and Athens, respectively. Therefore, the equivalent of 30 solar days is achieved by this design using continuous irradiation for approximately 10-8 and 9.9 days for Proenix and Athens, respectively.

The dark test systems were included in the dark for to days at 20.1 °C and a soil moisture of 53.3% MWHC in a walk-in chimatic chamber.

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₹ N N N 2. Sampling Eight sampling intervers were distributed over the entire incubation period of 11 days. Duplicate samples were processed and analysed 0, \$17, 003, 1, 2, 4, 7 and 11 days after treatment (DAT) for

samples were processed and analysed 0, 0,17, 0,33, 1, 2, 4, 7 and 11 days after treatment (D. both firadiated and dark samples, Microbal soil biomass was determined once for the test soil.



### 3. Analytical Procedures

Carbon dioxide absorbed by soda lime was liberated with 18% aqueous hydrochloric acid and trapped in a scintillation cocktail selective for binding of carbon dioxide using an air-tight assembly. The radioactivity content was determined by liquid scintillation counting (LSC).

The PU foam plugs were extracted with ethyl acetate in an ultrasonic bath to desorb. VOC. The radioactivity content was determined by LSC.

The entire soil of each test system was extracted three times at ambient temperature using a mechanical shaker followed by one accelerated extraction using a moreowave at 70°C with a mechanical shaker followed by one accelerated extraction using a moreowave at 70°C with a mechanical shaker followed by one accelerated extraction using a moreowave at 70°C with a mechanical shaker followed by one accelerated extraction using a moreowave at 70°C with a mechanical shaker followed by one accelerated extraction using a moreowave at 70°C with a mechanical shaker followed by one accelerated extraction using a moreowave at 70°C with a mechanical shaker followed by one accelerated extraction step extract and soil were separated by centrifugation (> 4500 x g) and decantation. The radioactivity content of the combined ambient foil extracts and the microwave soil extract was determined by USC. Aliquots of the soil extracts were combined, concentrated and analysed by reversed phase HPFC/radiodetection. The limit of detection and limit of quantitation for HPLC/radiodetection analysis of the combined soil extracts were 0.2 and 0.6% AR, respectively.

The exhaustive extracted soils were air-dried and non-extractable residues were determined by combustion/LSC.

Test item and degradation products were identified by HPLC co-chromatograph (with reference items and by HPLC-MS(/MS) including accurate mass determination (For identification of the degradation product M2, formed above the new identification triggers in irradiated samples of soil photolysis study M-033410-01-1 (Baseline Dossier, KCA 74.1.3/01), additional investigations by TLC were performed.

The degradation kinetics of the test item was determined according to FOCUS kinetics (2006)<sup>1</sup> using the software KinGUI 2 with a single first order kinetic model. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial total recovery (material balance) at DAT was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model.  $DT_{50}$  and  $DT_{90}$  values were calculated from the resulting kinetic parameters.



<sup>&</sup>lt;sup>1</sup> FOCUS kinetics (2006): "Guidance Document on Estimating Persistence and Degradation Kinetics from Environmental Fate Studies on Pesticides in EU Registration", Report of the FOCUS Work Group on Degradation Kinetics, EC Document Reference Sanco/10058/2005 version 2.0, 434 pp.



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### **II. RESULTS AND DISCUSSION**

Results indicated that the anticipated standardized conditions were maintained over the duration of the formula boratory study. A. DATA Table 7.1.1.3- 6: Photodegradation of trifloxyströbin in coll

Fable 7.1.1.3- 6:	Photodegra	dation of	f triflox	ystrobi	n in soil				<b>4</b> a	i <sub>(</sub>
	(mean value	es and SD	expres	sed as %	6 AR)	Ş	×,	Ś		, ô <sup>5</sup>
	Mean		4	Ů.		Γ ο				
Compound	SD	0		0.	.17		S. Ó		1	
trifloxystrobin (EE)	irradiated	101.0	± 0.4	86.7	$0 \pm 0.9^{\circ}$	86.2	± 2.6	5,6.9	£9.9	
5	dark	101.0	A0.4	7, 94.9	) ± 159	85.7	£Q.0	61.1	± 4.8	
CGA 331409 (EZ)	irradiated	< LOD <sub>4</sub>	No.	< LØD		00.5	± 0.1	0.9	$\pm 0 A$	
	dark	< LQQ		n.d.		n.d.	¥	n.đ.		
CGA 357262 (ZZ)	irradiated	< <b>b</b> ØD		© n.d. 🗸		n.d.	Ś	×9.5	20.0	
	dark	A LOD&		na		"G.d.		D'n.d.s	0	
CGA 357276 (E)	irradiated	🖌 n.d. 🖉	, v	n.d.	2 1	n.d. 🍂	<del>)×</del>	n.d.		
	dark	n.Ø	Ś	Ön.d. (	<u>s</u> s	n	Ö	n.d.		
CGA 357261 (ZE)	irradiated	° 0.4	20.0	× 2.2	/	3.2	0.4	\$\$5.0	± 1.1	
	dank	0.4 🚿	$ \pm 0 0 $	0.4	ية 0.0 <sub>م</sub>	<i>Q</i> 0.4	$ \pm 0.0^{\circ} $	0.3	$\pm 0.0$	
NOA 409480 (Z)	irradiated C	n.do	<u> </u>	n.d.	Ś	n.d.~>		n.d.		
	`∕≫dark_ <u>∢</u>	n.e.	S <sup>V</sup>	外 n.d.	× ×	R.G.		n.d.		1
CGA 373465 ( <i>EZ</i> )	virradiated	Qn.d.	0	n <sub>e</sub> d	<u> </u>	🔬 n.d.	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	n.d.		l
	dark 🔬	🦻 n.d.		h.⁄d.	<u>(</u>	)″n.d. ∛	1	n.d.		
CGA 321113 ( <i>EE</i> )	intediated	n dz	~ ~	<u>6</u> 8.4	$\psi \pm 1 A$	104	$\pm 0.6$	30.3	$\pm 6.0$	
<u> </u>	dark dark	n.d. 🛛	y	8.15	$\pm \mathcal{U}_0$	15.4	$\pm 1.5$	38.6	± 4.6	
$CGA 3813 \log(ZZ)$	1rradiated	$O^{n.d}$		tand. ≈ 1		n.d.		n.d.		
CCA 2700((7E)	*Stark	n.d.		Sti.d.		n.d.		n.d.	+ 1.0	
CGA 37 3400 (ZE)	trradiated	11.0.	<u> </u>			0.4	$\pm 0.0$	4.9	$\pm 1.2$	l
NO \$ 13163 (FE)	irrodioted	and a	<u>↓                                    </u>	nd	~ <u>0</u> `	n.d.		0.5	$\pm 0.0$	
NOA 413103 (EE)	ark @	n°ad	<u>_</u>	n d	4	n d		n.u.		
NOA 413161 (2)	Arradiated	d	<del></del>	$n d^{O}$	1	n d		n d		l
(U) (E) (E) (E)	dark	Ôn.d. 🥎	y A	17.00		n.d.		n.d.		l
Sum of Um@/Diff. <sup>O</sup>	irradiated	1.5%	±0/1	≈1.4	$\pm 0.2$	1.7	$\pm 0.1$	1.7	$\pm 0.4$	
Residues 1	dark	A.H	Q 0.1	© 1.1	± 0.2	1.4	± 0.0	1.3	± 0.2	
Total Extractable 。	Girradiaed	f02.9	10.4	99.0	± 2.2	102.3	$\pm 1.8$	100.0	± 2.1	
Residues 2	dark	≫ 102, <b>9</b>	±.0,±	104.5	$\pm 0.6$	104.9	$\pm 0.5$	101.7	$\pm 0.0$	
Carbon Dioxide 🔊	ircadiated	n.@.	ŝ	< 0.1	$\pm 0.0$	< 0.1	$\pm 0.0$	< 0.1	$\pm 0.0$	
	<sup>10</sup> dark	<sub>@</sub> p.a.	<sup>O</sup>	< 0.1	$\pm 0.0$	< 0.1	$\pm 0.0$	0.1	$\pm 0.0$	
Volatile Organic	◊ irradiated	🖉 n.a. 🧟	) /	< 0.1	$\pm 0.0$	< 0.1	$\pm 0.0$	< 0.1	$\pm 0.0$	
Compounds <sup>3</sup>	dark	n.a		< 0.1	$\pm 0.0$	< 0.1	$\pm 0.0$	< 0.1	$\pm 0.0$	
Non-Extractable	j adiated	TA T	$\pm 0.0$	0.5	$\pm 0.0$	0.4	$\pm 0.0$	1.0	$\pm 0.1$	
Residues 3	darts	0.1	$\pm 0.0$	n.a. <sup>4</sup>		n.a. <sup>4</sup>		n.a. <sup>4</sup>		
Total Recovery 2	irradiated	103.0	$\pm 0.4$	99.5	$\pm 2.2$	102.8	$\pm 1.8$	101.1	$\pm 2.0$	
<u></u>	<b>A</b> dark	103.0	$\pm 0.4$	104.5	$\pm 0.6$	104.9	$\pm 0.5$	101.8	$\pm 0.0$	l
Ĉ										

Table 7.1.1.3- 6: Photodegradation of trifloxystropin in soil

# Table 7.1.1.3-6 (continued)

	M				DA	т				
Compound	SD	2		4	DA 	1   7			10	6 <sup>31</sup>
trifloxystrobin (EE)	irradiated	20.7	± 10.5	26.9	$\pm 0.6$	10.3	©± 4.1	4.2	$\pm 0.$	
	dark	47.9	± 1.5	21.5	± 1.6	7.5	¥ ± 0.4	3.5	±0.4	
CGA 331409 (EZ)	irradiated	0.4	$\pm 0.0$	1.1	$\pm 0.3$	1.7	$\pm 0.2$ ,	Ø.9	Ø¥ 0.1 √	Q.
	dark	n.d.		n.dÖ		aly.d.	Å	n.d		a
CGA 357262 (ZZ)	irradiated	< LOD		1.1	$\pm 0.1$	0 1.1	$\pm 0$	0,9	±	Š
	dark	n.d.		Ap.d.	۵. ۱	n.d.	Ž	@.d.		
CGA 357276 (E)	irradiated	0.3	$\pm 0.0$	<u>≰</u> ≪LOD	Ŵ,	8.0	£0.3 <sub>⊿</sub>	ľ.7	$\circlearrowright \pm 0.3 @$	e v
	dark	n.d.		* n.d.	~ ´	n.d. *	ç, ö	n.d	Ĩ	
CGA 357261 (ZE)	irradiated	2.8	± 2.0	5.1	_@¥ 0.2_	> 2.5~	±30	, KJ°	<b>₽</b> Ø.2	
	dark	0.2	±Ø.0	_n.d. 🔬	<u>, 4</u>	n d.	<u>S</u>	n.d.	4	
NOA 409480 (Z)	irradiated	< LOD		J< LOØ∕		Ôř.3	$^{49}\pm0.8$	¥ 3.5	$\rightarrow \pm 0.8$	
	dark	n.d. 🖉		n.o.		n.d. ∂	, , , , , ,	n.C		
CGA 373465 (EZ)	irradiated	1.	_≞_0.6	_@Ø.8^	$5\pm0.6$	2, Î	±09.6	<b>\$</b> 3.3	<b>2</b> 0.1	
	dark	rQ.		n.d		ŵd.		n.d.	0	
CGA 321113 (EE)	irradiated	£57.4 C	₹±7.9	36.₽	1.3	\$32.3	$\mathbb{Y} \pm 0.5$	24	$\pm 1.4$	
	dark '	≫ 54. <b>4</b> ₀	± Ø_1	@1.2	& <u>⊈ 0.2</u> €	86.6	±¢ľľ	Ŷ¥.6	$\pm 1.9$	
CGA 381318 (ZZ)	irradiate	.0.5	£0.0	©_0.9 €	$1 \pm 0$	3.9*	21.1	<b>6</b> .2	$\pm 0.2$	
	darek	n.d. 🔌	Ş.	n.d.		jan.d.	, (C	n.d.		
CGA 373466 (ZE)	irradiated	×15.7	$\pm 365^{\circ}$	200.2	±"1.5	33.0	± 307	35.6	$\pm 2.4$	
	ð sa ark	0.4	±0.0	×0.5	$\pm 0.0$	0.3	O.0	0.6	$\pm 0.0$	
NOA 413163 (EE)	irradiated	¢gd.	<u> </u>	♥ n.d.♥		< LOD	<u></u>	0.4	$\pm 0.1$	
	dana	n.d.		n⁄d.		Ö <sup>v</sup> n.d. 🗸	,	n.d.		
NOA 413161 (ZE)	irradiated (	) n.d. V	~.	ar.d.		n.d.	0.4	n.d.	0.1	
,	\_dark, √	n.d.	$\sim$	r≪ LOD	<u> </u>	ACS -	$\pm 0.1$	0.6	$\pm 0.1$	
Sum of Unid Diff.	Dirradiated	0 <sup>1.4</sup>	<u> </u>	2:6,	±07.1	2.5	$\pm 0.1$	3.1	± 0.2	
Residues of	ckark		±.0.0		<u> </u>	<u> </u>	$\pm 0.3$	2.0	$\pm 0.0$	
Total Extractable	urradiated	100.5	±09.4	195.1 (j	$\frac{\pm 0.2}{2}$	90.5	± 1.6	85.6	$\pm 3.2$	
Residues <sup>2</sup>	O dark	103.6	$\pm 1.4$	<u>* 94.3</u>	±6	96.6	$\pm 1.7$	98.3	$\pm 2.3$	
Carbon Dioxide	irraduated		$\frac{1}{2} \pm 0.00^{-1}$	0.1	<u></u> <u></u> 0.1	0.3	$\pm 0.0$	1.3	$\pm 0.1$	
N L CL Q	dark 🦂	v 0.9	± 0.90	0.2	$\pm 0.0$	0.4	$\pm 0.0$	0.6	$\pm 0.0$	
Volatile Organize	HTradiates		$\times 0.0$	< 0.1	$\frac{1}{100} \pm 0.0$	< 0.1	$\pm 0.0$	< 0.1	$\pm 0.0$	
Non Extendable	irroductod	20.1	$1 \stackrel{\circ}{\to} 0.0$	< U/OF	$\pm 0.0$	< 0.1 5.0	$\pm 0.0$ $\pm 1.2$	< 0.1	$\pm 0.0$	
Residues 3		y" 2.0 y	± ų.ø	~×u,a.		3.0	$\pm 1.3$	9.2 2.2	$\pm 0.8$	
Total Økaavamy 2	Carradiate	180 6	$\frac{2}{2}$	$\Im_{052}$	$\pm 0.0$ $\pm 0.6$	1.9	$\pm 0.0$ $\pm 2.0$	2.3 06.2	$\pm 0.0$ $\pm 2.5$	
	darl	102.0	$1 \approx 0.2\%$	95.2 05.7	$\pm 0.0$ $\pm 1.6$	93.9	$\pm 3.0$ $\pm 1.6$	101.2	$\pm 2.3$ $\pm 2.4$	
		\$103.0	″ ⊥ <b>↓.</b> +%	75.1	$\pm 1.0$	70.7	$\pm 1.0$	101.2	⊥ ∠.4	

n.d. not detected, n.a. not analysed, DAT days after treatment, SD: standard deviation

 <sup>1</sup> Minor degradation products are summed up to sum of unidentified / diffuse residues, with no one component exceeding 1.6% GR.
 <sup>2</sup> Difference Material Balance values due to rounding errors as well as clean up and chromatographic losses. losses. <sup>3</sup> Values aken from Material Balance.

<sup>4</sup> Samples were lost due to a malfunction of the oxidizer during quantitation of the NER by combustion/LSC.

\_ 0

### **B. MATERIAL BALANCE**

Mean material balances were 99.6% of applied radioactivity [% AR] (range from 95.3 to 103.5% AR) for irradiated samples and 101.9% AR (range from 96.0 to 104.9% AR) for dark samples. The complete material balances found at all sampling intervals for both irradiated and dark samples demonstrated that there was no significant loss of radioactivity dissipated from the test systems or during sample processing.

# C. EXTRACTABLE AND NON-EXTRACTABLE RESIDUES

Extractable residues decreased from 103.4% AR at study start (DAT-0) to 85.6 and 98.4% AR at study end (DAT-11) in irradiated and dark samples, respectively. Non-extractable residues increased from 0.1% AR at DAT-0 to 9.2 and 2.3% AR at DAT-11 in irradiated and dark samples respectively.

# D. VOLATILES

The maximum amount of carbon dioxide was 1.3 and 0.6% AR at DAT 11 in irradiated and dark samples, respectively. Formation of volatile organic compounds was insightficant as demonstrated by values of  $\leq 0.1\%$  AR at all sampling intervals for both irradiated and dark samples.

# E. DEGRADATION OF PARENT COMPOUND

The amount of trifloxystrobin in the soil extracts decreased from 101.0% AR at DAT-0 to 4.2 and 3.5% AR at DAT-11 in irradiated and dark complex, respectively, thus not indicating a significant difference in the rate of degradation. However, the rout of degradation of offloxystrobin differed between irradiated and dark complex with regard to E/Z isomerization.

In irradiated samples, totloxystrobin (EE) isomerized to its E/Z isomers CGA 357261 (ZE) (max. 5.1% AR at DAT-4), GA 357262 (ZZ) and CGA 331409 (EZ) (both max. 1.1% AR at DAT-4 and DAT-7). Trifloxystrobin (EE) and its E/Z isomers, were degraded to CGA 321113 (EE) (max. 57.4% AR at DAT-2) and its E/Z isomers, CGA 73466 (ZE) (max. 35.6% AR at DAT-11), CGA 381348 (ZZ) (max. 6.2% AR at DAT-11) and CGA 473465 (EZ) (max. 3.3% AR at DAT-11) by microbial ester cleavage and E/Z isomerization. Furthermore, NOA 413163 (EE) (max. 0.4% AR at DAT-11), CGA 350276 (E) (max. 1.7% AR at DAT-44) and its E/Z isomer NOA 409480 (Z) (max. 3.5% AR at DAT-11) were formed. The total unidentified residues amounted to a maximum of 3.1% AR with no one component exceeding 1.6% AR at any sampling interval.

In dark samples, trifloxystrobin (*EE*) was degraded to CGA 321113 (*EE*) (max. 91.6% AR at DAT-11) and NOAAI3161 (*ZE*) (max. 9.6% AR at DAT-11). Furthermore, the *E/Z* isomer CGA 357261 (*ZE*) of trifloxystrobin (*EE*) and the *E/Z* isomer CGA 073466 (*ZE*) of CGA 321113 (*EE*) were found with very 16w maximum amounts of 0.4% AR for CGA 357261 (*ZE*) from DAT-0 to DAT-0.33 and 0.6% AR for CGA 373466 (*ZE*) at DAT-11. Both are presumably formed by light during the sample processing. The total unidentified residues amounted to a maximum of 2.0% AR with no one component exceeding 1.6% AR at any sampling interval.

The experimental  $DT_{5}$  and  $DT_{90}$  values of trifloxystrobin in irradiated and dark samples were calculated using single first order (SFO) kinetics (see Table 7.1.1.3-7).

 Table 7.1.1.3- 7:
 Photodegradation
 kinetics
 of
 trifloxystrobin
 in
 soil

 4a according to FOCUS
 4a
 4

					SFO <sup>1</sup>		
Test System	DT50 (exp.) [days]	DT90 (exp.) [days]	Chi <sup>2</sup> Error [%]	Rate Constant [day <sup>-1</sup> ]	DT50 under natural conditions [days]	Net Photodegradation Rate Constant <sup>2</sup> /D <sup>5</sup> <sub>0</sub> [day: 9 days]	
Irradiated	1.3	4.2	13.2	0.55	5.6 (Phoenix, USA) 5.6 (Athens, Greece)		, C 1
Dark	1.7	5.8	4.4	0.40	no conversion		

<sup>1</sup> SFO: single first order

<sup>2</sup> net photodegradation rate constant = rate constant of irradiated samples  $\frac{1}{2}$  for the constant of dark samples

The degradation product M2, formed above the new identification trigger in irradiated samples of soil photolysis study M-033410-01-1 (Baseline Dossier, KCA7/1.1.1.9/01), was identified as NGA 413 63 by the comparison of TLC retardation factors and chromatographic profiles of this study with these of M-033410-01-1 (Baseline Dossier, KCA7/1.1.1.9./01).

Trifloxystrobin was rapidly degraded in soil (experimental half-life of 1.3 days) when being exposed to simulated sunlight in the laboratory. The experimental half-life for dark samples was 1.7 days, resulting in a net experimental photolytic half-life of 4.6 days.

III<sup>®</sup> CONCLUSTONS

The rate of degradation of trithoxystabin (EE) was therefore mainly influenced by biotic processes, but the route of degradation (see figure 1.1.1.) for degradation pathways differed with regard to E/Z isomerization on this summary referred to as "photodegradation products"). In irradiated samples, trifloxystrobin (EE) isomerized to its major E/Z isomer CGA 357261 (ZE) and its minor E/Z isomer CGA 357262 (ZZ). The loxystrobin (EE) and its E/Z isomers were degraded to the major degradation product CGA 321108 (EE) and its major E/Z isomers CGA 373466 (ZE) and CGA 381318 (ZZ) by microbial ester cleavage and E/Z isomerization. CGA 321103 (EE) was observed as the single major degradation product in dark samples. Formation of varbon dioxide was low.

It is concluded that the degradation of the loxy trobin is driven by microbial degradation under typical conditions in the environment and photodegradation plays only a minor role in the overall fate of trifloxystrobin

The results are in good agreement with the proposed photodegradation pathway of trifloxystrobin on soil known from studies included in the Baseline Dossier. The photodegradation product CGA 381318 is newly addressed in soil in this Supplemental Dossier because it was formed above the new identification triggers. The degradation product M2, formed above the new identification triggers in irradiated samples of soil photolysis study M-033410-01-1 (Baseline Dossier, KCA 7.1.1.3 /01), was identified as NOA 413163.

The results are included in the summary of the route of degradation of trifloxystrobin in soil given in section  $\sqrt{7.1}$  and Figure  $\sqrt{2.1-1}$ .

section A 7.1 Cand Figure



### CA 7.1.2 Rate of degradation in soil

CA 7.1.2 Rate of degradation in soil Trifloxystrobin was rapidly degraded in soil under aerobic and anaerobic conditions in the laboratory as well as under field conditions. The kinetic models and DT<sub>50</sub> values in soil of trifloxystrobic and its major degradation products used for modelling purpose and trigger evaluation (best-fit) as well as the formation fractions in soil for major degradation products are summarized in sections CA7.1.2 Vand CA 7.1.2.2.

est scion al conception undwater CPEC () () dealed and the control of the set control of the set () the Dis views and the control of the set () the Dis views and the control of the set () the Dis views and the control of the set () the Dis views and the control of the set () the Dis views and the control of the set () the Dis views and the control of the set () the Dis views and the () trifloxystrobin and its major degradation products in soil (PEC<sub>soil</sub>) groundwater (PEC<sub>g</sub>) and surface acts and k, ., CAM. obin renewa soil and aquat. ing input values for the source of the water (PEC<sub>sw</sub>) were derived from studies and kinetic evaluations (according to FOCUS kinetics  $(2006)^{1}$ ) summarized in sections CA 7.1.1, CA 7.1.2 and CA 7.2, and are submitted within this Supplemental Dossier for the trifloxystrobin renewal of approval. The DF<sub>50</sub> values and maximum occurrences / formation fractions in soil and aquatic systems of trifloxystrobin and its major degradation products used as modelling input values for the calculation of PECs are sumparized in

Table 7.1.2-1:DT50 values and maximum occurrences in soil of trifloxystrobin and its<br/>major degradation products used as modelling input values for calculation<br/>of PECsoil

			~	
Modelling Input Parameter	Endpoint	Comment		<u> </u>
	trifloxystrol	pin (EE)		
DT <sub>50</sub> in soil [days]	1.43	laboratory, non-nor	malised, worst case	
maximum occurrence in soil [%]	100	worst case		A Ó
	CGA 3572	(7F)	, e ,	J. L.
DT <sub>50</sub> in soil [days]	36.9 Å	laboratory, pon-nor	malised worst case	
maximum occurrence in soil [%]	13.5	field, soil surface	plied $$	8 Ó
	CG 3/3211			V V
DT <sub>50</sub> in soil [days]	358.0	laboratory, non-nor	malised, worst case	
maximum occurrence in soil [%]	51.2×	field, soil surface ap	oplied	
Ŵ	ÇGĂ 3734	96 (ZÈ) X ()		
DT <sub>50</sub> in soil [days]	<sup>™</sup> 72.3	laboratory, non-nor	malised worst case	<del>~</del>
maximum occurrence in solut [%]	31.0	held, son Surface ap		¥
	<b>CGA 3813</b>	18 (ZZ)		
$DT_{50}$ in soil [days]	<u> </u>	laboratory, non-nor	malised, worst case	
maximum occurrence in soil [%]@		flaboratory, som pho		
	NOA 4151			
D150 in solution in Stil 196	> 90.0°	haboratory, non-nor	malised, worst case	
	SNOA 4331	53 (PE)		
DE <sub>30</sub> in soil [days]	68,6	Waboratory, non-nor	malised, worst case	
maximum occurrence in soil [24]	6.0	laboratory, sori pho	tolysis	
	Ô.CGA 3572	746 (E)		
DT <sub>50</sub> in soil [days]	<b>79</b> .0	Taboratory, non-nor	malised, worst case	
maximum occurrence in soil [98]	×2.3 ×	field soil incorpora	ted	
	2 NQ 4094	(Z)		
$\mathcal{D}^{\mathcal{T}_{50}}$ in soil [days]	×45.3	laboratory, non-nor	malised, worst case	
maximum occurrence in son [%]		laboratory, soil pho	tolysis	



Table 7.1.2- 2:DT50values and formation fraction / maximum occurrences in soil of<br/>trifloxystrobin and its major degradation products used as modelling input<br/>values for calculation of PECgw

	-		<i></i> ⊘	
Modelling Input Parameter	Endpoint	Comment	<u></u>	
	trifloxystrobi	n ( <i>EE</i> )	, <sup>1</sup> 0 <sup>.</sup>	
DT <sub>50</sub> in soil [days]	0.37	median laboratory an	d field, normalise	d Q A
		Č A	A.	S a
	CGA 357261	(ZE)		
DT <sub>50</sub> in soil [days]	0.13	median laboratory an	d field, normalige	d S
FF trifloxystrobin $\rightarrow$ CGA 357261 in soil	1.000	worst case assumption	n 🗸 🧃	
	CGA 321113	(EE) 2 2	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
DT <sub>50</sub> in soil [days]	<b>4</b> 6.8	biaseoorrected geome	an field, normalis	sed a
FF trifloxystrobin $\rightarrow$ CGA 321113 in soil	0.707	arithmetic mean fuld		
	CGA 373466			
DT <sub>50</sub> in soil [days]	<i>2</i> 0.5 √	bias-corrected geome	an fi <b>glí</b> , normális	sed <sup>O</sup>
FF CGA 357261 $\rightarrow$ CGA 321113 in soft	0.853	arithmetic mean field	<u>, S. S.</u>	, Ôg
	CGA 38130			~
DT <sub>50</sub> in soil [days]	19.2	bias-corrected geome	an laborato©, no	rmalised
maximum occurrence in soil [%]	C 624	Baboratory, soil photo	dysis 🔊	
	NGA 413.001			
DT <sub>50</sub> in soil [days]	38,5%	bias-corrected geome	an field, normalis	sed
FF CGA 321113→ OA 413161 in soil ~	0.145	Darithmetic mean field	×	
	NOA 413463			
DT <sub>50</sub> in soil [@rys]	<u>× 378</u>	median faboratory an	d field, normalise	d
FF CGA 373466→ NOA 413163 f@ soil A	<u>\$</u> \$276 C	arithmetic mean labor	ratory and field	
	CGA 30/27	6 ( <b>É</b> ) .		
DT <sub>50</sub> in soil [days]	50.9	median laboratory an	d field, normalise	d
FF CGA 321113 CGA 35727 in soik	× 9.059	aritionetic mean labor	ratory and field	
	NOA-40948			
DT <sub>50</sub> in soil [days]	33.9	median laboratory an	d field, normalise	d
FF CGA §73466→ NOA, 409480 in soi	<u></u>	arithmetic mean field		
FF. formation fraction				

FF: formation fraction is a first of the second sec

# Table 7.1.2- 3:DT50 values and maximum occurrences in soil and aquatic systems of<br/>trifloxystrobin and its major degradation products used as modelling input<br/>values for calculation of PECsw

Modelling Input Parameter	Endpoint	Comment
trifloxy	strobin ( <i>EE</i>	
$DT_{50}$ in soil [days]	0.37	median laboratory and field, pormalised
DT <sub>50</sub> in water [days]	0.8 🖄	geometric mean
DT <sub>50</sub> in sediment [days]	2.5 🕅	geometriconean
DT <sub>50</sub> in total water/sediment system [days]	147	geometrie mean 🖉 🖉 🤞
max. occurrence in sediment [%]	<u>4</u> 2.3	
CGA	357261 (ZE)	
DT <sub>50</sub> in soil [days]	Ø,13 ×	median Jaboratory and Tield, normalised
max. occurrence in soil [%]	× 3.5 °	field soil subace applied A A
DT <sub>50</sub> in water [days]	1000	default 1 5
DT <sub>50</sub> in sediment [days]	1000	default y by a s
DT <sub>50</sub> in total water/sediment system [days]	¥000	default of a construction of the construction
max. occurrence in total water/sediment system [%]		not a major degradation product in water/second systems
max. occurrence in aquatic systems [%]	\$07.5	aqueous photonsis 0
CGA	<sup>'0°</sup> \$\$7262 ( <i>ZZ</i> )	
DT <sub>50</sub> in soil [days]	1000	default no major degradation product in soil
max. occurrence in soil [%]	00_ ć	no major soil degradation product
DT <sub>50</sub> in water [days]		def@lt 🖉 🏏
DT <sub>50</sub> in sediment [da@]	1000	default y
DT <sub>50</sub> in total water sediment system [days]	-\$ <b>100</b> 0	defaulty
max. occurrence in total water/sediment system [%]		no major degradation product in water/sediment systems
max. occurrence in aquatic systems [6%]	167	Aqueousphotolysis
CGA	320113 (EE	
$DT_{50}$ in soil [days] $\sqrt{2}$ $\sqrt{2}$	× 4648§	bias-corrected geomean field, normalised
max. occurrence in Soil [%]	5¶.2 🍖	field, soil surface applied
$DT_{50}$ in water [days] $Q^{*}$ $S^{*}$ $Q^{*}$	Q209.7 Q	geometric mean
$DT_{50}$ in sediment [days]	€ 502.2 <sup>®</sup>	geometric mean
DT <sub>50</sub> in total water/sediment system [days]Q	38820	geometric mean
max. occurrence in total water/sediment system [%]	×100	
max. occurrence in aquatic systems [%]	$0^{9}100$	100% aerobic mineralisation surface water
	Ý	100% in hydrolysis (pH 9 and 25 °C) $57.40$ in success 1 ( 1 1 1
		5/.4% in aqueous photolysis1
GA CONTRACTOR	373466 ( <i>ZE</i> )	
DT <sub>50</sub> in soil [stays]	20.5	bias-corrected geomean field, normalised
max. occurrence in soil [%]	31.0	field, soil surface applied
DT <sub>50</sub> in water [days]	1000	default
DT <sub>50</sub> in sedimont [days]	1000	default
DT soin total water/sediment system [days]	1000	default
max. occoprence in total water/sediment system [%]	0	no major degradation product in water/sediment systems
max. occurrence in aquatic systems [%]	34.7	aqueous photolysis

# Table 7.1.2- 3 (continued)

Modelling Innut Parameter	Endpoint	Comment 🔊
	381318 (77)	
	$\frac{100}{2}$	
$DT_{50}$ in soil [days]	19.2	bias-corrected geomean Asboratory,
max. occurrence in soil [%]	6.2	laboratory, soil photolysis
DT <sub>50</sub> in water [days]	1000 ്ര	default
DT <sub>50</sub> in sediment [days]	1000	default
DT <sub>50</sub> in total water/sediment system [days]	1000	default 0 x x x
max. occurrence in total water/sediment system [%]	40	no major degradation product ju
max. occurrence in aquatic systems [%]	<sup>v</sup> 0	water/sediment and quatic systems
NO	≪ 413169 ( <i>ZE</i> )	
DT <sub>50</sub> in soil [days]	×38.7 Û	bias-forrected geomean field normalised 1,
max. occurrence in soil [%]	5.7	field, soil surface spplied
DT <sub>50</sub> in water [days]	1000	default of by the state
DT <sub>50</sub> in sediment [days]	×4000 ×	default
DT <sub>50</sub> in total water/sediment system [days]	×1000	detault 5 5 6
max. occurrence in total water/sediment system [%]	Í Q	no major degradation product in
max. occurrence in aquatic systems [%] 🛒 💦		water/sediment and aquatic systems
Č ( ČOA	4 <b>1,3163 (</b> EE)	
DT <sub>50</sub> in soil [days]	37.8	median aboratory and field, normalised
nax. occurrence in soil [%]	\$0.0 C	Maboratory, son photolysis
DT <sub>50</sub> in water [days]		defailt ky
DT <sub>50</sub> in sediment [da@]	1000	default 🔍 🔗
DT50 in total water sediment system [days]	<u> ∿Î\$000</u>	default
max. occurrence w total water/sediment system [1%]	_√y″0 _ <sup>~</sup>	no major degradation product in
max. occurrence in aquatic systems [%]		water/sediment and aquatic systems
	357276 (E)	
DT <sub>50</sub> in soil [days] . O S	<sup>™</sup> 50.9∜√	median laboratory and field, normalised
max. occurrence in soji?[%] 🕻 🎽 🖉 🖉	, <sup>≫</sup> 2%3	fæld, soil incorporated
DT <sub>50</sub> in water [days) $\sqrt{2}$	1600 🦓	default
DT <sub>50</sub> in sediment [days] $0^{3}$ $5^{3}$ $0^{3}$	St000 S	default
DT50 in total water/sediment system [days]	₩ 1000 <sup>°0°</sup>	default
max. occurrence in total water/sediment system [%	P	no major degradation product in
	, KŬ	water/sediment systems
max. occarrence in aquatic systems [%]	<sup>×</sup> ¥10.4	hydrolysis (only at pH 7 and 60 °C)
NON NON	ý 409480 (Z)	
DT <sub>50</sub> in soil [days]	35.9	median laboratory and field, normalised
nax. occurrence in soil [%]	9.3	laboratory, soil photolysis
DT <sub>50</sub> in water [days]	1000	default
DT <sub>50</sub> in section ment drays]	1000	default
DT50 in Otal water/sediment system [days]	1000	default
nax. occurrence in total water sediment system [%]	0	no major degradation product in
	0	water/sediment and aquatic systems

<sup>C</sup>O<sup>S</sup>

# Table 7.1.2- 3 (continued)

viouening input rarameter	Enderstat	Commont
	Enapoint	I Comment
CGA 10	/170 (volati	
DT <sub>50</sub> in soil [days]	1000	default, no major degradation product in soil
max. occurrence in soil [%]	0	no major soil degradation product
DT <sub>50</sub> in water [days]	1000	default v v v v
DT <sub>50</sub> in sediment [days]	1000 (5	default x x x
DT <sub>50</sub> in total water/sediment system [days]	1000%	default of the second s
max. occurrence in total water/sediment system [%]		no major degradation product inter water sediment systems
max. occurrence in aquatic systems [%]	\$ 53.8	acueous photolysis (39.5% in hydrolysis only at pH/S and $\gtrsim 40^{\circ}$ C)
2-hydroxym	ethylbenzô	nitrileo A A
DT <sub>50</sub> in soil [days]	1000	default, no major degradation product in Coil
max. occurrence in soil [%]	r Dy	po major soil degradation product
DT <sub>50</sub> in water [days]	4000 ×	default
DT <sub>50</sub> in sediment [days]	§1000	default a la la
DT <sub>50</sub> in total water/sediment system [ays]	1000	default
max. occurrence in total water/sediment system [%]		no major degradation product in water sediment systems
max. occurrence in aquatic systems [%]	£ 20.1	aquisous photolysis



### **Document MCA: Section 7 Fate and behaviour in the environment** Trifloxystrobin

Report:	KCA 7.1.2 /01; ; ; ; 2013
Title:	Derivation of Kinetic Input Parameter of Trifloxystrobin and its Metabolites for
	Soil Risk Assessment in the EU
Report No:	EnSa-13-0895
Document No:	M-469501-01-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>
	- FOCUS kinetics (2011) <sup>2</sup>
	- EFSA kinetics $(2010)^3$
GLP:	No V Q Q Q X
Justification:	New data / guideline requirement:
	Derivation of kinetic modelling input values for calculation of predicted
	environmental concentrations of trifloxystrobin and its major degradation
	products in soil

# **Executive Summary**

The DT<sub>50</sub> values and maximum occurrences in of truloxystrobin and its major degradation SOR products used as modelling input values for the calculation of predicted invironmental concentrations in soil (PEC<sub>soil</sub>) are summarized in Table 70.2-1.

METHODS

DT50 values and maximum occurences in soil of trifloxystrobin and its major degradation products used as modelling input values for the calculation of predicted environmental concentrations in soil (PEC<sub>soil</sub>) were derived from studies and kinetic evaluations (according to FQCUS kinetics (2006)<sup>1</sup>) summarized in sections CA 1.1 and CA 7, 1.2.

Modelling input Values for the DT 50 values in soil wore degived from laboratory studies (see section CA 7.10.1). The DT<sub>50</sub> values were calculated as DT<sub>20</sub>3.32 in case of the first order multi compartment kinetio model and from the slow & rate or case of the double first order in parallel and hockey stick kinetic models. The worst case DT50 values of triflory strobin and its major degradation products were used as modeling input values for the calculation of PEC<sub>soil</sub>. The DT<sub>50</sub> values were averaged (geometric/means) for the same soil types. Box and whisker plot analyses of the individual DT<sub>50</sub> values were performed in cases where DT<sub>50</sub> values were clearly outside a 3-sigma range. Additional outlientests were performed in these cases for the soil averaged DT50 values (geometric means) based on Grubbs' test also called the ESD method (extreme studentized deviate), to determine whether the most extreme calues are significant outliers (t-test < 0.05) from the other values.



FOCUS Gunetics (2011) "Generic Guidance for Estimating Persistence and Degradation Kinetics from Environmental Fate Studies on Pesticides in EU Registration", version 1.0, 436 pp., 23 November 2011.

3 EFSQ kinetics (2010): "Guidance for evaluating laboratory and field dissipation studies to obtain DegT<sub>50</sub> values of plant protection products in soil", EFSA Panel of Plant Protection Products and their Residues (PPR), European Food Safety Authority (EFSA), Parma, Italy, EFSA Journal, 2010, 8 (12), 1936.



Modelling input values for the maximum occurrences in soil of major degradation products have been selected based on the available data from laboratory and field dissipation studies exections CA 7.1.1 and CA 7.1.2.2.1) in the following order:

- 1. maximum occurrence under field conditions in presence of light after soil surface application of trifloxystrobin
- 2. maximum occurrence under field conditions after soil incorporation of trifloxystobin
- 3. maximum occurrence under laboratory condition

The observed maximum occurrences in soil of major degradation products after soil incorporation are worst case for field conditions in presence of light as the photodegradation route is suppressed due of soil incorporation. The maximum occurrences in soil of major degradation products under field conditions are given as applied trifloxystrobin equivalents and are referenced to the recovered residues at day 0.

Table 7.1.2- 4:	Maximum	occurrences	in soil of	major 2	trifloxy	robin deg	radation
	products (e	xpressed as pe	xcentage of t	he applie	d parent	equivalent	)

	$\sim$			Cĩ 🍾
	Laborate	ury Studžes 🦂	Field Dispipation	@Studies
	j Djark 🖒	Photolysis <sup>O</sup>	Soil Incorporation (Dark)	Presence of Light
Degradation Product	<sup>%</sup> [%]&	[%]∛		[%]
CGA 357261 (ZE)	<u> </u>	õ 15 o		K 13.5 <sup>1</sup>
CGA 321113 (EE)	<sup>7</sup> 94,8	\$ <b>7</b> .4 0	<sup>™</sup> 6 <sup>№</sup> 698.5 <sup>™</sup> 6	51.2 <sup>1</sup>
CGA 373466 ( <i>ZE</i> )	\$~ \$	42.5		<b>31.0</b> <sup>1</sup>
CGA 381318 (ZZ)	- 2	<b>6.2</b> ₺ <sup>℃</sup>		-
NOA 413161 (2)	13,6	$\langle \rangle^{*} \sim \langle \rangle^{*}$		5.7 <sup>1</sup>
NOA 41316 (EE)	× &	<b>6</b> .0 <sup>1</sup>		-
CGA 357076 (E)	<u>5.6</u> O	1.7	2.3 <sup>1</sup>	-
NOA 4099480 (Z)	-0	9,3,¥		-

<sup>1</sup> maximum occurrences in **bold** used as modelling input values

* *		$\sim$
Table 7 1 2- 5.	sol@of twiflowwet	rohin/mon_normalised)
1 abit 7.1.2- 3.	I SUIPS UI LIQUIUNYS G	(unit (unit-not manscu)

			,	
~		(USDA)	DT50 [days]	
.4		loam	1.43	
, AND NO TO THE TOT TOT THE TOT TOT TOT TOT TOT TOT TOT TOT TOT TO		ر 🖉 silt loam	0.93	
		$\sim 0^{3}$ loamy sand	0.83	
A CONTRACTOR		loamy sand	0.70	
* ¥		sandy loam	0.90	
~		sandy loam	0.80	
Ó		sandy loam	70.8 <sup>1</sup>	
Ĺ		sandy loam	0.24	
	, O	sandy loam	0.37	
star and a star	y 4a	silt loam	0.52	
15 B	O's	clay loam	0.53	
	modell	1.43		
<u>e</u>	1 outlier not considered for selection of worst age DT for DEC - seleculation			

<sup>1</sup> outlier not considered for selection of worst case DT<sub>50</sub> for PEC<sub>soil</sub> calculation

DT<sub>50</sub> values in soils of CGA 357261 (non-normalised) Table 7.1.2- 6: Soil Texture **DT**50 (USDA) [days] **Q**.08 sandy loam 36.9 sandy loam 4a silt loam 2.45 0.24 clay loam 36.9 Ø modelling input value (worst case) DT<sub>50</sub> values in soils of CGA 321113 (non-normalised) Ý. Table 7.1.2-7: Textore DT Soil (USPA) [days] @oam 🖓 257.2  $\bigcirc$ © 143.¢ silt loann 755 🔊 1 loamy sand loandy sand 198.1 ) 358.0 sandy loam Sandy Dam 162.5 sandy loans loams sand 2Ŷ.4 ¢70.1 sandy loana 71:6 sandy loam silt doam « 55,5 4a Table 7.1.2- 8. DT<sub>56</sub> Values in soil a considered for selection of worst case DT<sub>5</sub> for PEC oil calculation 77.4 Testure **DT**50 ŞØ (USDA) [days] sandy loam 31.3 sand 44.6 Ô 44.7 soft loam O 72.3 冷 lay loam modeling input value (worst case) Ì 72.3 Q, DT 50 yalues in soils of CGA 381318 (non-normalised) Table 7.1.2- 9: Soit Texture **DT**<sub>50</sub> Q, (USDA) [days] 11.9 sandy loam 22.8 loamy sand silt loam 22.8 4a 20.4 loam Ś modelling input value (worst case) 22.8

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Table 7.1.2-10:



DT<sub>50</sub> values in soils of NOA 413161 (non-normalised)

The worst case  $DT_{50}$  values and maximum occurerences in soil of trifloxystrobin and its major degradation products used as modelling input values for the calculation of predicted environmental concentrations in soil (PEC<sub>soil</sub>) were derived from laboratory and field dissipation studies. The results are summarized in Table 7.1.2-1.


## Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

KCA 7.1.2 /02; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
Derivation of Kinetic Input Parameter of Trifloxystrobin and its Metabolites for
Groundwater Risk Assessment in the EU
EnSa-13-0894
M-469352-01-1
- FOCUS kinetics (2006) <sup>1</sup>
- FOCUS kinetics (2011) <sup>2</sup>
- EFSA kinetics (2010) <sup>3</sup>
- EFSA Q <sub>10</sub> (2007) <sup>4</sup>
- FOCUS groundwater (2009) 5 $\sqrt{2}$
- FOCUS groundwater (2012) $^{6}$
No $\mathcal{O}^{\mathcal{O}^{\mathcal{V}}}$ $\mathcal{O}^{\mathcal{O}^{\mathcal{V}}}$ $\mathcal{O}^{\mathcal{O}^{\mathcal{V}}}$ $\mathcal{O}^{\mathcal{O}^{\mathcal{V}}}$
New data / guideline requirement:
Derivation of kinetic modelling input values for calculation of predicted
environmental concentrations of traffoxystrobin and its major degradation
products in groundwater is in a set of the s

### **Executive Summary**

The DT<sub>50</sub> values and formation fractions, maximum occurences in soll of to floxy trobin and its major degradation products used as modelling input values for the calculation of predicted environmental concentrations in groundwater ( $PEC_{gw}$ ) are summarized in Table 1.2-2.

**METHODS** 

 $DT_{50}$  values and formation fraction / maximum occurrences in soil of trifloxystrobin and its major degradation products used as modelling input values for the calculation of predicted environmental concentrations in groundwater (PEC<sub>gw</sub>) were derived from studies and tonetic evaluations (according to FOCUS kinetics (2006)<sup>1</sup>) summarized interctions CA 7.1.1 and CA 7.1.2.



- <sup>4</sup> EFSA Q<sup>6</sup> (2007). "Sciontific Opinion of the Panel on Plant Protection Products and their Residues on a requestorem ESA related to the default Q<sub>10</sub> value used to describe the temperature effect on transformation rates of pesticides in soil", 40 SA Journal, 622, 1-32.
- <sup>5</sup> FOCUS groundwater (2009): "Assessing Potential for Movement of Active Substances and their Metabolites to Ground Water in the EU", Final report of the Ground Water Working Group of FOCUS (FOrum for the Co-ordination of pesticide fate models and their USe). vers. 1, 13. June 2009, EC Document Reference SANGO/13144/2010, v1.
- <sup>6</sup> FOCUS groundwater (2012): "Generic guidance for Tier 1 FOCUS groundwater water assessments", version 2.1, 64 pp., December, 2012.



Degradation rates in soil from laboratory studies (see section CA 7.1.2.1) were normalised to 20 °C and field capacity using the  $Q_{10}$  rule (based on the Arrhenius equation and a default  $Q_{10}$  factor of 258) and the Walker equation (default value of 0.7 for the moisture exponent), respectively. The field dissipation data were normalised before performing kinetic analysis using the time-step normalisation (see section CA 7.1.2.2). The  $DT_{50}$  values were averaged (geometric means) for the same soil types. In order to select the relevant population to calculate the modelling input DT<sub>50</sub> values, the null hypothesis that laboratory and field dissipation values are equal, was tested. The statistical some of differences in the laboratory and field dissipation DT<sub>50</sub> values was checked with Student's trest at a 5% significance level. If the t-test value (t) was lower than the t-quantife of t-distribution (top, 1-a), the null hypothesis was not rejected and the  $DT_{50}$  values were pooled from both aboratory and field  $\square$ dissipation studies. If the null hypothesis was rejected, the DT50 galues from freid dissipation studies were used as modelling input values for the calculation of PECgw. For the major degradation product CGA 381318, only laboratory DT<sub>50</sub> values and maximum ocorrrence in soil were available and used as modelling input values for the calculation of  $PEC_{0}$ ? If  $\geq 0$  DT  $_{0}$  values were vailable, the median DT<sub>50</sub> value in soil was used as modelling input value. If Jess than 10 DF<sub>50</sub> values were available, the bias-corrected geometric mean as estimator of the median was used as modelting input value.

The formation fractions of major degradation products were averaged (a) the metric means) for the same soil types. The modelling input formation fractions in set of major degradation products used for the calculation of  $PEC_{gw}$  were selected based on the outcome of the population test for aboratory and field dissipation  $DT_{50}$  values.

10 /.1.2- 14	eapacity)		ioxystroi پ چ		(normalised to 20)	<sup>PC</sup> and
L	aboratory@Field^ Study		SốH/ Si	te S	(USDA)	DT50 [days]
ð	′ Laboratory	0			boam .	0.99
, Ø	Laboratory 🚽	P A		°	silt loam	0.37
	Laboratory				Noamy sand	0.31
R <sup>a</sup>	Laboratory		0	*	loamy sand	0.28
	Laporatory	Q %		× ^	sandy loam	0.33
	aboratory		4		sandy loam	0.18
a	, Laboratory	Ô.			sandy loam	2.83
~Q°	Laboratory				sandy loam	0.13
A	Laboratory 🕺	) í			sandy loam	0.15
	Laboratory Q			4a	silt loam	0.18
	Laboratory	$\sum$			clay loam	0.30
*) *	Field S 2	, Q			Loam	1.13
<i>.</i>	, Field G				sandy loam	1.66
Å	Field O	2	<i>Q</i>		silt loam	1.69
	Field				silt loam	2.73
	S Field S	,			Loam	1.10
	Field				silty clay loam	2.49
				mo	delling input value	0.37 <sup>1</sup>

#### Table 7.1.2-15: DT<sub>50</sub> values of CGA 357261 in soils (normalised to 20 °C and field capacity)

Laboratory / Field Study	Soil / Site	Texture (USDA)	DT50 [days]	
Laboratory		sandy loam 🔗	0.06	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Laboratory		sandy loam	0.07 "	
Laboratory	4a	silt loam	$0.08^{\circ}$	
Laboratory	· B	clay foram	0,44	S &
Field	ÿ	Qam	Ø.09	
Field		sandy loam	0.61	Ň ×
Field		Silt loam	0.42	
Field		Silt Ioam	<u>_</u> √1.35	
Field		Loam	©0.95°	K, <sup>™</sup>
Field		sity clay foam	0.88	A co
		odelling input vatue	0.P3 <sup>1</sup>	

 $\bigcirc$ 



2	and	field	cap	acity)
		$\sim$	120	°Če

	~				<i>"</i>
Laboratory / Field	"Soil /2	Site	Texture	<b>DT</b> 50	✓ Formation
Study	w y			[days]	Fraction
laboratory	Ô	, <sub>Q</sub>	loam 🔊 💦	299.0	0.822
laboratory			🖓 🚮t loam 🗸	<b>8</b> C.Ö	0.971
laboratory			oamy sand 🌾	°~ <b>40</b> 6.8	0.944
laboratory 🦉		Č,	$\sim$ loamy sand $\circ$	105.2	0.961
laboratory	NOY .	.~	🔊 saabady loanha 🦉	206.3	0.946
laboratory	ð - ×		🖉 🔍 sandy Qam 🛷	80.4	0.979
laborato		× . Ø	sand loan loam sand	219.5	0.983
laboratory		P	o sandy loam	70.8	0.917
laboratory	õ		🖓 🔨 Sandy Loam	72.3	0.996
laboratory 🌮		***	silt Agam	52.0	0.973
laboratory 🍣	~~~		o clay loam	78.1	0.961
field 🖉	<i>A</i>		loam	52.4	0.680
field	Ó Č		sandy loam	24.7	0.830
field			Silt loam	53.0	0.556
field			🗸 silt loam	95.8	0.688
Field			∛ loam	23.7	0.488
, K field			silty clay loam	79.8	1.000
$\sim$	TO TO	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	modelling input value	<b>46.8</b> <sup>1</sup>	0.707 <sup>2</sup>



Table 7.1.2- 17:	DT <sub>50</sub> values and formation fractions of CGA 373466 in soils (normalise				
	20 °C and field capacity)	Q	ð		

					S
Laboratory / Field	Soil / Site	Texture	<b>DT</b> 50	Formation	"O"
Study		(USDA)	(days]	Fraction	
laboratory		sandy loam	<sup>10</sup> 31.9	0.980	\$
laboratory		sandy loam	45.5	0 <sup>°</sup> 1.000 <sup>°</sup>	Q J
laboratory	4a	🖉 silt loam	43.2	1 4,000 \$	- Q
laboratory		clay loam Q	73.7	A.000	Å
field		loam	6.80	Q 0.646	5
field		sandy loam 🔊	8%.57	لم 1. <b>00</b> 0 لم	/
field		silt Isam 🖉	~~29.1 <sub>0</sub> 0	<b>@</b> .618	
field		©° sith loam≪ √	90 <b>,0</b>	՟∼> 1.00€	
field	0.	loam of	1 <b>0</b> #.5	0,860	
field		silty claysloam	≈56.1 <sup>©</sup>	d.000 0	
	<u> </u>	modelling input value	<sup>)</sup> 20.5 <sup>↓</sup>	0.853	

bias-corrected geometric mean (n = 6) from field dissipation  $\mathcal{D}T_{50}$  values arithmetic mean (n = 6) from field dissipation formation fractions  $\mathcal{D}$ 1

2

Table 7.1.2- 18:	DT <sub>50</sub> values and formation	fractions	CGA 381398	in soils (normalised to
	20 °C and field capacity)	O L		

		×	Č, K		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<i>.</i> (	ð .	
Laboratory / Field		SQ1 <sup>°</sup> / S	Site C	۰. م	Texture		DT	Formation
Study	- %	1	a de la comercia de l	a, <sup>y</sup>	QUSDA)	s s s s s s s s s s s s s s s s s s s	days	Fraction
laboratory	21			) N	sandy Joam 🖇		×12.2	N/A
laboratory 🦉	¥		, S	Z 2	loamy sand $^{\bigcirc}$		23.5	N/A
laboratory			₽a	Č S	salt loam		23.5	N/A
laboratory	ð				clay loam	Ś	32.0	N/A
		0	V Q	mo	lelling inpu	value	<b>19.2</b> <sup>1</sup>	6.2 <sup>%</sup> <sup>2</sup>

# N/A: not applicable <sup>1</sup> bias, corrected geometric mean (n = 0 from laboratory DF, walues) <sup>2</sup> maximum occurrence in soluphotolysis study M-402074-01-1 (Supplemental Dossier, KCA 7.1.1.3 /04) **Table 7.1.2- 19:** DT<sub>50</sub> values and formation fractions of NOA 413161 in soils (normalised to 20 °C and field capacity) Table 7.1.2- 19:

		<u>~</u> `~	~		
Laboratory / Field	Soul / Sit		<b>Texture</b>	DT50	Formation
Study			≪J <sup>™</sup> (USDA)	days	Fraction
laboratory			✗ loamy sand	221.1	N/A
🗸 🖓 aboratory 🛷		Ž	sandy loam	90.4	0.135
<sup>9</sup> laboratory	1 Contraction of the second se	$\supset^{\mathbf{v}}$	sandy loam	48.6	0.164
laboratory		4a	silt loam	70.1	0.132
laborat@y 🚿			clay loam	51.5	0.213
field	O N		loam	66.1	0.071
affeld a			sandy loam	30.7	0.263
field			silt loam	- 3	_ 3
s field O			silt loam	26.0	0.078
🚿 Keld	()		loam	34.9	0.259
Öfield			silty clay loam	50.8	0.055
			modelling input value	38.7 <sup>1</sup>	0.145 <sup>2</sup>

N/A: not applicable

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- 1 bias-corrected geometric mean (n = 5) from field dissipation  $DT_{50}$  values
- 2 arithmetic mean (n = 5) from field dissipation formation fractions
- 3 value excluded due to unreliable statistical parameters

DT<sub>50</sub> values and formation fractions of NOA 413163 in soils (normalised to Table 7.1.2-20: 20 °C and field capacity)

			"U"	
Laboratory / Field	Soil / Site	Texture 📣	DT <sub>50</sub>	Formation
Study		(USDA)	[days]	Fraction
laboratory		sandy loam	<u>69.3</u>	@?229 @
laboratory		sandy loan	54.6	20.24 C
laboratory	4a	silt loam / sandy loam	39.1	. 0.162
laboratory		clay loam / loam	Q7.7, Ó	<b>A</b> .260
field		loam y	53:2	
field		🖉 sándy loason 🖉	8 <b>%</b> Ă	0.457
field	4	silt logm	. 29.9 <i>č</i>	∑ 0, <del>,</del> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
field		silt loam A	<sup>36.5</sup>	Ø.185
field		Joam of the	2502	≪ 0.3 <b>3</b> €°
field		sitty clay toam	8.7	0.115
		🧡 modelling/input@alue	37.8	<b>0.276</b> <sup>2</sup>

median (n = 10) from laboratory and field dissipation  $OT_{50}$  values

arithmetic mean (n = 9) from Caboratory and field dissipation fractions 2

value excluded due to unreliable statistical parameters 3

DF values and formation fractions of CGA 357276 in soils (normalised to 20 °C and field capacity) Table 7.1.2- 21:

S <sup></sup> 0 <sup>_</sup>			L.	
Laboratory / Field よ St Study ふ く	))/ Sine	Texture	DT50 [days]	Formation Fraction
laboratory	l l l	sandy Sam	65.9	0.043
laboratory		loanny san Sandy Goam	71.2	0.027
laboratory	Žа	gjilt loamo	69.2	- 3
latoratory		loam v	21.4	_ 3
field		🔬 Loam	36.5	0.072
field	~ ^ ~	○ sandy loam	80.2	0.098
field		Silt loam	36.1	0.062
field		silt loam	- 3	_ 3
field		loam	45.5	0.077
field & S		silty clay loam	76.5	0.032
		modelling input value	50.9 <sup>1</sup>	0.059 <sup>2</sup>

N/As not applicable (n = 9) from laboratory and field dissipation DT<sub>50</sub> values

2 arithmetic novan (n = 7) from laboratory and field dissipation formation fractions

- arithmetic mean (n = 7) from laboratory and field dissi <sup>3</sup> value excluded due to unrefiable statistical parameters

ð

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Table 7.1.2- 22:	DT <sub>50</sub> values and formation fractions of NOA 409480 in soils (	normalised to
	20 °C and field capacity)	Q

					S
Laboratory / Field	Soil / Site	Texture	<b>DT</b> 50	Formation	"Or
Study		(USDA)	(days]	Fraction	
laboratory		sandy loam	42.8	N/A Y	~
laboratory		sandy loam	37.1	O'N/40	Q,
laboratory	4a	🖉 silt loam 🔗	23.5		- Ø
laboratory		clay loam Q	15.2	N/A V	Å
field		loam L	97,3	Q 0.006	$\langle \rangle$
field		🗳 sandy loom 🊕 °	<b>\$</b> 5.5	0.641	,
field		silt/boam 🖉	<sup>~</sup> ∕84.7∖0	Ø.025 Ø	
field	×.	©° sitte¶oam∠ √	° 11 Ôr	°∼y - <sup>3</sup> √y	
field	. O´,	loam a	<b>1</b> 8.1	0, <u>0</u> 35	
field	A of	Silty clay loam	<sub>≁©</sub> 29.7 ©	Q035 J	
	× .~	modelling input value	35.9	<b>0.028</b>	

N/A: not applicable <sup>1</sup> median (n = 10) from laboratory and field dissipation DT<sub>50</sub> values <sup>2</sup> arithmetic mean (n = 5) from field dissipation formation fractions <sup>3</sup> value excluded due to unreliable statistical parameters <sup>4</sup> **III: CONCLUSIONS** <sup>5</sup> **CONCLUSIONS** <sup>6</sup> **CO** 

The DT<sub>50</sub> values and formation fractions / maximum occurrences in sou of trifloxystrobin and its major degradation products used as modelling input values for the calculation of predicted environmental concentrations in groundwater (PEC.5) were derived from laboratory and field dissipation studies the results are summarized in Table 7.1.3 (2).



## Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2 /03; ; ; ; ; ; ; 2013
Title:	Derivation of Kinetic Input Parameter of Trifloxystrobin and its Metabolites for
	Surface Water Risk Assessment in the EU
Report No:	EnSa-13-0930
Document No:	M-469771-01-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>
	- FOCUS kinetics (2011) <sup>2</sup>
	- EFSA kinetics (2010) <sup>3</sup>
	- EFSA Q <sub>10</sub> (2007) <sup>4</sup>
	- FOCUS surface water (2003) $7 \sqrt{2}$
	- FOCUS surface water (2012) A Q A A A A
GLP:	No $\mathcal{O}^{\mathcal{O}}$ $\mathcal{O}$ $\mathcal{O}^{\mathcal{O}}$ $\mathcal{O}^{\mathcal{O}}$ $\mathcal{O}^{\mathcal{O}}$
Justification:	New data / guideline requirement:
	Derivation of kinetic modelling input values for calculation of predicted
	environmental concentrations of traffoxystrobin and its major degradation
	products in surface water in the second

### **Executive Summary**

The DT<sub>50</sub> values and maximum occurences in soil and quatic systems of to floxy trobin and its major degradation products used as modelling input values for the calculation of predicted environmental concentrations in surface water ( $PEC_{sw}$ ) are summarized in Table 7.1.2-9.

METHODS

 $DT_{50}$  values and maximum occurences in soil and aquatic systems of trifloxystrobin and its major degradation products used as modelling input values for the calculation of predicted environmental concentrations in surface water (PEC<sub>sw</sub>) were derived from studies and kinetic evaluations (according to FOCUS kinetics (2006)<sup>1</sup>) summarized interctions CA 7.1.1, (A 7.1.2 and CA 7.2.



- <sup>7</sup> FOCUS Surface Water (2003): "FOCUS Surface Water Scenarios in the EU Evaluation Process under 91/41/EC", Report of the FOCUS Working Group on Surface Water Scenarios. EC Document Reference SANCO/4802/2001-rev2.
- <sup>8</sup> FOCUS surface water (2012): "Generic Guidance for FOCUS Surface Water Scenarios", version 1.2, 357 pp., December 2012.



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Degradation rates from laboratory studies in soil (see section CA 7.1.2.1) were normalised to 20 °C and field capacity using the  $Q_{10}$  rule (based on the Arrhenius equation and a default  $Q_{10}$  factor of 258) and the Walker equation (default value of 0.7 for the moisture exponent), respectively. The field dissipation data were normalised before performing kinetic analysis using the time-step normalisation (see section CA 7.1.2.2). The DT<sub>50</sub> values were averaged (geometric means) for the same soil types and water/sediment systems. In order to select the relevant population to calculate the modelling mput  $DT_{50}$  values, the null hypothesis that laboratory and field dissipation values are equal, was tested. The statistical significance of differences in the laboratory and field dissipation DT<sub>50</sub> values was checked with Student's t-test at a 5% significance level. If the t-test value (t) was lower than the t-quantile of tdistribution (tdf, 1- $\alpha$ ), the null hypothesis was not rejected and the  $D_{50}^{\gamma}$  values were pooled from both laboratory and field dissipation studies. If the null hypothesis was ejected, the DT 50 yalues from field dissipation studies were used as modelling input values for the calculation & PECO. For the major degradation product CGA 381318, only laboratory DT56 values and maximum occurrence in soffwere available and used as modelling input values for the calculation of  $PEC_{50}$ . If  $\geq 00 \text{ DT}_{50}$  values were available, the median DT50 value in soil was used as mode ling input value. If less that 10 DT50 values were available, the bias-corrected geometrie mean as estimator of the median was used as modelling input value.

Modelling input values for the maximum occurrences in soil of major degradation products have been selected based on the available data from laboratory and field dissipation studies (see sections CA 7.1.1 and CA 7.1.2.2.1) in the following order:

- 1. maximum occurrence under field conditions in presence of light after soil surface application of trifloxystrobin
- 2. maximum occurrence under field conditions after foil incorporation of maloxystrobin
- 3. maximum occurrence under Jaboratory conditions O

The observed maximum occurrences in soil of major degradation products after soil incorporation are worst case for field conditions in presence of light as the photod gradation route is suppressed due to soil incorporation. The maximum occurrences of major degradation products in soil under field conditions are given as applied transversion equivalents and are referenced to the recovered residues at day 0,  $\sqrt{2}$ ,  $\sqrt{2}$ ,

 $DT_{50}$  values and maximum occurrences from water/sediment studies were only available for trifloxystrobin and its major degradation product CGA 321113 (see section CA 7.2). The geometric means of  $DT_{50}$  values in wher, sediment and total system were used as modelling input values. Modelling input values for the maximum occurrences of major degradation products in aquatic systems were derived from studies sumparized in section CA 7.2.





#### II. RESULTS

Table 7.1.2- 23:	Maximum occurrences in soil of major trifloxystrobin degradation	111
	products (expressed as percentage of applied parent equivalent)	

	Laborate	ory Studies	Field Dissipatio	n Studies
	Dark	Photolysis	Soil Incorporation (Dark)	Presence of Fight
Degradation Product	[%]	[%]	<u>(%)</u>	
CGA 357261 (ZE)	-	15.5	- <sup>Q</sup>	
CGA 357262 (ZZ) <sup>1</sup>	-		с, <u>-</u> 0 <sup>°</sup>	
CGA 321113 (EE)	96.8	57.4 <sub>4</sub> 0	۲ <b>۶</b> ۶.5	51.2
CGA 373466 (ZE)	-	42.5		
CGA 381318 (ZZ)	-	6.2 <sup>£</sup>		
NOA 413161 (ZE)	13.6			∑ <sup>∞</sup> <sup>∞</sup> <sup>5</sup> .7 <sup>2</sup> <sup>∞</sup>
NOA 413163 (EE)	-	6.0 <sup>2</sup>		
CGA 357276 (E)	5.6	1.7.		
NOA 409480 (Z)	-	S 9,3 V		
CGA 107170 (volatile) <sup>1</sup>	- Q			7 <u>5</u> - 0
2-hydroxymethyl-	0`	~ ~ ~	N N - N N	
benzonitrile <sup>1</sup>	Q.			
1 / 1 1/1	1 · · · · ·			

<sup>1</sup> not a major degradation product in soil

 <sup>1</sup> not a major degradation product in soil
 <sup>2</sup> maximum occurrences in **bold** used as modelling input values ,Ô Ľ

**K** Maximum@ccurrences in aquatic systems of triflosystrobin and its major Table 7.1.2-24: degradation products texpressed as percentage of applied parent equivatent) 0 Õ a.

Õ

			/	
\$. O	>Water/Sediment	, Aerobic Mineralisation	Photolysis	Hydrolysis
DegradationProduct	🖇 🔬 [%] 🕎 💈		[%]	[%]
trifloxystepbin (EE)	42.3Qin settiment)		-	-
CGA 357261 (ZE)	$0 - \lambda$		51.5 <sup>2</sup>	-
CGA/357262 (ZZ)			10.1 <sup>2</sup>	-
CA 321113 (EE)		× ~ 1,000°	57.4	100 <sup>2,5</sup>
CGA 373466 (ZD)		K AY	21.1 <sup>3</sup>	-
		$O^{\nu}$	<b>34.7</b> <sup>2,4</sup>	
CGA 381318 (ZZ)		×	-	-
NOA 4130/61 (ZADY 🖒		~ ° -	-	-
NOA 413163 ( <i>EE</i> ) <sup>1</sup> 2		<u>~</u> -	-	-
CGA 357276 (E)		-	-	<b>10.4</b> <sup>2,6</sup>
NOA 409480 (Z)		-	-	-
ÇGA 107170 (vəfatile) 🕰		-	53.8 <sup>2</sup>	39.5 <sup>7</sup>
2-fivdroxymethylbenzonitine		_	20.1 <sup>2</sup>	-

1

2

3

2-nydroxymethylbenZontorie 20.12 not a major degradation product in aquatic systems maximum occurrences in **bud** used as modeling input values from trifloxystrobin from CGA 321113: 60,5%; calculated as worst case from trifloxystrobin: 57.4% x 60.5% = 34.7% pH 9 and 25 °C only at pH 7 and 60 °C, assessed as thermal decomposition product only at pH 7 and 60 °C. 4

5

6





) (days) 5 2.09.0
2 <b>9</b> 9.0
N7/
n 81.0
nd 🔍 🖓 406 🔊
nd 🔬 140.5%2 🖧
m 🖉 🗐 🍕
m 🖉 🖉 80.4
mx sand 21905
m 0 50.8 0
m 72.3
1 5240
p. 0 <sup>*</sup> <i>1</i> 8.1
) <u>5</u> 2.4 (
m 🔊 🕺 24.7
n S J 53.0
N
23.7
70.8

#### Table 7.1.2- 27: DT<sub>50</sub> values in soils of CGA 321113 (normalised to 20 °C and field canacity)



	0 19	
Laboratory 🖉 ield 🖓 , 🔗 🕺 Soil / Site 🗸 🖉	Textpre	<b>DT</b> <sub>50</sub>
Study V Ly X X	γ (USΦA)	[days]
laboratory	sandy loam	31.9
ląboratory 🖓 👘 🖉	🛇 🚕 Sandy loam	45.5
Jaboratory 🖉	🖉 🔍 🖉 silt loam	43.2
k laboratory, 0 6 6	s C clay loam	73.7
field field	loam	6.86
field of a field of a	🐆 sandy loam	8.57
field Q & Q	silt loam	29.1
field of the second sec	silt loam	90.9
field	loam	14.5
field J J	silty clay loam	56.1
	modelling input value	20.5 <sup>1</sup>

 $\checkmark$  bias-corrected geometric mean n = 6 for the dissipation DT<sub>50</sub> values

Table 7.1.2-	29@``	DT50	values i	n soils of C	GA 381318	(normalised to 20	°C and field capa	city)
	@ <sup>v</sup>		~~ ~ ~ /	, · · ·				

Laboratory Pield Soft / Site		Texture (USDA)	DT50 [days]
laboratory		sandy loam	11.9
J laboratory J		loamy sand	22.8
4 Aboratory 4	4a	silt loam	22.8
≥ <sup>©</sup> laboratory		clay loam	20.4
		modelling input value	<b>19.2</b> <sup>1</sup>

<sup>1</sup> bias-corrected geometric mean (n = 4) from laboratory DT<sub>50</sub> values

 $\square$ 

Table 7.1.2- 30:	DT <sub>50</sub> values in soils	of NOA 413161	(normalised to 20	<sup>o</sup> C and field capacity)
			<b>`</b>	

Laboratory / Field Study	Soil / Site	Texture (USDA) <sub> ≫</sub>	DT50 [day©]	G,
laboratory		loamy sand	22.1	
laboratory		sandy loam	×90.4 ×	»-
laboratory		sandy Toam 🔩	Q 48.60 x	Q
laboratory	4a_C	sift toam	79.1	Q
laboratory	Б. Г	Pay loam	531.5	ő
field		🖌 loam 🔿	\$ 66,D <sup>*</sup>	1
field		😤 san <b>d</b> y°loam 🗇 🔬	30.7	
field		suit loam		
field	Č) °	S will loam	×y 26.0≪J	
field		bashi 🗸	3429	
field		Silty clay loam	<b>20</b> .8	
		modelling input value	38.7 <sup>1</sup>	

bias-corrected geometric mean (n 5) from field dissipation DT values 1

rable	/.1.2-31:	DI 50 Value	s ni sons oi	DUA 4131				jeiu capacity	)
Tabla	717 21.	DT volge	a in doile of	CANO A 4021	62 de amo	Bead R 1	) Of Dand f	ield eeneeity	•
			* 0		Ób (		<u> </u>	V	
		đ	9	Re De		$\cap$	r.	°~~	
			<u>`</u> ¥	· .		_O" Cı	e V	. *	
	varae eneradea	add to amend		ai parte ile certe	$\sim$				
2	value excluded	due to unrelia	ablestatistic	al narameters	1 <sup>3</sup> ~ 0		s s	Ô	
2						<u> </u>	S VI		
	Dias-corrected	geometric me	all $(1 - 3)$ is		ipangon D 150	values		,	
1	hige_corrected	Geometric me	on /n_se⁄ ∖i т⊮/	21111 TIQIOV (11CC)	เกวสเดก เ เ เ.∞≽	×1/011104&		SZ (( ))	

Laboratory / Field	if Site of O	Pexture Q	DT50
Study 🔪 🖉	) a a	<u>~</u> ∿ ≪"(USĐ(A) ≪	[days]
laboratory	· · · · ·	🔰 🌾 sandy loam 🔊	69.3
laboratory 😴 🛛 🔊	, S	🔍 santdy loam	54.6
laborator 🖉	Ja	© silt loam / sandy loam	39.1
laboratory		Cay loan / loam	27.7
field of o	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	loam	53.0
, field O <sup>x</sup> *		🔍 🔬 🔊 🖉	87.4
field to the field		🖉 🦯 silt loam	29.9
field	í "V	$\mathbb{S}^{\mathbb{O}}$ silt loam	36.5
field	×,	لم المعلم ال	25.2
field of a		silty clay loam	28.7
	à s s	modelling input value	37.8 <sup>1</sup>

median (n = 10) from aboratory and field dissipation  $DT_{50}$  values 1

## DT<sub>50</sub> values in soils of CGA 357276 (normalised to 20 °C and field capacity) Table 7.1 32:

Laboratory / Field Soft / Site	Texture (USDA)	DT50 [days]
laboratory	sandy loam	65.9
laboratory C	loamy sand / sandy loam	71.2
laboratory 4a	silt loam	69.2
Caboratory C	loam	21.4
and a start	loam	36.5
Tield of the second sec	sandy loam	80.2
field	silt loam	36.1
field	silt loam	_ 2
field	loam	45.5
field	silty clay loam	76.5

50.9

modelling input value bias-corrected geometric mean (n = 9) from laboratory and field dissipation DT<sub>50</sub> values

2 value excluded due to unreliable statistical parameters

DT<sub>50</sub> values in soils of NOA 409480 (normalised to 20 % and field capacity) Table 7.1.2-33:

		Ś	
Laboratory / Field	Soil / Site	Texture	DT <sub>50</sub>
Study		(USDA)	
laboratory	Ĉ	sandy loam	× #2.8 × ×
laboratory		sandy loam	0 37.10 × ×
laboratory	<b>4</b> a	efft loam 📈	2205 6 4
laboratory		Qclay loam 🔏	L15.2 V
field		N Jobin 🖓 🗤	0°97.30
field	(A)	sandy loan 🖉	95.5
field		🖉 🖉 silt loagen 🖓	34.7
field		Q silt loam	0111.10°
field		Toam O K	18.1
field	Ŵ, Ŵ,	👌 silQ clay loam 🖇	29.7
	64 4 . A . A	modelling input value	<b>3</b> 5.9 <sup>1</sup>
<sup>1</sup> median $(n = 10)$ fr	om laboratory and field dissinati	on Dis values	S di

DT50 values in water/sediment systems of filloxystrobin and CGA 321113 Table 7.1.2-34:

	$\sim$	<u>v</u> 4 4	de a	de la s	ČA –	
Water/Sediment	Ô	o trifloxystı	cobun "O"	· ~~	CGA 321	113
System	Water	Sediment	Total System	Wåter	Sediment	Total System
*	, DT <sub>5</sub>	<b>Ø</b> T50 C		<b>D</b> T50 (	D T S	DT50
- S	[days]	, days,	<b>Adays</b>	days	[days]	[days]
Rhine 🖉	Q.77 .	S 3.5¶	2,48	285.1	<i>"</i> ,570.9	423.1
Rhine	0.57	4.08	263 5	3019.9	<b>4</b> 41.8	362.9
Pond	× 0.90	¥.48 <sub>&amp;</sub> @`	× 1.25	<b>\$</b> \$54.6	_ 2	341.1
Pond a	<b>Q.</b> \$6	1.67		D 137,₽	_ 3	432.7
modelling input value	<b>≪0.76</b> ¹≪	2.45		20907 <sup>1</sup>	502.2 <sup>1</sup>	<b>388.0</b> <sup>1</sup>
1 01		@ <sup>0</sup>		·		

<sup>1</sup> geometric mean

<sup>2</sup> no clear dissipation observes in sediment

<sup>3</sup> DT<sub>50</sub> could not be calculated due to a top for number of thata

CONCLUSIONS

The DT<sub>50</sub> values and maximum occurrences in soil and aquatic systems of trifloxystrobin and its major The DT<sub>50</sub> values and maximum Securences in soil and aquatic systems of trifloxystrobin and its major degradation products used as modelling input values for the calculation of predicted environmental concentrations in surface water (PEC<sub>sw</sub>) were derived from laboratory and field dissipation studies. The results are summarized in Table 7.15-3.





#### CA 7.1.2.1 Laboratory studies

The degradation rates of trifloxystrobin and its major degradation products in soil were studied sing two different radiolabel positions, [14C-GP] and [14C-TP], and unlabelled compounds. The studies have been performed in a number of soils in the dark in the laboratory at temperatures between 10 to 25 °C and different soil moistures. The kinetic models and DT<sub>50</sub> values used for modelling purpose (non-normalised) and trigger evaluation (best-fit) as well as formation fractions for major degradation? products are summarized in Table 7.1.2.1-1 to Table 7.1.2.4-26. The Date and DT<sub>90</sub> values for trigger evaluation (best-fit) were taken from study reports and may slightly differ from the List opEndpoints JOY (SANCO/4339/2000-Final, 7 April 2003).

				S S	
Temp.	Soil	Texture 🐇	Annex Point /	Kinetic 🔗	<b>1 1 5 0</b> <sup>2</sup>
[°C]		(CSDA)	Reference No A	Model <sup>1</sup>	<b>Adays</b>
25		/ loam	KCA 7	FOMC	(J) 0.85 <sup>°</sup>
20		🖉 silt kaam 🚿	KCÅ 7.1.2. KJ /14	FQQC	» 0 <u>.</u> 49
		P 🎝 🏹	KQA 7.1.2.9.1/15	SFO S	ي \$0.41
	A Q	silt loam	KCA 7. 2.1.1 OT	FOME	مَرْ 0.49
	$B^{3}$	silt loum	KCA@1.2.1_/11	© FONSEC &	, 0.89
	DC .	sitQoam	KCA 7.1.2 . 1 /11	FOMC O	0.64
	h O	loamy sand	K@A 7.1.2.1.1	`~ <b>F</b> OMC⊘	0.57
	.4	Bamy sand	KCA 2.1.1 12	FOME	0.73
		🖗 sandyQoam 🗞	KGA97.1.2.M /12	FONIC	0.58
		sitty loam	KCA 7.1.2.1.1/10	<i>≰</i> ≸FO	0.82
	, O	Joamy sand	CA 7. 9.2.1.1/19	FOMC	0.46
	Ă Á	sandy joam	KCA 1.2.1 /17	FOMC	0.34
		satady loam√	KGA 7.1.2.1.1/17	FOMC	0.40
		loamy sand	KCA 7.1.2.1.1.1.1	FOMC	0.44
		Sandy Bam	KCA 9.1.2.1 1913	DFOP	4.35
ŀ		sandy loam	KCA 7.1.2.9.1 /18	FOMC	0.13
		sandy loan	KCA 7.42.1.1/18	FOMC	0.15
	4a	📣 silt løam	KCA@1.2.1.1/18	FOMC	0.19
		clay Yoam ô	KC 7.1.2.1.1 /18	FOMC	0.30
10		Sitt loam	KCA 7.1.2.1.1/11	FOMC	1.05

Table 7.1.2.1- 1:	Summary of DT <sub>50</sub> valu	es for degradation	of triff	oxyste	binm	aerobic	: soils
	for modelling purpose	(non-normalised)		, O	8		, Ç

SFO: single first order, FOMC First order multicomparement, DFOP: double first order in parallel for FQ91C:  $DT_{50}$  was not calculated as  $DT_{90}$  32,  $DT_{50}$  is based on fit of the decline curve

for DFOP: DT50 was not calculated from the slow Prate, DT50 is based on fit of the decline curve



# Table 7.1.2.1- 2:Summary of DT50 and DT90 values for degradation of trifloxystrobin in<br/>aerobic soils for trigger evaluation

							S
Temp.	Soil	Texture	Annex Point /	Kinetic	DT <sub>50</sub>	<b>Ф</b> Т <sub>90</sub>	' <i>0</i> ?'
[°C]		(USDA)	Reference No	Model <sup>1</sup>	[days] 🖉	(days)	1
25		loam	KCA 7.1.2.1.1 /03	SFO	2.0	n.v.	
20	·	silt loam	KCA 7.1.2.1.1 /01	SFO	٥.٥°×	£¥.8 €	Q D
		loam	KC 🗞 7.1.2.1.1 /02	🖉 SFO	×0.4 ~	🏷 1.4 🛇	
		silt loam	KCA 7.1.2.1.1 /04	SFO	<b>%</b> .6-1. <u>1</u>	2.0-3,5	Ś
		loamy sand	KACA 7.1.2.1.1	SFO ≪	0,5	<i>\$</i> .4	, O'
		loamy sand	KCA 7.1.2.1,0,05	∘ SFQ	0.8	ۇ 2.7℃	1
		sandy loan	KCA 7.1.2.1.1 /05	SFØ	00.7 <i>©</i>	2.4	1
		silty loam	KCA 7.12.1.1/08	_∕S¥FO ⊘	0.7%	2,3	1
		loamy sand	KCA ZJ.2.1.K/06	SFO S	0.9	<u>م</u> 2.9	1
		sandy loam	КСА, 7.1.2, 1 /07 🤇	SFO	63-0.6	1.8-2.0	1
		loanny sand/	KÇA 7.1≥2.1.1 /04	SFO 🚽	, 0.7 🛇	20.5	1
		andy loam	ØKCA, 7.9.2.1.1_008	TOTC	3.6	<b>4</b> 62	1
		loanty sand (	KCAC7.1.2.1 /09	FOTC	Ø.1	80.5	1
		🔬 santay loam	KČA 7.12M.1/10	DFOP	\$0.1 J	0.7	1
		😤 saandy loan	©CA 7 2.1.1 90	EOMC C	ṽ 0.Ž≫	1.3	1
		4a 🔊 silt loam	KCA(9.1.2.1,Q/10	FOMO	6/2	1.8	l.
		🔬 clayMoam 🛴	KCA 7.1.2 1/10	FQMC	0.3	1.8	I
10		O <sup>*</sup> suit loam	KCA 7.1.2.1.1	SFO 2	1.0	2.0-3.5	I.

n.c.: not calculated <sup>1</sup> SFO: single first order, FOTCC first order two comparement (Dewton Raphson method), FOMC: first order multi compartment, DFOP: double first order in pacifiel

### Table 7.1.2.1- 3- Summary of DT<sub>50</sub> values for degradation of CGA 357261 in aerobic soils for modelling purpose (new-normalised)

Temp.	Soil, K	Textinge (USDA)	Annex Point Reference No	Formation Fraction	Kinetic Model <sup>1</sup>	DT <sub>50</sub> <sup>2</sup> [days]
20	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	sandy loain	KCA 7.1,2M.2 /25	N/A	FOMC	0.06
		sandy løam	CA 7.1.2.1.2 /25	N/A	DFOP	0.07
	4a	silt Joan 🖉	KCA .1.2.1.2 /25	N/A	DFOP	0.08
	) ) ) )	clay loam	KCA 7.1.2.1.2 /25	N/A	FOMC	0.14

N/A: not applicable

<sup>1</sup> FOMC first order multi compartment **DFOP**: double tirst order in parallel

8

<sup>2</sup> for FOMC:  $DT_{50}$  was not calculated as  $DT_{9}$  32,  $DT_{50}$  is based on fit of the decline curve for DFOP:  $DT_{50}$  was not calculated from the slow k-rate,  $DT_{50}$  is based on fit of the decline curve

# Table 7.1.2.1-4: Summary of DT<sub>50</sub> and DT<sub>90</sub> values for degradation of CGA 357261 in Ageroble soils for trigger evaluation

Temp.	ð	Texture (USDA)	Annex Point / Reference No	Kinetic Model <sup>1</sup>	DT <sub>50</sub> [days]	DT90 [days]
20		sandy loam	KCA 7.1.2.1.2 /10	DFOP	0.1	0.3
		sandy loam	KCA 7.1.2.1.2 /10	DFOP	0.1	0.3
4a		silt loam	KCA 7.1.2.1.2 /10	DFOP	0.1	0.4
		clay loam	KCA 7.1.2.1.2 /10	FOMC	0.1	0.9

<sup>1</sup> FOMC: first order multi compartment, DFOP: double first order in parallel





### Bayer CropScience Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Table 7.1.2.1- 5:	Summary of DT <sub>50</sub> values and formation fractions for degradation of
	CGA 321113 in aerobic soils for modelling purpose (non-normalised)

	CGA	A 321113	in aerobic soils	for modelling pur	pose (non-	normalise	ed) °	
Temp. [°C]	Soil		Texture (USDA)	Annex Point / Reference No	Formation Fraction	Kinetic Model <sup>1</sup>	DT50	Ø
25			loam	KCA 7.1.2.1.2 /22	0.822	SFQ	257/2	
20			silt loam	KCA 7.1.2.1.2 /20	× 0.969	SF@ <sup>°</sup>	Ø.3 🔬	
			loam	KC 37.1.2.1.2 /21	0.947 🎸	SFO ∧	<sup>™</sup> 99.2 <sub>2</sub> <sup>™</sup>	
		А	silt loam	KCA 7.1.2.1.2 /15	0.951	<sup>©</sup> SFO <sub>2</sub> ♀	120.0	Å
		B <sup>2</sup>	silt loam	KACA 7.1.2.1.2	1.000 📈	SEQ	262.7 \$	$\langle \rangle$
		D	silt loam 🔬	KCA 7.1.2.1.Q/17	∘1.00Q	<b>S</b> FÓ	©35.1_©	ŗ
			loamy sand	KCA 7.1.2.1.2 /180	0.944	SFO 🖏	7556	
			loamy sand	KCA 7.1 2.1.2 /18	<b>009</b> 70 ĉ	sfq	428.4	
			sandy@am	ŮKCA,\$₩Ĭ.2.1,2%18	0.946	ŞFÓ	<u>358.0</u>	
			silty loam 🖉	KCo, 7.1.2.0.2 /32	0.935	SFO	≥ <sup>3</sup> 386.4	
			loamy sand	KCA 7. 3.1.2 /32	<u>00</u> 13 «	, SFO 🤝	1,15.3	
	A		Bandy loam	KCA 7, ¥.2.1.2023	×1.000	SEC	ອ້ຳ້າ2.4	
	В		Sysandy loam 🖓	KCAC7.1.2 / 2 /23	O 0.95	<b>₿</b> ĬFO	235.0	
		á	loanny sand	KČA 7.1.2 1.2 /20	1,000	SFO SFO	157.4	
			foamy sand	CA 70)2.1.2 16	N/A O	SFO	223.2	
			∼y sandy loam 🧷	KCA(7.1.2.1,2/19	0.983	\$FO	380.4	
		4	sandy loant	KCA 7.1.2 1.2 /24	0. <b>9</b> )7	SFO	70.1	
		0	sandy loam	KČA 7.1\2.1.2/24	~@x996 K	SFO	71.6	
		4a	silt loam	KCA 1.2.4.2 /24	<sup>\$\$0.97</sup>	SFO	55.5	
		di si	clay loam	KCA 7.1.2Q.2 /24	0.961	SFO	77.4	
10		C S	agailt loam	KOČA 7. p.2.1.2 /17	0.996	SFO	369.5	

# 10 N/A: not applicable 1 SFO: single first order 1 SFO: single first order 2 soil moisture of 30% of the field capacity at 1/3 bar 1 Stormary of DT<sub>50</sub> and DT<sub>90</sub> values for degradation of CGA 321113 in Table 7.1:2.1- 6: Summary of DT<sub>50</sub> and DT<sub>90</sub> values for degradation of CGA 321113 in Table 7.1.2.1- 6:

	a()' a						
Temp.	Soil,	Ŭ	Texture	O Annex Point /	Kinetic	DT50	DT90
[°C]			🖉 (USDA) 🖉	Reference No	Model <sup>1</sup>	[days]	[days]
25			Ram 📎	KCA 7.1.2.1.2 /03	SFO	301	n.c.
20	×		Silt loana	CA 7.1.2.1.2 /01	SFO	83.9	279
	A A	No.	🖉 loann 🔍	KCA 7.1.2.1.2 /02	SFO	101	340
æ	22	$\sim$	silti Toam	KCA 7.1.2.1.2 /04	SFO	32.9-259	n.c.
<i>A</i>			loamy sand	KCA 7.1.2.1.2 /05	SFO	493	n.c.
**		٥»	ToamyQand	KCA 7.1.2.1.2 /05	SFO	394	n.c.
	e e e e e e e e e e e e e e e e e e e		san <b>dy</b> loam	KCA 7.1.2.1.2 /05	SFO	277	n.c.
		$\mathbb{Q}_{n}$	silty loam	KCA 7.1.2.1.2 /06	SFO	101	n.c.
		d de la companya de l	A goamy sand	KCA 7.1.2.1.2 /06	SFO	295	n.c.
all	Q´Q`	$\sim$	sandy loam	KCA 7.1.2.1.2 /07	SFO	112-267	371-886
Ŵ		Č,	loamy sand	KCA 7.1.2.1.2 /07	SFO	169	562
		1	loamy sand	KCA 7.1.2.1.2 /08	SFO	210	n.c.
\$0	<u>S</u>		silt loam	KCA 7.1.2.1.2 /04	SFO	305	n.c.

n.c.: not calculated

<sup>1</sup> SFO: single first order

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Table 7.1.2.1-7: Summary of DT<sub>50</sub> values and formation fractions for degradation of CGA 373466 in aerobic soils for and modelling purpose (non-normalise@)

Temp. [°C]	Soil	Texture (USDA)	Annex Point / Reference No	Formation Fraction	Kinetic Model <sup>1</sup>	DT50 [days)	Ô
20		sandy loam	KCA 7.1.2.1.2 /25	0.980	SFQ	313	~
		sandy loam	KCA 7.1.2.1.2 /25	<b>√</b> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ŞFØ	Ø4.6 🔬	
	4a	silt loam	KC 7.1.2.1.2 /25	1.000 ¢	sfo «	A4.7 🖓	
		clay loam	KČA 7.1.2.1.2 /25	1.000	SFOS	733	Å

<sup>1</sup> SFO: single first order

Table 7.1.2.1-8: Summary of DT50 and DT values for degradation of CC 466 in aerobic soils for trigger evaluation Ki

			O″(	V 🔊	No.	N N	ſ	4
Temp.	Soil		Texture 🖉	Annex Pa	றint /	<sup>©</sup> Kinetic	DT50	DT
[°C]			(USDA)	Referenc	e No 1	Mødrel <sup>1</sup>	[days]©	[days]
20			sandy toam	KCA 74.	1.2625	SFO S	3∦33∕	<b>40</b> 4
			Sandy toam	KCA 7.1.2.	<u></u> ≰2/25	SFQ SFQ	<b>4</b> 4.6	<sup>0</sup> 154
		4aS	si⁄toloam ๎∽∕ັ	KCA 7.1.2	a.2 /25	SFØ	\$44.7	152
		$\sim$	iglay loaign	CA 752.	1.2 25	SFO C	72.3	240
<sup>1</sup> SFO: s	single first order	Å.		<u>z</u>	R'		<sup>×</sup>	

Summary of DT5 value for degradation of GA 381318 in aerobic soils Table 7.1.2.1-9: for modelling purpose (non-normalised)

	, w				· · · · · · · · · · · · · · · · · · ·		
Temp.	Soil		Texture	Annex Point / 🔿	Formation	Kinetic	DT50
[°C]	<u></u>	<u> </u>	(USDA)	Reference No	Fraction	Model <sup>1</sup>	[days]
20			, sandy loam	KCAJ.1.2.1.2/31	N/A №	SFO	11.9
		C	loanny sand	KOA 7.1.2 .2 /31	N/A	SFO	22.8
		ђа	silt loans	CA 7.1.2.1.2 31	N/A	SFO	22.8
		× ×	🖉 loam	KCA .1.2. 1.2931	N/A	SFO	20.4
N/A: no	applicable	6					

<sup>1</sup> SFO: single first order 0

Table 7.1.2.1- 10?	Summary of DF <sub>50</sub> and DT <sub>90</sub> values for degradation of CGA 381318 in
Ø	Gerohie soils for trigger englugtion
~0	Automation angler Annuntion

Temp.	Soil N	🕈 Texture 🧹	Annex Point /	Kinetic	DT <sub>50</sub>	DT90
[°C]		(U\$DA)	<b>Reference</b> No	Model <sup>1</sup>	[days]	[days]
20		sandy loàna	KCA 7.1.2.1.2 /11	DFOP	11.3	43.3
		Twamy Sand	KCA 7.1.2.1.2 /11	DFOP	20.4	95.7
	4a_0	🖉 silt vam	KCA 7.1.2.1.2 /11	SFO	22.8	75.9
		loam	KCA 7.1.2.1.2 /11	SFO	20.4	67.8

<sup>1</sup> SFO: single first order, DOP: double first order in parallel

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Table 7.1.2.1-11: Summary of DT<sub>50</sub> values and formation fractions for degradation of NOA 413161 in aerobic soils for modelling purpose (non-normalised) 🖉

								S
Temp.	Soil		Texture	Annex Point /	Formation	Kinetic	$\mathbf{D}\mathbf{T}_{50}$	0
[°C]			(USDA)	<b>Reference No</b>	Fraction	Model <sup>1</sup>	(days)	
20			sandy loam	KCA 7.1.2.1.2 /24	0.135	SFQ	90A	<u>م</u>
			sandy loam	KCA 7.1.2.1.2 /24	× 164	SFO	Ø\$8.1 🔬	Q j
		4a	silt loam	KC 7.1.2.1.2 /24	0.132	, sfo ∧	¥35.1\$	Ø
			clay loam	KCA 7.1.2.1.2 /2	0.213	SFO	30.9	Å
			loamy sand	CA 7.1.2.1.2 29	N/A	SFQ	3.7	$\checkmark$
			sandy loam	, KCA 7.1.2.1 <sup>(2)</sup> /28	° N/A	\$FO	©89.6	7
		4a	silt loam	KCA 7.1.2 1.2 /28	N/A	SFO S	1499	
			clay loam	Ø\$\$CA 7.€2.1.2,*2⁄8	×N/A	SFØ/	\$\$.0	
N/A: not	t applicable		O v		S O	4	Ac	
<sup>1</sup> SFO: s	single first order		A m	. Ø - Q .	×	0' 4	T' X	

Summary of DT and DT avalues for degradation of NOA 413161 in aerobic soils for trigger evaluation Table 7.1.2.1- 12:

	Ő	¥ <sup>1</sup> 0 1		Ô.	S . V	
Temp.	Soil	/ Texture	O'Anno Point?	<b>A</b> Gnetic	DT <sub>50</sub>	DT90
[°C]		(USDA)	Reference	Mode	[days]	[days]
20	L L L L L L L L L L L L L L L L L L L	loany sand	KCA 7.1.2 .2 /09	SFO	253	840
		sandy loan	KCA 7.1.2.1.2 🛱	DFOP	82.8	> 1000
	4a	silt loom	KCA \$1.2.1.2712	<b>≪ĎFOP</b> ©	173	713
		💦 clay loam 💭	KCA 7.1.2 2 /12	, DFOP	80.9	305
	4a	stirt learn	KCA 7.1.2.1.2 / 2 KCA 7.1.2.1.2 / 12 KCA 7.1.2 2 / 12	DFOP DFOP		

# <sup>1</sup> SFO: single first order, DFOP: dorder first order in parallel Table 7.1.2.1-16 NOA@13163in accobic soils for mation tractions for degradation of NOA@13163in accobic soils for modeling purpose (non-normalised) Table 7.1.2.1- 18

. Ca	9 -	Ô	.1 ~7				
Temp.	Soil	¢,	<b>Frexture</b>	Annex Point/	Formation	Kinetic	DT <sub>50</sub>
[°C]		y .	💱 (USDA) 🔊	ReferenceNo	Fraction	Model <sup>1</sup>	[days]
20	- V C - V - V	Į	sandy loam	KCA 7.12.1.2/25	0.229	SFO	76.0
		Ì	🔬 sandy loam	CA 3, 1.2.1.2 /25	0.246	SFO	53.6
		4a	🖗 silt¶øam 🖓	KCA 7.1.2.1.2 /25	0.162	SFO	40.0
	J	_°₹	clay loam	KCA 7.1.2.1.2 /25	0.260	SFO	25.4
			sandy loam	CA 7.1.2.1.2 /27	N/A	SFO	61.9
		4a	∅ sandx Yoam	KCA 7.1.2.1.2 /27	N/A	SFO	39.6
			↓ ¶oam \$\$	KCA 7.1.2.1.2 /27	N/A	SFO	29.6

N/A: not applicable <sup>1</sup> SFO: single first order

Summary of DT5 and DT90 values for degradation of NOA 413163 in Table 7.1.2.1 acobic soils for Grigger evaluation

Temps Soil S	Texture (USDA)	Annex Point / Reference No	Kinetic Model <sup>1</sup>	DT50 [days]	DT90 [days]
420	sandy loam	KCA 7.1.2.1.2 /13	DFOP	53.6	> 1000
م الم الم الم الم الم الم الم الم الم ال	sandy loam	KCA 7.1.2.1.2 /13	FOMC	37.3	158
	loam	KCA 7.1.2.1.2 /13	FOMC	27.7	113

<sup>1</sup> FOMC: first order multi compartment, DFOP: double first order in parallel

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Table 7.1.2.1-15: Summary of DT<sub>50</sub> values and formation fractions for degradation of CGA 357276 in aerobic soils for modelling purpose (non-normalised)

								S
Temp.	Soil		Texture	Annex Point /	Formation	Kinetic	$D_{50}^{2}$	0"
[°C]			(USDA)	<b>Reference</b> No	Fraction	Model <sup>1</sup>	(days)	
20			sandy loam	KCA 7.1.2.1.2 /24	0.043	- 3		A
			sandy loam	KCA 7.1.2.1.2 /24	×_0.027	<u>,-</u> ©″	Q <sup>23</sup> 4	Q J
			sandy loam	KC \$7.1.2.1.2 /30	N/A	,≪JHS ∧	× 66.5	0
			loamy sand	KCA 7.1.2.1.2 /30	N/A	∂ DFOR	7169	Å
		4a	silt loam	CA 7.1.2.1.2.30	N/A O	DF <b>Q₽</b>	ð9.0 <sup>(</sup>	$\swarrow$
			loam 🎢	KCA 7.1.2.1.2/30	° N/A	FOMC	21.65	ľ
<b>NT/A</b>	11 11		0					-

N/A: not applicable

N/A: not applicable	~~~				$\sim$
<sup>1</sup> FOMC: first order multi compartment, D	FOP: double first a	ordeom paralle	l, HS: nockey	štick 📎	L <sup>V</sup>
<sup>2</sup> for FOMC: $DT_{50}$ was calculated as $DT_{90}/2$	3.32 O <sup>×</sup> <sup>2</sup>		NO N	L L	
for DFOP and HS: DT <sub>50</sub> was calculated f	from the slow k-ra	¢ĕ~Qš,		Ó" "Q"	, A
<sup>3</sup> degradation rate could not be calculated			¢, Ó° «		£9
Ď	, <sup>1</sup> <sup>1</sup> <sup>1</sup> <sup>1</sup>		J S		
Table 7.1.2.1- 16: Summary of 🕰 5	o and DT <sub>N</sub> valu	es for degrad	ation of CG	A 357276 ir	Ň
aerobic soils for t	rigger evaluatio	m 🔉 🐧	F C .	Š, V	

			¥ 0 <u>0</u>			) 'Y	
Temp.	S	loil	Texture	Annex Point /	Kinetic	<b>D</b> C 50	DT90
[°C]		J.		Reference No	Model <sup>1</sup>	[days]	[days]
20			sandy loan	K@A 7.1.2.1.2	FOMC	22.0	190
			foamy sand	KCA 23.1.2714	<b>FOM</b>	21.5	237
			🖌 🖗 silt 🗞 silt 🖓	KCA 7.1.2 1/2 /14	FOMC	21.3	123
	Ó	4a 🕺 🐐	Î Q Î		, s		
		· •	loam	CA 7.2.1.2/14	<b>₽</b> OMC	12.0	71.8
			loam .	CA 2.1.2014	<b>E</b> OMC	12.0	71.8

<sup>1</sup> FOMC: first order multi comparation

Summary of DT50 values for degradation of NOA 409480 in aerobic soils Table 7.1 Ø for modelling purpose (non-normalised)

		a.	ÔŇ '					
Temp.		Soil 💍	Č	Texture	(Annex Point /	Formation	Kinetic	DT <sub>50</sub>
[°C]				`∕ <b>∢USD</b> A)	Reference No	Fraction	Model <sup>1</sup>	[days]
20		<i></i>		Sandy toam	KCA .1.2.1.2 /26	N/A	SFO	45.3
	~			san@y loam	KCA 7.1.2.1.2 /26	N/A	SFO	39.3
		4a		Gilt loafo	CA 7.1.2.1.2 /26	N/A	SFO	24.9
đ			$\mathbb{Q}$	claysloam	KCA 7.1.2.1.2 /26	N/A	SFO	19.1

N/A. not applicable <sup>1</sup> SFO: single first order

#### ASumpary of DT50 and DT90 values for degradation of NOA 409480 in Table 7.1.2.1 robic soils for frigger evaluation

Temp, [°Ct	, Br	Soil	ð ¥	Texture (USDA)	Annex Point / Reference No	Kinetic Model <sup>1</sup>	DT50 [days]	DT90 [days]
20°				sandy loam	KCA 7.1.2.1.2 /15	FOMC	27.8	275
Ĩ, <sup>v</sup>	Ŷ			sandy loam	KCA 7.1.2.1.2 /15	FOMC	30.2	239
U U			4a	silt loam	KCA 7.1.2.1.2 /15	FOMC	20.1	113
				clay loam	KCA 7.1.2.1.2 /15	SFO	19.1	63.4

<sup>1</sup> SFO: single first order, FOMC: first order multi compartment





## Table 7.1.2.1- 19:Summary of DT50 values for degradation of trifloxystrobin in anaerobic<br/>soil for modelling purpose (non-normalised)

Temp. [°C]	Soil	Texture (USDA)	Annex Point / Reference No	Kinetic Model <sup>1</sup>	DO20 [days]
25	North Carolina	loamy sand	KCA 7.1.2.1.3 /02	HS	0.61
1 4				9	

<sup>1</sup> HS: hockey stick

# Table 7.1.2.1- 20:Summary of DT50 and DT90 values for degradation of trifloxystration in<br/>anaerobic soil (best-fit)

			<u>د</u> ک		C	0
Temp.	Soil	Texture	Annex Point /	Kinetic	DT 50	DT
[°C]		(USDA) <sup>SQ</sup>	Reference No	Model <sup>1</sup>	\[days])	[days]
25	North Carolina	loamy sand	RCA 7. 9.2.1.3 01	SFO SFO	0.7%	n.c.
n.c.: not	calculated	× ×		Nº W	2	A .

<sup>1</sup> SFO: single first order

# Table 7.1.2.1-21:Summary of DF values and formation fractions for degradation ofCGA 321113 in an erobic soil for modelling purpose from pormalised)

Temp. [°C]	Soil	(USDA)	Annex Point Reference No	Formation Fraction	Kinetic Model <sup>1</sup>	DT50 [days]
25	North Carolina 🔍 🔬	loanty sand	KGA 7.1.2 1.4 /04	1.000	SFO	> 1000
20	) <sup>°</sup>	silt loan	KČA 7.1,2.1.4,02	∧ A ×	SFO	356

N/A: not applicable

<sup>1</sup> SFO: single first order

### Table 7.1.2.1- 22: Summary of DRs and DT90 values for degradation of CGA 321113 in anaerobic soils (best-bit)

Temp.	Soil S	Texture (USDA)	Annex Point	Kinetic Model <sup>1</sup>	DT50 [days]	DT90 [days]
25	North Garolina	loamy sand	KCA 7.1,2.0.4 /01	SFO	> 1000	n.c.
20	$\mathbb{Q}$	Oft loam	KCA 7.12.1.4 /02	SFO	356	> 1000

n.c.: not calculated

# Table 7.1.2.1 23: Summary of DT values for degradation of NOA 413161 in anaerobic soil for modeling purpose (non-normalised)

A	2	$\sim$	×	<b>A</b>	$\sim$				
Temp,		Soil	A		Texture y	Annex Point /	Formation	Kinetic	DT50
<u>ା</u> ଜ୍ଜୁ	~		y' è	y 4	(USDA)	<b>Reference No</b>	Fraction	Model <sup>1</sup>	[days]
20				Ø	sth	KCA 7.1.2.1.4 /05	N/A	SFO	976.4
NI/A. mot	annlinghi	4	Ø		$\sim$				

N/A: not applicable A '

# Summary of DT<sub>50</sub> and DT<sub>90</sub> values for degradation of NOA 413161 in Summary of DT<sub>50</sub> and DT<sub>90</sub> values for degradation of NOA 413161 in

Temp. [°C]℃	Soil	Texture (USDA)	Annex Point / Reference No	Kinetic Model <sup>1</sup>	DT50 [days]	DT90 [days]
20		silt	KCA 7.1.2.1.4 /03	SFO	976	> 1000

<sup>1</sup> SFO: single first order

#### Summary of DT<sub>50</sub> values for degradation of NOA 413163 in anaerobic sol Table 7.1.2.1-25: for modelling purpose (non-normalised)

				~		
Temp.	Soil	Texture	Annex Point /	Formation	Kinetic	
[°C]		(USDA)	<b>Reference</b> No	Fraction	Model <sup>1</sup>	[days]
20		silt	KCA 7.1.2.1.4 /05	N/A	ŞFO	206.1
N/A: not	applicable		Ò.	4		
<sup>1</sup> SFO:	single first order			J.	_Û ~0 <sup>2</sup>	

### Summary of DT<sub>50</sub> and DT<sub>90</sub> values for degradation of NOA 413163 m Table 7.1.2.1-26: anaerobic soil (best-fit)

					$\mathcal{N}$	Ś
Temp.	Soil	Texture	Annex Point	Kinetic	DT5	<b>DT</b> 90
[°C]		(USDA) 🔬	Reference No	Model	[days]	days] °
20		silt 😽	KCA 7.1.2.1.4 /03	SKO	206	68
1 SEO: a	ingle first order					S.Y.

SFO: single first order

CA 7.1.2.1.1 Aerobic degradation of the active substance of the degradation rate of triflox strobin in some under aerobic conditions of the dark in the laboratory was evaluated during the Annex I inclusion using two radioabel positions, [14C-GP] and [14C-TP], and was accepted by the European Commission (SANCO/4039/2000-Final, 7 April 2003). The following studies are included in the Baseline Dosper:

	à O	<u>~~</u> .0 <u>%</u> , .	. 05	
Annex Point / Reference No	Author(s)		Year	<b>Document No</b>
KCA 7.1.2.1.1 /04	Ô,		1997	M-033008-01-1
KCA 7.1.2.1.1 02			<b>\$</b> 997	M-033147-01-1
KCA 7.1.2. 2/03			<b>1997</b>	M-033394-01-1
KCA 7.1.2.1.1 /04			1997	M-033459-01-1
KCA 7. 2.1.1 /05			1997	M-033453-01-1
KCA 1.2.1.1 /06 2			1997	M-033599-01-1
KCA 7.1.2.1.1 /0			1997	M-033464-01-1
KCA 7.1.2.1.1 98			2001	M-073242-01-1
KCA 7.1.2.1 4/09	2		2001	M-069897-01-1
× · · · ·		<u>6</u> 0ř		

An additional study has been performed for without submitted within this Supplemental Dossier for the trifloxystrobin renewal of approval using unlabelled trifloxystrobin. Furthermore, updated kinetic evaluations of the degradation behaviour of trifloxystrobin in soil under aerobic conditions in the dark in the laboratory have been performed according to FOCUS kinetics (2006) 1 to derive kinetic parameters suprable for modelling purpose and environmental risk assessment. A summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory is given in section CA 7.1.2



# Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.1.1 /10; ;	; 2013
Title:	Formation Fraction of NOA 413161 from Triflo	xystrobin in Four European Soils
Report No:	EnSa-12-0410	I I I I I I I I I I I I I I I I I I I
Document No:	M-464420-01-1	
Guidelines:	- OECD Test Guideline No. 307	
GLP:	Yes	
Justification:	Determination of formation fraction in soil	l of major degradation products
	NOA 413161 for modelling purpose 🖏	Y Y N N N

### **Executive Summary**

The formation fraction of NOA 413161, a degradation product of triflexystrobin, was studied in the soils under aerobic conditions in the dark in the laboratory for 120 days at 20.1 % and 53.4% of the maximum water holding capacity:

	Å	n U	Q, U	~ O'	
Soil	Sour	ેલ્લ 🔊	Fexture (USD	<u>* Н</u>	OC [%]
	M@nheim,×	Germany 🤸	🖉 sandy loann	5.1	68
	Monheym, (	Germany	Sandy loam	5 <b>5</b>	ي 1.5
4a -	Ö Burscheid,	Germany	S' silt oam	<u>0</u> <u>8</u> 2 2	1.6
	Blankenheim	, Germany	C chay loan	م <sup>0</sup> 7.1%	4.8
* nH value was derived from garleo	us 0 01 M€CSaC1	a suspension		- 0	

\* pH value was derived from agricous 0.01 MCaCl<sub>2</sub> suspension

Additionally, kinetic data for a possible evaluation of the formation fractions of the trifloxystrobin degradation products CGA 32(113 and CGA)35726 were determined

A study application rate of 480 up triflox strobin per by soil dry weight was applied based on a single field application rate of triflox strobin of 187, 9 g per hectary.

The amount of trifloxystroom in the soil extracts decreased from 163.8, 99.4, 102.8 and 100.3% of applied amount [% AA] at study start (DATO) to < LOD (limit of detection) at DAT-58, DAT-120 (study end), DAT-93 and DAT-30 is soils

formation of its degradation products COA 321/13, NOA 413161 and CGA 357276.

CGA 321113 amounted to maxima (trifl@ystroon equivalents) of 92.0% AA (DAT-3), 96.9% AA (DAT-3), 91.6% AA (DAP-3) and 91.5% AA (DAT-3) in soils

4a and

21

, respectively.

NOA 413161 amounted to maxime (triflexystrobin equivalents) of 5.3% AA (DAT-93 and DAT-120), 4.9% AA (DAT-93), 3.6% AA (DAT-58 and DAT-93) and 4.2% AA (DAT-58 and DAT-93) in soils

CGA 357276 anounted to maxima (trifloxystrobin equivalents) of 2.4% AA (DAT-120), 1.9% AA (DAT-120) and 1.0% AA (DAT-120) in soils and 4a, respectively. In soil the amounts of CGA 357276 were

< BOD focall sampling intervals.

respectively.



#### The experimental data could be well described by a double first order in parallel (DFOP) kinetic and a first order multi compartment (FOMC) kinetic model model for soil . The half hite of 4a and for soils trifloxystrobin under aerobic conditions was 0.1, 0.2, 0.2 and 0.3 dates (corresponding to approximately 2 to 7 hours) in soil

approximately 2 to 7 hours) in soil and the sepectively.
It is concluded that trifloxystrobin and its degradation products have no potential for accumulation in the environment.
I. MATERIALS AND METHODS
A. MATERIALS
I. Test Item unlabelled trifloxystrobin Certificate of Analysis: AZ 15228
Batch Code: AE C642802 00 1B99 0002
Chemical Purity: 99.654 w/w
Z. Test Soils
Four soils were used (see Wable 7.1.2.1 or 1). The soils were taken from agricultural use areas representing different geographical origin and different soil properties as required by the guidelines. No plant protection products were used for the previous 5 years. The soils were sampled freshly from the fields (upper horizon of 602 200 h) and and an analysis of 602 200 h) and an an analysis of 602 200 h) and an an an analysis of 602 200 h) and an analysis of 602 200 h) and an an an analysis of 602 200 h) and an an an analysis of 602 200 h) and an an an analysis of 602 200 h) and an an an analysis of 602 200 h) and an an an analysis of 602 200 h) and an an analysis of 602 200 h) and an an an analysis of 602 200 h) and an an an analysis of 602 200 h) and an an an analysis of 602 200 h) and an an an analysis of 602 200 h) and an an an analysis of 602 200 h) and an an analysis of 602 200 h) and an

Four soils were used (see Wable 7.1.2.16) 1). The soils ware taken from agricultural use areas representing different geographical origin and different soil properties as required by the guidelines. No plant protection products were used for the previous 5 tears. The soils were sampled freshly from the fields (upper horizon of 0.6.20 cm) and sieved to a particle size of ≤ 2 mm. Soil collection and handling were in accordance to ISO 1038.66.

\_ 0

#### Table 7.1.2.1.1-1: Physico-chemical properties of test soils

Parameter		Results	/ Units		Ş
Soil Designation			4a		r
Geographic Location			.1		ก
City					, A
State	North-Rhine Westphalia	North-Rhine Westphalia	North-Rhin Westphalia	North-Rhine Westphalia	, , ,
Country	Germany	German	Germany	Germany	
GPS Coordinates					
Soil Taxonomic Classification (USDA)	loamy, mixed,	sondy, mored,	loamy mixed,	fin@toamy	
Å	Argudalf	Cardbudolb	Argudati	trigid Typic Eutrudept	
Soil Series		🗸 no informati	om available 🖉		
Textural Class (USDA)	sandy bam	⊳ sand§loam_Õ	_sijt loam℃	°∕γlay loam	
Sand $[50 \ \mu m - 2 \ mm]$	V 5 <b>9%</b> Å	\$75% Q	© 15%	ky 41%	
Silt [2 μm – 50 μm] 🖉 👔	\$\$30% <u>(</u>	16%	\$ 7 <u>0</u> %	26%	
Clay $[< 2 \mu m]$	xx 17%€ <sup>7</sup>	9% ~	×3×5% \$	33%	
pH (soil/0.01 M CaCl <sub>2</sub> 1/2)	SA NO	\$5.9	£ 6.2 S	7.1	
pH (soil/water 1/1)	5.3	\$\$ 6.1℃	6.¥	7.2	
pH (saturated paste)	<u>∼</u> 5.3~ <sup>3</sup>	5 61	8.4	7.2	
pH (soil/1 N KCL $\mathcal{D}$ ) $\mathcal{O}^{\vee}$	× 47 ×	5.6	5.8	6.8	
Organic Carbot	60t.8% 2	1.5%	1.6%	4.8%	
Organic Matter <sup>1</sup>	<sup>∞</sup> 3.1%	2.6%	2.8%	8.3%	
Cation Exchange Capacity [meq/100 g]	<u>~</u> , 169 '	8.7	11.7	20.7	
Water Holding Capacity	\$ 15 m		54.8	81.6	
at 0.1 bar (pF 2.0)	× 26.9%	14.7%	32.5%	36.1%	
Bulk Density (disturbed) g/cm <sup>2</sup>	×1.16 ~	1.26	1.09	0.97	
Microbial Biomass [pag microbial		*O <sup>*</sup>			
carbon per kg soil DW] <sup>2</sup>		Þ			
DAT-0 BIO-) 3	F 207 W	188	231	942	
DAT 🐯 (BIO- / BIO )	493 / 563	398 / 392	424 / 496	1948 / 1885	
DAT-120 (BIO- / BYO+)	@390/2449	298 / 328	338 / 428	1731 / 1575	

<sup>1</sup> % organic matter = % organic garbon x  $1.724_{\odot}$ 

<sup>2</sup> BIO- samples were left untreased, BIO+ samples were applied with solvent of application solution (400  $\mu$ L

BIO- sampled with solvent of application solution (400 μL acetone/water 1/1 (49γ)).
 <sup>3</sup> The values determined at DAT-0 are too fow compared to DAT-58 and DAT-120, but the reason is unclear. However, determinations of microbial biomass demonstrated that the used soils were microbial viable.
 DAT: days after treatment
 DW; dry weight

DW; dry weight

GPS. global positioning system

USDA: United States Department of Agriculture

**BAYER** Bayer CropScience Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

#### **B.** STUDY DESIGN

#### 1. Experimental Conditions

The static test system for degradation in soil under aerobic conditions consisted of Erlenmeyer glass flasks (volume e.g. 300 mL). Each flask was closed with a polyurethane (PU) from plug allowing the oxygen exchange.

For preparation of the test systems, 100 g dry weight equivalents of the speed soils were weighted into each flask. Soil moisture was adjusted to  $55 \pm 5\%$  of the maximum water holding spacing (MWHC) for the individual test systems by addition of de-ionized water. The flasks were then closed with PU foam plugs and equilibrated to study conditions for W days prior to application.

The study application rate (SAR) was based on a single field application rate of triflowystrobin of 187.5 g per hectare, resulting in a nominal SAR of 500 µg trifloxystrobin per kg soil dry weight.

The test item was applied dropwise onto the soft surface of the respective test systems in 400 $\mu$ L acetone/water 1/1 (v/v) using a pipette After application, the test vessels (except DAT-0, DAT-0.08 and DAT-0.25 samples) were closed with PL\$ foam plugs.

The test systems were incubated in the dark for 120 days at 20.1 °C and a soil- moisture of 53.4% MWHC in a walk-in climatic chamber of the dark for 120 days at 20.1 °C and a soil- moisture of

#### 2. Sampling

11 sampling intervals were distributed over the entire incubation period of 420 days. Duplicate samples were processed and analysed 0, 0.08 0.25 0, 3, 7 14, 30, 58, 93 and 120 days after treatment (DAT). Microbial soil biomass was determined at start, middle and end of the study (DAT-0, DAT-58 and DAT-120).

At each sampling interval, concurrent recovery samples were prepared freshly by fortification of a representative soil (1990), with test item triflexystrobin and reference items CGA 321113, NOA 413161 and CGA 357276 at LOQ level (corresponding to 3% of the nominal SAR (test item equivalents)) and application rate level (corresponding to 100%, 100%, 50% and 50% of the nominal SAR (test item equivalents) for triflexystrobin, CGA 321113, NOA 413161 and CGA 357276, respectively). Duplicate samples were prepared and processed in parallel to the degradation samples of the respective samples interval for each fortification level.

### 3. Analytical Procedures

The entire soil of each test system was extracted three times at ambient temperature using a mechanical shaker and acetonitrile/water 4/1 (v/v). Furthermore, two accelerated extraction steps using a microwave with a magnetic stincer were performed, first with acetonitrile/water 1/1 (v/v) at 70 °C and second with methanol/water 1/1 (v/v) at 50 °C. After each extraction step, extract and soil were separated by centrifugation (2560 x g) and decantation. The soil extracts were combined, internal stable-labelled standards (ISDDs) actied (nominal concentrations of ISTDs were 10% of the nominal SAR (test item equivalents) and an aligned of the combined soil extract was analysed by reversed phase HPIC-MSMIS in selected reaction monitoring mode. Concurrent recovery samples were processed and avalysed analogously. The limit of detection (LOD) and limit of quantitation (LOQ) for HPLC MS/MS analysis of the combined soil extracts corresponded to 1 and 3% of the nominal SAR (test item equivalents), respectively.



The HPLC-MS/MS method was validated with regard to linearity, accuracy and precision. The mass selective detector was operated in the positive electrospray ionization selected reaction monitoring mode, tuned for the mass transitions of parent and a significant product ion. The linearity range of the mass spectrometer was tested in pure extraction solvent. Therefore, multi-point calibration curves using ISTDs were established covering a range from 1% to 120%, 120%, 60% and 60% of the nominal SAR (test item equivalents) for trifloxystrobin, CGA 321113, NOA 413161, and CGA 357276, respectively. The nominal concentrations of the ISTDs were 10% of the mominal SAR (test item equivalents) and precision of the method was assessed on the basis of the recovery rates determined for each soil after fortification with test item trifloxystrobin and reference items CGA 321113, NOA 413161, and CGA 357276, at LOQ level (corresponding to 3% of the nominal SAR (test item equivalents)) and application rate level (corresponding to 100%, 100%, 50% and 50% of the nominal SAR (test item equivalents) for trifloxystrobin, CGA 321113, NOA 413161 and CGA 357276, respectively). The fortified samples were processed and analysed as described for the degradation samples. Blank soil matrix solutions were used to determine the background abundance of the test item in the respective soils.

The degradation kinetics of the test item was determined according to FOCUS kinetics (2006), bising the software KinGUI 2 with three different kinetic models: single first order, first order multi compartment and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The best-fit kinetic model was selected on the basis of the chi<sup>2</sup> scaled-error criterion and on the basis of a visual assessment of the goodness of the fits. DF<sub>50</sub> and DT<sub>90</sub> values were calculated from the resulting kinetic parameters

Results indicated that the anticipated standardized aerobic conditions were maintained and that the soils were microbially active over the duration of the laboratory andy.

### A. DATA

	🔊 🔊 'ae	róbic c	ooditie	ons (m	ieän va	lues an	d SD ez	xpresse	d as 9	% AA)		
	6 F		Ų' ų		ý "		) )	•		,		
a	Mean		. Ô		l ô		DAT	_	_	_	_	
Compound	SO	. I	<u>ð.98</u>	0.25	্শ্যু	3	7	14	30	58	93	120
trifloxystrobin	Mean	Ŷ03.8≈	Q67.3 ,	<b>3</b> 1.9	© <b>8</b> .8	Ø3.2	2.0	1.6	1.4	<lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""></lod<></td></lod<>	<lod< td=""></lod<>
Ö <sup>y</sup>	SD 🖏	$\pm 0.2$	″±1.7⊄	$\pm 0.3$	10.5	<sup>J</sup> ±0.1	$\pm 0.0$	$\pm 0.1$	$\pm 0.1$			
CGA 321113	Mean	<lod< td=""><td>34,9</td><td>71Û</td><td>9,ħØ</td><td>92.0</td><td>86.4</td><td>79.2</td><td>70.1</td><td>49.4</td><td>40.3</td><td>34.5</td></lod<>	34,9	71Û	9,ħØ	92.0	86.4	79.2	70.1	49.4	40.3	34.5
	`\$Ď		₽Î.1	<u>\$</u> 2.8	~€0.5	$\pm 0.3$	$\pm 0.5$	$\pm 1.8$	$\pm 3.5$	$\pm 0.3$	±1.6	$\pm 0.6$
NOA 413161	Mean	n.d	n.d	n.d. 🔊	LOD	<lod< td=""><td><lod< td=""><td>1.7</td><td>2.8</td><td>4.5</td><td>5.3</td><td>5.3</td></lod<></td></lod<>	<lod< td=""><td>1.7</td><td>2.8</td><td>4.5</td><td>5.3</td><td>5.3</td></lod<>	1.7	2.8	4.5	5.3	5.3
L. L.	SD ∖	Ű	, S	- Q				$\pm 0.1$	$\pm 0.4$	$\pm 0.1$	±0.4	$\pm 0.0$
CGA 357270°	Mean	æ.d.	n.d.	Ø.d.	n.d.	n.d.	<lod< td=""><td><lod< td=""><td>1.2</td><td>1.6</td><td>2.0</td><td>2.4</td></lod<></td></lod<>	<lod< td=""><td>1.2</td><td>1.6</td><td>2.0</td><td>2.4</td></lod<>	1.2	1.6	2.0	2.4
, A	SD a			Ŷ					$\pm 0.1$	$\pm 0.0$	$\pm 0.0$	±0.2

# Table 7.1.2.1.1-2: Degradation of triflexystrobin in soil according a conditions (mean values and SD expressed as % AA)

n.d.: nor detected DAT: days after treatment, SD: standard deviation

trifloxystrobin equivalents

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Table 7.1.2.1.	1-3: I c	Degrada conditio	ation o ons (me	f triflo ean val	oxystro lues an	bin in s d SD ex	oil apresse	d as %	AA)	und	ler aero	obic .
	Mean <sup>1</sup>						DAT		ð	ÿ		)) 
Compound	SD	0	0.08	0.25	1	3	7	14	<b>30</b>	58	93	120
trifloxystrobin	Mean	99.4	68.9	34.7	13.7	4.7	3.1	2.3	1.6	1.4	d.2	, <b>≾DÓ</b> D
	SD	±0.9	$\pm 0.8$	±1.5	$\pm 0.1$	±0.4	$\pm 0.1$	±0.0 ,	0.0 🗲 م	±0.1 ~	Q±0.0 (	ð 4
CGA 321113	Mean	<lod< td=""><td>34.7</td><td>63.1</td><td>92.9</td><td>96.9 Ĉ</td><td>&gt; 88.7</td><td>82.9</td><td>73.4</td><td>55.5</td><td>41.8</td><td>34</td></lod<>	34.7	63.1	92.9	96.9 Ĉ	> 88.7	82.9	73.4	55.5	41.8	34
	SD		±1.2	±0.3	±1.7	$\pm 0.8$	$\pm 0.5$	±QQ	±0.2	±2,2	±92	±0.8

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±0.2

166

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- N 1

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SD n.d.: not detected, DAT: days after treatment, SDOstanda@deviation 6

<LOD

n.d.

n.d.

n.d.

Mean

SD

Mean

<LOD

n.d.

NOA 413161

CGA 357276

					10 10 S I	
n.d.: not detected, DAT	: days after treatmer	nt, SD©standa	deviation		Ĩ.	1
<sup>1</sup> trifloxystrobin equiv	alents	A . 0		Q°, O°		Ø,
			$\sim$ $\sim$	A	Ő <sup>v</sup> 4,	
Table 7.1.2.1.1- 4:	Degradation of	rifloxystrob	jø/in soil/		2	4a und
	aerobic condition	ns (mean va	lues and SI	) expressed	as & AA	پ ۵
	e C	a s	s s			Ø

<LOD

n.d

			Š	-0	, /		a V	(O) <sup>r</sup>	r.	Ň	s l	
	Mean <sup>1</sup>		Ŷ	Ô	Ô	ð	₿ĂT	0	~Õ~	Õ	°	
Compound	SD	0	Ø.08 🛛	Ø.25	Ň	3	, <b>Č</b> 1	<u>0</u> 14	©30 ?	<sup>©</sup> 58 ≰	<i>"</i> 93	120
trifloxystrobin	Mean	10258	74,6	43.7	717.5	5.7	<sup>♥</sup> 3.0ℓ	3,10	2.0	1.3 <sup>O</sup>	<lod< td=""><td><lod< td=""></lod<></td></lod<>	<lod< td=""></lod<>
	SD	$\pm 0.0$	$\pm 0,2$	±l	±200	$\pm 0.9$	$\pm 0.2^{\vee}$	±0,Å	±0,3	±Ø.2		
CGA 321113	Mean	∛≰OD	<sub>4</sub> 28.4	<b>\$?</b> .9	\$5.4	<b>∮</b> }.6	\$7.5	84.4	۾ 0.4	<b>3</b> 0.2	30.0	23.5
	SD 🛒		€±0.1	\$±1.4	Õ±1.7 (	>±0.8⊳	$O_{\pm 0.1}^{\circ}$	∕ ±0.2	±0.4	ϱ1.6	$\pm 0.6$	±1.2
NOA 413161	Mean	n.d.	n đ	n.d	<lqd< td=""><td><lqd< td=""><td>1.1</td><td>1.9</td><td>3.∜</td><td>3.6</td><td>3.6</td><td>3.1</td></lqd<></td></lqd<>	<lqd< td=""><td>1.1</td><td>1.9</td><td>3.∜</td><td>3.6</td><td>3.6</td><td>3.1</td></lqd<>	1.1	1.9	3.∜	3.6	3.6	3.1
	SD)	Å	$\sim$	4	۵.	?	æ <b>0</b> .1	.∉0.1	@_0.0	±0.2	$\pm 0.0$	$\pm 0.3$
CGA 357276	Mean	n.d. 🖉	n.d.	n.d.	n.d.	ñ.d.	Ô'n.d.	<b>¢lod</b>	LOD	<lod< td=""><td><lod< td=""><td>1.0</td></lod<></td></lod<>	<lod< td=""><td>1.0</td></lod<>	1.0
2	SD	.0	Ô			ľ ô	le l					$\pm 0.0$

n.d.: not detected, DAT: days after meatment, SD; standard peviation

trifloxystrobin equivalents

Ŵ Table 7.1.2.1.1- 5: Degradation of trifloxystrobin in soil **for the second second** up conditions (mean values and SD expressed as % AA) under aerobic

	Q (	5		8° 3		∧ 4	×					
	Mean®			Č Č	)″	r O	Ø DAT					
Compound	SD		0.08	0,23	1 A	ð	7	14	30	58	93	120
trifloxystrobin	Mean	100.3	80.3	55.9	<b>\$9</b> .7	× \$.0	2.0	1.2	<lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""></lod<></td></lod<>	<lod< td=""></lod<>
	SD 🗞	₽±1.5©	, ±2.0	±1.94	$10.5^{\circ}$	¥±0.3	±0.1	$\pm 0.1$				
CGA 321113	Mean	<lqd< td=""><td>20,4</td><td>43</td><td>812</td><td>91.5</td><td>87.6</td><td>84.1</td><td>72.1</td><td>54.7</td><td>43.3</td><td>36.4</td></lqd<>	20,4	43	812	91.5	87.6	84.1	72.1	54.7	43.3	36.4
- S	SĎ	S'	°∰1.3	±Q,5	£1.2	±0.5	$\pm 1.3$	$\pm 1.0$	$\pm 0.1$	$\pm 0.5$	$\pm 1.0$	±0.5
NOA 413161	Mean	n.d. 🔨	n.d. 🤇	Vn.d.	<b>LOD</b>	<lod< td=""><td>1.1</td><td>2.3</td><td>3.4</td><td>4.2</td><td>4.2</td><td>3.8</td></lod<>	1.1	2.3	3.4	4.2	4.2	3.8
	🖉 SDL 🕻				\$		±0.1	$\pm 0.1$	$\pm 0.0$	$\pm 0.0$	$\pm 0.0$	±0.1
CGA 357276	Mean	A.d.	<sub>≪</sub> n.d.	"p.d.	n.d.	n.d.	<lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<></td></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""></lod<></td></lod<>	<lod< td=""></lod<>
<u> </u>	<i>∱</i> SD	Û a	) )	¥								

n.d.: no detected, DAT: days after treatment, SD: standard deviation

trifloxystropin equivalents



4a and

#### **METHOD VALIDATION** B.

The HPLC-MS/MS method was successfully validated prior to application of the degradation samples The correlation coefficients ( $\mathbb{R}^2$ ) of the multi-point calibration curves ranged from 0.9999 to 0.0000. The recovery rates ranged from 91.5 to 109.3% of applied amount [% AA] for all soils, analytes and concentrations. The relative standard deviations for each recovery set ranged from 0.7 to 40%, showing a good repeatability of this method. Background abundance in blank soil, matrix was far below 30% of the limit of quantitation in all soils and its interference by other metrix components occurred. The combination of the selective MS/MS detection method used with the preceding HPLC separation leads to a high specificity of the method.

In addition, the extraction efficiency was demonstrated by concurrent recovery samples at each sampling interval. The overall mean concurrent recoveries overe 101.5% AA (range from 962 to 114.1% AA) for trifloxystrobin, 102.1% AA (range from 97.1 to 110.3% AA) for CGA 321113, 100.5% AA (range from 94.5 to 108.1% AA) for NOA 493161 and 100.8% AA (range from 96.2 to 110.7% AA) for CGA 357276.

### C. DEGRADATION OF PARENT COMPOUND

Ŵ The amount of trifloxystrobin in the soil extracts decreased from 103. 99,4 102.8 and 100.3% AA at study start (DAT-0) to < LOD (limit of detection) of DAT 38, DAT-120 (study end), DAT-93 and DAT-30 in soils 4a and

. Degradation of triffexystrobin was accompanied by the formation of its degradation products CGA 321113, NOA 413161 and CGA 357276.

CGA 321113 amounted to maxima (trifloxystrobn equivalents) of \$2.0% (DAT-3), 96.9% AA (DAT-3), 91.6% A& (DAT-3) and 91.5% AA (DAT-3) in soils ↑řespec@vely,~S

4a and

NOA 413161 amounded to maxima (trifloxystrobin equivalents) of 5.9% AA (DAT-93 and DAT-120), 4.9% AA (DAT-93), 3.6% AA (DAT-58 and DAT-93) and 4.2% AA (DAT-58 and DAT-93) in soils

respectively.

0 CGA 357276 amounted to maxima (priflox vetrobin, equivalents) of 2.4% AA (DAT-120), 1.9% AA (DAT-120) and 1.0% AA (DAT-120) in Soils. and

S

a, respectively. In soil the amounts of CGA 357276 were < LOD for all sampling intervals.

Aa and the best-fit results of the DT<sub>50</sub> and DT<sub>90</sub> calculations. The degradation of triflox strobin followed double first order in parallel (DFOP) kinetics in soil

according to the lowest chi<sup>2</sup> error values and visual assessments Dat

Table 7.1.2.1.1- 6:Best-fit degradation kinetics of trifloxystrobin in soils under aerobic<br/>conditions for trigger evaluation according to FOCUS

Soil	Best-Fit Kinetic Model <sup>1</sup>	DT <sub>50</sub> [days]	DT90 [days]	Chi <sup>2</sup> Error	Visual Assexsment 20
	DFOP	0.1	0.7	3.1	
	FOMC	0.2	1.3	6.9	
4a	FOMC	0.20	1.8	3.8	
	FOMC	0.3	1.8	0.9 @	<u> </u>

<sup>1</sup> FOMC: first order multi compartment, DFOP: double first order in paralle

<sup>2</sup> visual assessment: + = good

### **III. CONCLUSIONS**

Trifloxystrobin was rapidly degraded in soil under aerobic conditions in the dark in the laboratory. The calculated best-fit half-lives were between 0.1 and 0.3 days (corresponding to approximately 2 to 7 hours) in the tested soils. The major degradation products CGA 321113 and NOA 413161 were formed and declined towards study end.

It is concluded that trifloxystrobin and its degradation products have no potential for accumulation in the environment.

The results are included in the spinmary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 74.2.1.

	S	107		1, 5	s s s s s s s s s s s s s s s s s s s		L.	
Report:	KCA 7	Q.2.1.1	<b>311;</b>		Ó	;	;	2013
Title:	Kinetic	Evalua	tion of th	10 Degrad	ation of	[rifl@ystro	bin and its	Metabolite under
, O	Aerobi	c Soil (	Condition	sôin Labo	ratory, Ac	cording to	FOCUS K	inetics Using the
O*	KanGU	K2 Too	1	× <u>,</u> Q	-G	0 0		-
Report No?	EnSarl	,3-07 <u>15</u>		S,	<sup>®</sup> 0			
Document No:	M-467	655201-	1 🖉		7 29	Ň		
Guidelines:	- FOC	US Kine	tics (200	6) <sup>°</sup> 1 ~	•~©	N N		
GLP:	No	× 4	Ş în		Ň a			
Justification:	New de	ata / gan	deline re	quirement				
_Q	Kinetic	analys	is of the	degradat	ion 🐠 tri	floxystrobi	n and its m	ajor degradation
~Ģ~	produc	ţ@GA	32111370	ðr moðelli	ngpurpo	se		
4	(	) 🔊	) 4 54	(Co)	$(\Omega n)$			

### Executive Summary,

A kinetic analysis of soft residue data from the aerobic soil degradation study M-033459-01-1 (Baseline Dossier, KCA 7.1,21.1/04 and KCA 7.1.2.1.2/04) was performed with the software KinGUI 2 according to FQCUS kinetics (2006)<sup>1</sup> to derive half-lives for trifloxystrobin and its degradation product CGA \$21113 as well as formation fractions for CGA 321113, which are suitable for modelling purpose. Only the results for trifloxystrobin are described here.

First order molti compartment was the most appropriate kinetic model for modelling purpose for the degradation of trifloxystrobin in soil under aerobic conditions in the dark in the laboratory at different temperatures (20 and 10 °C), soil moistures (60 and 30% of the field capacity at 1/3 bar (FC)) and test concentrations (1.0 and 0.1 mg/kg).

**R** Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

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The half-life of trifloxystrobin was 0.49 days (20 °C, 60% FC, 1.0 mg/kg), 0.89 days (20 °C, 30% FC, 1.0 mg/kg), 1.05 days (10 °C, 60% FC, 1.0 mg/kg) and 0.64 days (20 °C, 60% FC, 0.1 mg/kg).

Soil residue data from the aerobic soil degradation study M-033459-00-1 (Baseline, Dossier, KCA 7.1.2.1.1 /04 and KCA 7.1.2.1.2 /04) were used. In this study, the degradation of trifloxyshobin was studied in soil **Control** (silt loam) under aerobic conditions in the dark in the laboratory for up to 287 days at different temperatures (20 and 10 °C), soil moistures (60 and 30% of the field capacity at 1/3 bar) and test concentrations (1.0 and 0.1 mg/kg).

The kinetic analysis was performed according to FOCUS kinetics (2006) using the coftwate KinGUI 2 with four different kinetic models: single first order, first order multicompartment, hocksystick (double first order sequential) and double first order in parallet. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessment of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, t-test significance, cortelation analysis and standard deviation. The DT<sub>0</sub> value was calculated from the resulting kinetic parameters. The degradation of degradation products was described with the single first order model. The resulting  $DT_{50}$  value from the first order multi compartment model was not calculated as  $DF_{50}/3$  as recommended by FOCUS. This procedure produces the worst case  $DT_{50}$  for the parent, compound, which, however, does not describe the worst case scenario for the following degradation products. The  $DT_{50}$  value taken for modelling is based on the iteratively calculated value from KingUI 2

First order multi compartment (FOMC) was the most appropriate kinetic model for modelling purpose for the degradation of orfloxystrobin in soil the kinetic analysis.

 Table 7.12.1.1-7:
 Kinetic parameters for the degradation of trifloxystrobin in soils under according to FOCUS

 Aerobic conditions for modelling purpose according to FOCUS

Soil 6	A Kinetic Model	<sup>1</sup> DT <sub>50</sub> <sup>2</sup> [days]	ChiOError	t-test <sup>3</sup>	Visual Assessment <sup>4</sup>
ΑÛ	FQMC	Q:#9 4	2.2	4.16 x 10 <sup>-8</sup>	+
B <sup>6</sup>	O FOMC	≶v0.89@	5.7	1.44 x 10 <sup>-4</sup>	+
C 7 . (	∂FOMC <sup>®</sup>	1.05	10.6	2.28 x 10 <sup>-5</sup>	+
D.S.	FOM	\$ 0.64	5.6	2.77 x 10 <sup>-6</sup>	+

FOMC: first order mithi<sup>2</sup> compartment

<sup>2<sup>''</sup> for FOMC: DT<sub>50</sub> way not calculated as DT<sub>2</sub>93.32, DT<sub>50</sub> is based on fit of the decline curve</sup>

<sup>3</sup> for FOM worst case value of rate parameters alpha and beta

<sup>4</sup> visual assessment: + = good «

<sup>5</sup> 20 °C 50% of the field capacity at 10 bar, 1.0 mg/kg

<sup>6</sup> 20 %, 30% of the field capacity at 1/3 bar, 1.0 mg/kg

<sup>7</sup> for C, 60% of the field capacity at 1/3 bar, 1.0 mg/kg

20 °C, 60% of the field apacity at 1/3 bar, 0.1 mg/kg

#### **III. CONCLUSIONS**

The calculated half-lives for modelling purpose for the degradation of trifloxystrobin in soil under aerobic conditions in the dark in the laboratory were between 0.49 and 1.05 days in the tested soils.

The results are included in the summary of the degradation rates of trifloxystrobin and its nois degradation products in soil in the laboratory given in section CA 7.1.2.1.

Report:	KCA 7.1.2.1.1 /12; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin and its Metabolite under
	Aerobic Soil Conditions in Laboratory According to FOCUS Kinetics Using the
	KinGUI 2 Tool
Report No:	EnSa-13-0716
Document No:	M-467663-01-1
Guidelines:	- FOCUS kinetics (2006) $^{1}$
GLP:	No A Q' o A L C Q'
Justification:	New data / guideline requirement:
	Kinetic analysis of the degradation of trifloxystrobin and its major degradation
	product CGA 321113 for modelling purpose

### **Executive Summary**

A kinetic analysis of soil residue that from the aerobic soil degradation study M-033453-01-1 (Baseline Dossier, KCA 7.1.2.1.1.05 and KCA 7.1.2.4.2./05) was performed with the software KinGUI 2 according to FOCUS kinetics (2006)<sup>1</sup> to derive half lives for trifloxystrobin and its degradation product CGA 321103 as well as formation fractions for CGA 321103, which are suitable for modelling purpose. Only the results for trifloxystrobin are described here.

First order multi compartment was the most appropriate kinetic model for modelling purpose for the degradation of trifloxystrobin in the data of the degradation of the data o

The half-life of trifloxystrohin was 0.57 days in soil **1997**, 0.73 days in soil and and 0.58 days in soil **1997**.

e appoint soil degradation study M-033453-0

Soil residue data from the actobic soil degradation study M-033453-01-1 (Baseline Dossier, KCA 7.1.2.1.1 /05 and KCA 7.1.2.1.2 /05) were used. In this study, the degradation of trifloxystrobin was studied in soils (loamy sand), (loamy sand), (loamy sand) and (sandy loam) under acrobic conditions in the dark in the laboratory for up to 204 days at 20 °C, 40% of the maximum vater holding capacity and actest concentration of 1.0 mg/kg.

The kinetic analysis was performed according to FOCUS kinetics  $(2006)^{1}$  using the software KinGUI 2 with four different kinetic models: single first order, first order multi compartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessement of the goodness of the fits, chi<sup>2</sup> scaled error obterior, t-test significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was balculated from the resulting kinetic parameters. The degradation of degradation products was described with the single first order model. The resulting DT<sub>50</sub> value from the first order multi compartment model was not calculated as DT<sub>90</sub>/3.32 as recommended by FOCUS. This procedure produces the worst case DT<sub>50</sub> for the parent compound, which, however, does not describe the worst

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Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

#### П. RESULTS

First order multi compartment (FOMC) was the most appropriate kinetic model for modelling purpo for the degradation of trifloxystrobin in soils and Table 7.1.2.1.1-8 summarizes the results of the kinetic analysis.

Kinetic parameters for the degradation of triffoxystrobin in soils under Table 7.1.2.1.1-8: aerobic conditions for modelling purpose according to FOGUS

			8	Q	
Soil	Kinetic Model <sup>1</sup>	DT <sub>50</sub> <sup>2</sup>	Chi <sup>2</sup> Error	<sup>©</sup> <sup>*</sup> t-test <sup>3</sup>	Visual 🔊
		[days	[%]	~~ ~ ~	Assessment
	FOMC	257	11.9	b99 x 10♀	$\sqrt{0^{\circ} + 0}$
	FOMC	0.73	° 5.4	₹.00 x <b>2</b> 0 <sup>-5</sup>	
	FOMC	0.58¢	¥4.2	3.48 × 10 <sup>-9</sup>	

FOMC: first order multi compartment of the decline curve

- 2 for FOMC: DT<sub>50</sub> was not calculated to DT<sub>20</sub>/3 DTX0 is based 3
- for FOMC: worst case value of rate parameters alpha and beta visual assessment: + = good

triffexystrobin and its major The results are included in the mmary of the degradation degradation products in soil in the laboratory given in section

CONCLUSION

The calculated half-lives for modelling purpose for the orgradation of triflox strobin in soil under aerobic conditions in the dark in the laboratory were between 0.07 and 9.73 days in the tested soils.

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	y V 'y		$\vee$ $\sim$		
Report:	KCA 7.1.2.1.1 /1	34	•	•	; 2013
Title: O	Kinetic Evaluatio	n of the Degrada	ation of Toff	oxystrobin and it	ts Metabolite under
	Aerobic Soil Con	nditions in Eabor	ratory Accor	ding to FOCUS	Kinetics Using the
2CT	KinGUI 2 Tool		* <u>`</u> \$	Y	
Report No:	Ensa-13-0717				
Document No:	<b>X</b> -467664-01				
Guidelines: 🖏	- FOCUS kinetic	s (2006)	. <i>D</i>		
GLP:	No No		, S		
Justification	New data / guide	line requirement:	· 🏷		
A	Kinetic <sup>0</sup> anal <sub>x</sub> sis	of the degradati	of triflox	systrobin and its	major degradation
Ô,	product CGA 321	1943 for modellu	ng purpose		-

### **Executive Summa**

A kinetic analysis of soil esidus data from the aerobic soil degradation study M-073242-01-1 (Baseline Dessier, KCA #1.2.1.1708) @ras performed with the software KinGUI 2 according to FOCUS kinetics 2006 to derive half-lives for trifloxystrobin and its degradation product CGA 324/13 a well as formation fractions for CGA 321113, which are suitable for modelling purpose/Only the results for trifloxystrobin are described here.

Double first order in parallel was the most appropriate kinetic model for modelling purpose for the under aerobic conditions in the dark in the laboratory at degradation of trifloxystrobin in soil 20 °C, 40% of the maximum water holding capacity and a test concentration of 337  $\mu$ g/kg.



The half-life of trifloxystrobin was 4.35 days.

#### **METHODS** L

Soil residue data from the aerobic soil degradation study M-073242-01-1 (Baseline Dossier KCA 7.1.2.1.1 /08) were used. In this study, the degradation of trifloxystrobin was studied in soil (sandy loam) under aerobic conditions in the dark in the laboratory for 120 days at  $20^{\circ}$ C the maximum water holding capacity and a test concentration of 337  $\mu g/kg$ ,

The kinetic analysis was performed according to FOCUS kinetics (2006) 1 using the software KinGUI 2 with four different kinetic models: single first order, first order multi compartment, bockeys stick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The Oitial ecover at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fig the value was allowed to be estimated by the model. The most appropriate kipetic model was selected on the basis of a detailed statistical analysis including visual assessment of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, t-test significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters. The degradation of degradation products was described with the single first order model. The resulting DT<sub>50</sub> value from the double first order in parallel model was not calculated from the slow & rate as recommended by BOCUS. This procedure produces the worst case DT<sub>50</sub> for the parent compound, which, hovever, does not describe the worst case scenario for the following degradation products. The DT 50 value taken for prodelying is based on the iteratively calculated value from KinGUH 2

### RESULTS

Double first order in paraller (DFQP) was the most appropriat kinet model for modelling purpose for the degradation of trifloxystropin in soil 1-9 summarizes the results of the kinetic analysis.

Table 7.1.2.1.9-9: Kinetic parameters for the degradation of trifloxystrobin in soil under aerobic conditions for modelling purpose according to FOCUS

sQ.			Ň		^	Ň	JY O	/		
	Soil	N°	Kineti	Model <sup>1</sup>	Ş 🗌	DA 50 <sup>2</sup>	Chi <sup>2</sup> Error		t-test	Visual
		\$	~ <u>~</u>	× ~		[days]	× [%]			Assessment <sup>3</sup>
			) I	FOP	, K	4.35	<b>3</b> .0	k	$_2:$ < 2 x 10 <sup>-16</sup>	+
<sup>1</sup> DFOP	doub	le first	rdes in n	araÛel	S.	Č,				

<sup>2</sup> for DFOP: DT<sub>5</sub> was no calculated from the slow k-pate, DT<sub>50</sub> is based on fit of the decline curve

<sup>3</sup> visual assessment: + good Щ

### CONCLUSIONS

The calculated half-life for modelling purpose for the degradation of trifloxystrobin in soil under aerobic conditions in the dark in the dark in the daboratory was 4.35 days in the tested soil.

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 7.1.2.1.

E Stranger W.


Report:	KCA 7.1.2.1.1 /14; ; ; ; 2013 。
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin and its Metabolite under
	Aerobic Soil Conditions in Laboratory According to FOCUS Kinetics Using the
	KinGUI 2 Tool
Report No:	EnSa-13-0718
Document No:	M-468172-01-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>
GLP:	No S A A A
Justification:	New data / guideline requirement:
	Kinetic analysis of the degradation of trifloxystrobin and its major degradation
	product CGA 321113 for modelling purpose Q

### **Executive Summary**

A kinetic analysis of soil residue data from the aerobic soil degradation study M-035008-01-1 (Baseline Dossier, KCA 7.1.2.1.1/01 and KCA 7.1.2.1.2/01) was performed with the software KinGUI 2 according to FOCUS kinetics (2006)<sup>1</sup> to derive hab lives for triboxystrobin and its degradation product CGA 321113 as well as formation fractions for CGA 321113, which are suitable for modelling purpose. Only the results for artifloxystrobin are described here

First order multi compartment was the most appropriate knetic model for modelling purpose for the degradation of trifloxystrobin in soil means under aerobic conditions in the dark in the laboratory at 19 °C, 75% of the field capacity and a test concentration of 1.0 mg/kg.

The half-life of trifloxystrobin was 049 day

### METHODS,

Soil residue data from the aerobic soil degradation, study M-033008-01-1 (Baseline Dossier, KCA 7.1.2.1. //01 and KCA 7.1.2.1.2 //01) were used on this study. The degradation of trifloxystrobin was studied in soil for the field conditions in the dark in the laboratory for 364 days of 19 °C, 75% of the field conacity and a test concentration of 1.0 mg/kg.

The kinetic analysis was performed according to POCUS kinetics  $(2006)^{1}$  using the software KinGUI 2 with four different kinetic models single first order, first order multi compartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessement of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, t-test significance correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters. The degradation of degradation products was described with the single first order model. The resulting DT<sub>50</sub> value from the first order multi compartment model was not calculated as DT<sub>90</sub>/3.32 as recommended by FOCUS. This procedure produces the worst case DT<sub>50</sub> for the parent compound, which, however, does not describe the worst case scenario for the following degradation products. The DT<sub>50</sub> value taken for modelling is based on the iteratively calculated value from KinGUI 2.



#### П. **RESULTS**

First order multi compartment (FOMC) was the most appropriate kinetic model for modelling put . Table 7.1.2.1.1- 10 suppmarizes the re for the degradation of trifloxystrobin in soil the kinetic analysis.

Table 7.1.2.1.1-10: Kinetic parameters for the degradation of triffoxystrobin is soil and er aerobic conditions for modelling purpose according to FOCUS

			¥			<u> </u>
Soil	Kinetic Model <sup>1</sup>	DT 50 <sup>2</sup>	Chi <sup>2</sup> Error	⊃ <sup>≫</sup> t-test <sup>3</sup>	Visual	
		days	<b>1</b> %	• A	Assessment	, Q
	FOMC	Q:#9	5.1	5,94 x 1Q6		â

FOMC: first order multi compartment

<sup>2</sup> for FOMC:  $DT_{50}$  was not calculated as  $DT_{3}/3.32$   $T_{50}$  is based on fit of the decore curve

<sup>3</sup> for FOMC: worst case value of rate parameters appha and bet

<sup>4</sup> visual assessment: + = good

The calculated half-life for modeling purpose for the degradation of trifloxystrobin in soil under aerobic conditions in the dark in the laboratory was 0,49 day on the tested soil.

Ñ X 0 The results are included in the summary of the degradation rates of triflexystrobin and its major degradation products in solution the aboratory given in section CA 7.1

Report: KCA 7,1.2.1.1,15; ; ; ; ; 2013
Title: Kinetio Evaluation of the Degradation of Triflox ystrobut and its Metabolite unde
Aetobic Soil Conditions in Laboratory According to FOCUS Kinetics Using the
Tool V S S O
Report Non EnSa-13-0719 A A
Document No: M-468202-01-1
Guidelines: FOCUS Princips (2006) 1 . O
$GLP: \qquad A G D' \qquad A' \qquad$
Justification: New data / guideline requirement:
Kinetic analysis of the degradation of trifloxystrobin and its major degradation
product & GA 32 113 for motolling purpose

## ExecutiveSummary

A kinetic analysis of soft residue date from the aerobic soil degradation study M-033147-01-1 (Baseline Dossier, KCA7.1.201.1/02 and RCA 7.1.2.1.2/02) was performed with the software KinGUI 2 according to FOCUS konetics (2006)<sup>1</sup> to derive half-lives for trifloxystrobin and its degradation product OGA 201113 as well as formation fractions for CGA 321113, which are suitable for modelling purpose. Only the results for trifloxystrobin are described here.

Single for the most appropriate kinetic model for modelling purpose for the degradation of trifloxystrobun in soil under aerobic conditions in the dark in the laboratory at 19 °C, 75% of the field capacity and a test concentration of 1.0 mg/kg.

The half-life of trifloxystrobin was 0.41 days.

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Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

#### I. **METHODS**

Soil residue data from the aerobic soil degradation study M-033147-01-1 (Baseline Dossier, KCA 7.1.2.1.1 /02 and KCA 7.1.2.1.2 /02) were used. In this study, the degradation of trifloxy strobin (loam) under aerobic conditions in the date in the laberatory for was studied in soil 365 days at 19 °C, 75% of the field capacity and a test concentration of 1.0 mg/kg.

The kinetic analysis was performed according to FOGUS kinetics (2006)<sup>1</sup> using the software KinGUI 2 with four different kinetic models: single first order, first order multi compartment, hockeystick (double first order sequential) and double first order in paralla. Model input datasets were the residual amounts found in each replicate test system at each samping interval, The initial recovery a DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit the value was allowed to be estimated by the model. The most appropriate kingtic model was selected on the basis of a detailed statistical analysis including visual assessment of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, t-test significance, correlation analysis and standard deviation. The DTro value was calculated from the resulting kinetic parameters. The degradation of degradation products was described with the single first order model.

Single first order (SFO) was the most appropriate kinet model for model in purpose for the 11 summarizes the results of the degradation of trifloxystrobip in soil L. kinetic analysis.

Table 7.1.2.1.1-11: Kinetic parameters for the degradation of trifloxy pobin in soil under aerobic conditions for modelling purpose according to FOCUS

Soil Kineric Model 1 / DTso Chr?Error trest	Visual
	Assessment <sup>2</sup>
$ \begin{array}{c} & & \\ & & $	0
<sup>1</sup> SFQ single first order $\mathcal{A}$ $\mathcal{A}$ $\mathcal{A}$	
<sup>2</sup> vistral assessment $o = moderate 0$	

The calculated half-life for modelling purpose for the degradation of trifloxystrobin in soil under





Report:	KCA 7.1.2.1.1 /16; ; ; 2013 。
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin and its Metabolites
	under Aerobic Soil Conditions in Laboratory According to FOCUS Kingtics
	Using the KinGUI 2 Tool
Report No:	EnSa-13-0720
Document No:	M-468203-01-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>
GLP:	No S A No No
Justification:	New data / guideline requirement:
	Kinetic analysis of the degradation of trifloxystrobin and its major degradation
	products CGA 321113 and CGA \$57276 for modelling purpose

### **Executive Summary**

A kinetic analysis of soil residue data from the aerobic soil degradation study M-033394-01-1 (Baseline Dossier, KCA 7.1.2.1.1/03 and KCA 7.1.2.1.2/03) was performed with the software KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> to derive half-lives for traditoxystrobin and its degradation products CGA 321113 and CGA 357276 as well as formation fractions for CGA 321113 and CGA 357276, which are suitable for modelling purpose. Only the results for prifloxystrobin are described here.

First order multi compartment was the most appropriate kinetic model for modelling purpose for the degradation of trifloxystrobin in soil **provident and a set of the set of the** 

The half-life of triflos stroble was 0.85 days.

Soil residue data from the aerobic soil degradation study M<sub>2</sub> (33394-01-1 (Baseline Dossier, KCA 7.1.2.9.1 /03 and KCA 7.1.2.1.2./93) were used. In this study, the degradation of trifloxystrobin was studied in soil (learn) under aerobic conditions in the dark in the laboratory for 365 days at 25 °C, 75% of the field capacity at 1/3 bar and a text concentration of 0.5 mg/kg.

METHODS

The kinetic analysis was performed according to FOCUS kinetics  $(2006)^{1}$  using the software KinGUI 2 with four different kinetic models, single first order, first order multi compartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessement of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, t-test significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters. The degradation of degradation products was described with the single first order model. The resulting DT<sub>50</sub> value from the first order multi compartment model was not calculated as DT<sub>90</sub>/3.32 as recommended by FOCUS. This procedure produces the worst case scenario for the following degradation products. The DT<sub>50</sub> value taken for modelling is based on the iterative calculated and the form KinGUI 2.

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#### П. **RESULTS**

First order multi compartment (FOMC) was the most appropriate kinetic model for modelling purp Table 7.1.2.1.1- 12 symmarizes the for the degradation of trifloxystrobin in soil of the kinetic analysis.

Table 7.1.2.1.1-12: Kinetic parameters for the degradation of triffexystrobin is soil ander aerobic conditions for modelling purpose according to FOCUS

			V	a())		_%)
Soil	Kinetic Model <sup>1</sup>	DT 50 <sup>2</sup>	Chi <sup>2</sup> Error	$\mathbb{D}^{\mathbb{V}}$ t-test <sup>3</sup>	Visual	¢ (
		[days	[%]		Assessment	, Q
	FOMC	0.85	7.9	3,99 x 1Q	$\frac{1}{2}$	Ő,

FOMC: first order multi compartment

<sup>2</sup> for FOMC:  $DT_{50}$  was not calculated as  $DT_{50}/3.32$   $PT_{50}$  is Pased on fit of the decore curve

<sup>3</sup> for FOMC: worst case value of rate parameters appha and bet

<sup>4</sup> visual assessment: + = good

The calculated half-life for modeling purpose for the degradation of trifloxystrobin in soil under aerobic conditions in the dark in the laboratory was 0.65 day on the tested soil.

Ř 0 The results are included in the summary of the degradation rates of triflexystrobin and its major degradation products in solution the aboratory given in section CA 7,1,2.1

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Report: KCA 7,1.2.1.177;	; 2013
Title: Kinetio Evaluation of the D	gradation of Trifloxystrobut and its Metabolite under
Aerobic Soil Conditions in	Laboratory According to FOCUS Kinetics Using the
🏷 KinGUL 2 Tool 🔍 🐇	
Report Non EnSa-13-072, A	
Document No: M-468174-01-1	
Guidelines: - FOCUS Pinetics (2006) <sup>51</sup>	
GLP:	
Justification: New data / guideline require	ment:
Kingic analysis of the deg	radation of trifloxystrobin and its major degradation
product GGA 321113 for mo	A fling purpose

### Executiv@Summary

A kinetic analysis of soft residue date from the aerobic soil degradation study M-033464-01-1 (Baseline Dossier, KCA7.1.201.1/07 and RCA 7.1.2.1.2/07) was performed with the software KinGUI 2 according to FOCUS kinetics (2006)<sup>1</sup> to derive half-lives for trifloxystrobin and its degradation modulet OGA 201113 as well as formation fractions for CGA 321113, which are suitable for modelling purpose. Only the results for trifloxystrobin are described here.

First order matri compartment was the most appropriate kinetic model for modelling purpose for the under aerobic conditions in the dark in degradation of trifloxystrobin in soils and the aboratory at 19.2 °C, 40% of the maximum water holding capacity and test concentrations of 0.3 and 1.0 mg/kg.

The half-life of trifloxystrobin was 0.34(0.3 mg/kg) and 40 days (1.0 mg/kg) in soil and 0.44 days in soil

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Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

### I. METHODS

Soil residue data from the aerobic soil degradation study M-033464-01-1 (Baseline Dossier, KCA 7.1.2.1.1 /07 and KCA 7.1.2.1.2 /07) were used. In this study, the degradation of triflox strobin was studied in soils **area** (sandy loam) and **area** (loamy sand) uncer aerobic conditions in the dark in the laboratory for 105 days at 19.2 °C, 40% of the maximum water holding capacity and test concentrations of 0.3 and 1.0 mg/kg.

The kinetic analysis was performed according to FOCUS kinetics  $(2006)^{1}$  using the software KinGUI 2 with four different kinetic models: single first order, first order multi compartment, beckey, stick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The thitial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fix the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessment of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, t-test significance, correlation analysis and standard deviation. The  $DT_{50}$  value was described with the single first order model. The resulting DTs value from the first order multi compartment model was not calculated as  $DT_{9/9}^{-3}.32$  as recommended by DOCUS. This procedure produces the worst case  $DT_{50}$  for the parent compound, which, however, does not describe the worst case scenario for the following degradation products. The  $DT_{50}$  value taken for modelling is based on the iteratively calculated value from KinGUH.2.

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First order multi compartment (FOMC) was the most appropriate kinetic model for modelling purpose for the degradation of triflox strobins in soils and and the strobins in soils and the strobins in soi

 Table 7.1.2.1.9-13 Kinetic parameters for the degradation of trifloxystrobin in soils under aerobic conditions for modelling purpose according to FOCUS

		K		N V			
s,	Soil	🔊 Kinetic	Moder	$DT_{50}^{2}$	Chi <sup>2</sup> Error	t-test <sup>3</sup>	Visual
	<u></u>			∫ [days]∕	~ <b>[%</b> ]		Assessment <sup>4</sup>
	to A	FC	MC V	0.34	2.5	2.05 x 10 <sup>-6</sup>	+
		FC	MC or	ð 40 a	4.1	1.85 x 10 <sup>-5</sup>	+
	©	¢ ~F0	MC	≫ 0.44	4.8	1.37 x 10 <sup>-6</sup>	+
1 0	( '						

FOMC: first order multi compartment

<sup>2</sup> for POMC: DT<sub>50</sub> was not calculated as DF<sub>6</sub>/3.32, DT<sub>50</sub> is based on fit of the decline curve

for FOMC: worst case value of rate parameters of the and beta

- <sup>4</sup> √isual assessment: + <del>zg</del>ood
- <sup>5 %</sup>test concentration of **0**.3 mg/kg
- test conceptration of 1.0 mg/kg

### **H.** CONCLUSIONS

The calculated half-lives for modelling purpose for the degradation of trifloxystrobin in soil under aerobic conditions in the dark in the laboratory were between 0.34 and 0.44 days in the tested soils.

The restors are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 7.1.2.1.



Report:	KCA 7.1.2.1.1 /18; ; ; ; ; 2013 。
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin and its Metabolites
	under Aerobic Soil Conditions in Laboratory According to FOCUS Kinglics
	Using the KinGUI 2 Tool
Report No:	EnSa-13-0724
Document No:	M-467669-01-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>
GLP:	No S A A A
Justification:	New data / guideline requirement:
	Kinetic analysis of the degradation of trifloxystrobin and its major degradation
	products CGA 321113, NOA 413161 and CGAQ57276 for modelling purpose

### **Executive Summary**

A kinetic analysis of soil residue data from the aerobic son degradation study M-464420-01  $^{\circ}$  (Supplemental Dossier, KCA 7.1.2.1.1/10) was performed with the software KinGUI 2 according to FOCUS kinetics (2006)<sup>1</sup> to derive dalf-lives for trifloxystrobin and its degradation products CGA 321113, NOA 413161 and CGA 357276 as well as formation fractions for CGA 321113, NOA 413161 and CGA 357276, which are suitable for modelling purpose. Only the results for trifloxystrobin are described here.

First order multi compartment was the most appropriate kinetic model for modelling purpose for the degradation of trifloxystrobin in soils

4a and under aerobic conditions in the dark in the aboratory at 20.1 °C, 53.4% of the maximum water folding capacity and test concentration of 480 µg/kg.

The half-life of toploxystrobin, was 003 days in soil and 030 days in so

Soil restrue data from the abrobic soil degradation study M464420-01-1 (Supplemental Dossier, KCA 7.1.2.1.1/10) were used. In this study, the degradation of trifloxystrobin was studied in soils (sandy loam), (sandy loam), (sandy loam), 4a (silt load) and (clay boam) inder aerobic conditions in the dark in the laboratory for 120 days at 20.1 °C, 53.4% of the maximum water holding capacity and a test

laboratory for 120 days at 20.1 °C, 53.4% of the maximum water holding capacity and a test concentration of 480 μg/kg.

The kinetic analysis was performed according to FOCUS kinetics  $(2006)^{1}$  using the software KinGUI 2 with four different kinetic models: single first order, first order multi compartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amount found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessement of the goodness of the fits, chi<sup>2</sup> scaled error otherior, t-test significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was described with the single first order model. The resulting DT<sub>50</sub> value from the first order multi compartment model was not calculated as DT<sub>90</sub>/3.32 as recommended by FOCUS. This procedure produces the worst case DT<sub>50</sub> for the parent compound, which, however, does not describe the worst case scenario for the following degradation products. The DT<sub>50</sub> value taken for modelling is based on the iteratively calculated value from KinGUI 2.







#### II. **RESULTS**

First order multi compartment (FOMC) was the most appropriate kinetic model for modelling purpose for the degradation of trifloxystrobin in soils

Table 7.1.2.1.1- 14 summarizes the results of the kinetic 4a and analysis.

Table 7.1.2.1.1-14: Kinetic parameters for the degeadation of the low soils under aerobic conditions for modelling purpose according to FOCUS

		a.Y	A.		
Soil	Kinetic Model <sup>1</sup>	<b>D</b> T 50 <sup>2</sup>	Chi <sup>2</sup> Ecror	° t-test <sup>3</sup>	Visual 🦉
	la l	[days]	~[%] @		Assessment
	FOMC 🔬	0.13	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1.67 x 10	× + ×
	FOMC O	<b>@</b> 15	6.5	⊗.54 x 0 <sup>-11</sup>	
4a	FOMC	~0.19 ©	-Q5	4.74 x 10 <sup>-16</sup> C	
	FOMC	0.30	∂1.4	1.DS″x 10⊄ <sup>1</sup> ]	+

<sup>1</sup> FOMC: first order multi compartment  $\mathcal{Q}^{\vee}$ 

<sup>2</sup> for FOMC:  $DT_{50}$  was not calculated as  $DT_{90}$  32,  $DT_{90}$  is based on fit of the decline curv <sup>3</sup> for FOMC: worst case value of rate and the second se

<sup>3</sup> for FOMC: worst case value of rate parameters alpha and beta

<sup>4</sup> visual assessment: + = good

The calculated half-lives for modelling purpose for the degradation of the low strobin in soil under aerobic conditions in the dark in the laboratory were between 0.18 and 0.30 days in the tested soils. 6 Ľ O

 $\bigcirc$ The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 21.2. ht

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Report:	KCAJ.1.2.kJ/19; 2013 @ @
Title:	Kingthe Evaluation of the Degradation of Triflexystrobin and its Metabolite under
* *	Aerobic Soil Conditions in Laboratory According to FOCUS Kinetics Using the
	SunGUI2 Took
Report No:	©EnSa-13-0755
Document N@	$M_{\phi} = M_{\phi} = 0.1 - 1_{\phi} = 0^{\gamma} = 0^{\gamma} = 0^{\gamma} = 0^{\gamma}$
Guidelines:	- FOCLS kinetics $(2006)^1$
GLP:	No S AN A A A A A A A A A A A A A A A A A
Justification:	New data / Quideline requirement.
<i>"</i>	Kuretic analysis of the degradation of trifloxystrobin and its major degradation
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	product CGA 32111 Ofor modelling purpose

Executive Summary

A kinetic analysis of Soil residue data from the aged residues column leaching / aerobic soil degradation study M-033599 01-1 (Baseline Dossier, KCA 7.1.2.1.1 /06 and KCA 7.1.2.1.2 /06) was performed with the software KinGUI 2 according to FOCUS kinetics (2006)<sup>1</sup> to derive half-lives for triflexystropin and its degradation product CGA 321113 as well as formation fractions for CGA 321913, which are suitable for modelling purpose. Only the results for trifloxystrobin are described here.

Single first order was the most appropriate kinetic model for modelling purpose for the degradation of trifloxystrobin in soil and first order multi compartment in soil and under aerobic conditions in the dark in the laboratory at 20 °C, different soil moistures (75% of the field capacity at 1/3 bar for soil and 40% of the maximum water holding capacity for soil and a test concentration of 1.0 mg/kg.

The half-life of trifloxystrobin was 0.82 days in soil

and 0.46 days in soil

# I. METHODS

Soil residue data from the aged residues column leaching/aerobic soil degradation study M-033599-01-1 (Baseline Dossier, KCA 7.1.2.0 1/06 and KCA 7.2.1.2/06) were used. In this study, the degradation of trifloxystrobin was studied in soils for the laboratory for 233 days of 20 °C, different soil (loamy sand) under aerobic conditions in the tark in the laboratory for 233 days of 20 °C, different soil moistures (75% of the field capacity at 1/3 bar for soil for the maximum water holding capacity for soil for soil for the field capacity of a test concentration of 1.0 mg/kg.

The kinetic analysis was performed according to FOCUS kinetics (2006) using the software KinGUI 2 with four different kinetic models: single first order first order multi conpartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessment of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, test significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters. The degradation of degradation products was described with the single first order model. The resulting DT<sub>50</sub> value from the first order multi compartment model was not calculated as  $DT_{90}/3/2$  as recommended by FOCUS. This procedure produces the worst case DT<sub>60</sub> for the parent compound which however, does not describe the worst case scenario for the following degradation products. The DT<sub>50</sub> value taken for modelling is based on the iteratively calculated value from KmGUI 2.

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Single first order was the most appropriate kunetic model for modelling purpose for the degradation of trifloxystrobin in soil and first order multi compartment in soil Table 7.1.2, 1.1-15 summarizes the results of the kinetic analysis.

 Table 7.1.1- 15:
 Kinetic parameters for the degradation of trifloxystrobin in soils under

 A aerobic condition for modelling purpose according to FOCUS

Soit	Kinetie Model	DT <sub>50</sub> <sup>2</sup> [days]	Chi <sup>2</sup> Error [%]	t-test <sup>3</sup>	Visual Assessment <sup>4</sup>
· · · · · · · · · · · · · · · · · · ·	SEO SEO	0.82	4.6	1.76 x 10 <sup>-12</sup>	+
	C S FOMC	0.46	3.6	1.43 x 10 <sup>-3</sup>	+

<sup>1</sup> SFQ: single wist order, FONDC: first order multi compartment

<sup>2</sup> for FOMC  $DT_{50}$  was not calculated as  $DT_{90}/3.32$ ,  $DT_{50}$  is based on fit of the decline curve

<sup>3</sup> for FOM : worst case value of rate parameters alpha and beta

visual assessment: + = good

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The calculated half-lives for modelling purpose for the degradation of trifloxystrobin in soil under aerobic conditions in the dark in the laboratory were between 0.46 and 0.82 days in the tested sets.

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 7.1.2.1

## CA 7.1.2.1.2 Aerobic degradation of metabolites, breakdown and reaction products

The degradation rates of the major degradation products CGA 32013 and NOA 413161 in soil under aerobic conditions in the dark in the laboratory were evaluated during the Annex I inclusion using two radiolabel positions, [<sup>14</sup>C-GP] and [<sup>14</sup>C-TP], and were accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following studies are included in the Baseline Dossier:

		4				O'	a a a a a a a a a a a a a a a a a a a		L
Annex Point / Ref	erence No	Author(s)	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim$	× A	Year	Docun	rent Ng	Ŵ
KCA 7.1.2.1.2 /01			, ¢	7.4	Ô	1997	M-033	008-QI	÷1
KCA 7.1.2.1.2 /02			, Ç	S (	\$ }*	û 1997 s	M-033	147-01-	-1
KCA 7.1.2.1.2 /03			$\sim$		j di	1997	NF-033	<b>394-</b> 01-	-1
KCA 7.1.2.1.2 /04	<i>a</i>		Ĉ		Å	<b>199</b> 7 _	M-033	<b>4</b> 59-01	-1
KCA 7.1.2.1.2 /05			O.	~~ _(	ΰ× i	, 1997 <sup>©</sup>	M-033	453-01-	-1
KCA 7.1.2.1.2 /06			>	Ø Å		1997	<b>M</b> -033	599 <b>-</b> 01·	-1
KCA 7.1.2.1.2 /07		. ((			≪ <sup>v</sup>	J997 ~	M-033	464-01	-1
KCA 7.1.2.1.2 /08			ð,		¥ &	2001	M-069	897-01	-1
KCA 7.1.2.1.2 /09		<i>7. 1</i>	e e e e e e e e e e e e e e e e e e e		0	200¥	M-068	260-01-	-1
	Ő ×				L.	<u> </u>			

Six additional studies have been performed for major degradation products and are submitted within this Supplemental Dessier for the trifloxystrobin renewal of approval using unlabelled CGA 357261, CGA 381318, NOA 413161, NOA 413163, CGA 357276 and NOA 409480. Furthermore, updated kinetic evaluations of the degradation behaviours of major degradation products in soil under aerobic conditions in the dark in the laboratory have been performed according to FOCUS kinetics (2006)<sup>1</sup> to derive kinetic parameters suitable for modelling purpose and environmental risk assessment. A summary of the degradation of trifloxystrobin and its major degradation products in soil in the laboratory is given in section (7, 1, 2)





Report:	KCA 7.1.2.1.2 /10; ; ; 2013		0	
Title:	Formation Fraction of NOA 413163 from CGA 357261	in Four Europe	ean Soils	Ĉ
Report No:	EnSa-12-0409			1
Document No:	M-459997-01-1	ð		
Guidelines:	- OECD Test Guideline No. 307	Å		
GLP:	Yes	4		
Justification:	Determination of formation fraction in soil of major	photodegradat	ion product	
	NOA 413163 for modelling purpose and degra	dation rates	of major	$(\mathcal{A})$
	photodegradation products CGA 357261 and CGAG734	66	2° V 4	Ç

### **Executive Summary**

The formation fraction of NOA 413163 derived from CGA 957261, a photodegradation product of trifloxystrobin, was studied in four soils under aerobic conditions in the dark in the laboratory for 121 days at 20.2 °C and 55  $\pm$  5% of the maximum stater holding capacity.

Soil	Source 0	Texture (USDA) OpH	** OC**/
	Monheim, Germany S	sandy loam 5.	<b>1.8</b>
	Monheim, Germany	sandy Toam C	) , <sup>(1)</sup> 1.5
4a <sub>Øl</sub>	Burscheid, Germany	sitt loan 0 6.2	2
Â,	Blankenheim, Germany	Chay log m 7.0	<b>b</b> <sup>*</sup> 4.8

\* pH value was derived from aqueous 0.01 NF CaCle suspension

Additionally, kinetic data for a possible evaluation of the formation fraction of the trifloxystrobin which are also derived from photodegradation products CGA 373466 and NOA 409489, CGA 357261, were determined.

A study application rate of 494 µg CGA 355261 per kg soil dry weight was applied based on a single ×, field application rate of trifloxystrobin of 187.5 sper hestare.

The amount of CGA 35726 bon the soil extracts decreased from 100.6, 100.1, 98.4 and 99.0% of applied amount [% AA] at study start (DQT-0) to < LOD (limit of detection) at DAT-58, DAT-121 (study end), DAT-39 and DAT-30 in sails

Degradation of CGA 357261 was accompanied by the ‡a and formation of its degradation products CGAS 73466, NOA 413163 and NOA 409480.

CGA 373466 amounted to maxima (GGA 397261, Equivalents) of 96.5% AA (DAT-1), 94.1% AA (DAT-1) 95.7% AA (DAT-1) and 96.6% AA (DAT-3) in soils

la and , respectively.

Ŵ NOA 413163 appounted to maxima @CGA \$57261 equivalents) of 12.2% AA (DAT-58), 9.6% AA (DAT-90), 5,2% AA (DAT 8) and 5.6% AA (DAT-58) in soils ≸a and ∣

, respectively.

NOA 409480 amounted to Values above LOD only in soil with maxima (CGA 3572@ equivalents) of 1.1% AA (DAT-58 to DAT-121).



The experimental data could be well described by a double first order in parallel kinetic mode	el for
soils , and 4a and a	first 📎
order multi compartment kinetic model for soil	inder 🔊
aerobic conditions was 0.1 days (corresponding to approximately 2 hours) in all soils.	Ô
It is concluded that CGA 357261 and its degradation products have no potential for accomputat	Sh in
the environment.	an m
	Ş.
I. MATERIALS AND METHODS	u k
A. MATERIALS	Å
1 Test Item	<u>S</u>
unlabelled CGA 357261	ŗ
Certificate of Analysis: AZ 17556	Å
Batch Code: AE 1393224 $PU-04$	Ű.
Chemical Purity: $99.4\% w/\psi$ $\gamma$ $\psi$ $\gamma$ $\psi$ $\gamma$ $\gamma$ $\gamma$ $\gamma$ $\gamma$ $\gamma$	<i>y</i>
2 Test Soils	
Four soils were used (see Table 1 2-12-12). The soils were taken from a procultured use	areas
representing different geographical origin an@different soft properties a required by the guide	lines.
No plant protection products, were used for the previous 5 years. The soils were sampled freshly	from
the fields (upper horizon of 0 to 20 cm) and signed to a particle size of $\leq 2$ mm. Soil collection	1 and
handling were in accordance to ISO 10301-6.	
A A Q	
$\circ$	

#### Table 7.1.2.1.2-1: Physico-chemical properties of test soils

Parameter		Results	/ Units		Ś
Soil Designation			4a		Jr.
Geographic Location			1	\$ \$	'n
City					4
State	North-Rhine	North-Rhine	ریNorth-Rhine	North-Rhine	s (
Country	Westphalia Germany	, Westphalia Germany	Westphalia Germany	Westphalia Germany	0 <sup>7</sup> 1
GPS Coordinates					
Soil Taxonomic Classification (USDA)	loamy, mixed,	sandy, mixed,	doamy, moxed,	fine-loamy,	
	mesic, Type	foesic, Typic	mesic, l'ypic C	mixed, active,	
				Eutructept	
Soil Series		no informati	orCavailable		
Textural Class (USDA)	sandy loan	sandy løam	sile Boam 🔊	ay loam	
Sand $[50 \mu\text{m} - 2 \text{mm}]$	\$ 53 <b>%</b>		~ <sup>015%</sup>	<sup>**</sup> 41%	
Silt $[2 \ \mu m - 50 \ \mu m]$	30% &	L 16%	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	26%	
Clay [< 2 μm]	<u>کې17% چې</u>	⊘ <sup>9%</sup> √ <sup>°</sup>		33%	
pH (soil/0.01 M CaCl <sub>2</sub> 1/2)	\$ 5 A	5,9		7.1	
pH (soil/water 1/1)		× <sup>∞</sup> <sup>*6.1</sup> (x	6.25	7.2	
pH (saturated paste)	5.3 5	× 6.10	<i>6,</i> 4 ∕	7.2	
pH (soil/1 N KCl 145)	4.7 × 4.7		5.8	6.8	
Organic Carbon Ö		≈1.5% @`		4.8%	
Cation Exchange Cathority Mala		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2.8%	8.3%	
Water Holding Capacity 4 4			11./	20.7	
maximum [g H <sub>2</sub> O add 00 g sol DW]	\$5.0	\$ 42.60	54.8	81.6	
at 0.1 bar (pF 2.0)	€ <sup>26.9%</sup>	145%	32.5%	36.1%	
Bulk Density (disturbed) [g/cm <sup>3</sup> ]	× 1.96	≈1.26	1.09	0.97	
Microbial Biomass [mg microbial		S.			
carbon per kg oil $D V I^2$					
DAT-0 (BIO-) 3		253	378	1074	
DAT-MABIO-/BIO-	2 <sup>1</sup> 333√ 568 ℃	393 / 404	377 / 461	1954 / 1377	
DA1=4.51 (BIO- \ RtQ_+)	Dec / CT D	2747252	2/6/314	336 / 348	

<sup>1</sup>% organic matter % organic carbon x 1/24
 <sup>2</sup> BIO- samples were left intreated, BIO+ samples were applied with solvent of application solution (400 μL acetone/water @/1 (v/v)).
 <sup>3</sup> Due to an experimental error, the samples were shaken at a lower velocity. This was considered in the calculation of the microbial biomass.

DAT: days after treatment

DW: dry weight

GPS global positioning system

USDA: United States Department of Agriculture

<u>م</u>

**BAYER** Bayer CropScience Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

### **B.** STUDY DESIGN

### 1. Experimental Conditions

The static test system for degradation in soil under aerobic conditions consisted of Erlenmeyer glass flasks (volume e.g. 300 mL). Each flask was closed with a polyurethane (PU) from plug allowing the oxygen exchange.

For preparation of the test systems, 100 g dry weight equivalents of the speed soils were weighed into each flask. Soil moisture was adjusted to  $55 \pm 5\%$  of the maximum water holding spacing (MWHC) for the individual test systems by addition of de-ionized water. The flasks were then closed with PU foam plugs and equilibrated to study conditions for days prior to application.

The study application rate (SAR) was based on a single field application rate of triflowystrobin of 187.5 g per hectare, resulting in a nominal SAR of 500 µg CCA 357261 pc kg sol dry weight.

The test item was applied dropwise onto the soft surface of the respective test systems in  $400\mu$ L acetone/water 1/1 (v/v) using a pipette After application, the test vessels (except DAT-0, DAT-0.08 and DAT-0.25 samples) were closed with PLK foam plugs.

The test systems were incubated in the dark for 121 days at 30.2 °C and 30.5 soils moisture of  $55 \pm 5\%$  MWHC in a walk-in character frames.

### 2. Sampling

11 sampling intervals were distributed over the entire incubation period of 421 days. Duplicate samples were processed and analysed 0, 0.08 0.25 0, 3, 7 14, 30, 58, 90 and 121 days after treatment (DAT). Microbial soil biomass was determined at start, middle and end of the study (DAT-0, DAT-58 and DAT-121).

m

At each sampling interval, concurrent recovery samples were prepared freshly by fortification of a representative soil (1990) with test item CGA 357261 and reference items CGA 373466, NOA 413163 and NOA 409480 at LOQ level (corresponding to 3% of the nominal SAR (test item equivalents)) and application rate level (corresponding to 100%, 100%, 50% and 50% of the nominal SAR (test item equivalents) for CGA 357261, CGA 373466, NOA 413163 and NOA 409480, respectively). Duplicate samples were prepared and processed in parallel to the degradation samples of the respective sampling interval for each fortification level.

### 3. Analytical Procedures

The entire soil of each test system was extracted three times at ambient temperature using a mechanical shaker and acetonic lewater 4/1 (v/v). Furthermore, two accelerated extraction steps using a microwave with a pragnetic stirver were performed, first with acetonitrile/water 1/1 (v/v) at 70 °C and second with methanol water 1/1 (v/v) at 50 °C. After each extraction step, extract and soil were separated by centrifugation (2560 x g) and decantation. The soil extracts were combined, internal stable-labelled standards (ISTDs) added (nominal concentrations of ISTDs were 10% of the nominal SAR (test item equivalents) and an aligned of the combined soil extract was analysed by reversed phase HPIC-MS/MS in selected reaction monitoring mode. Concurrent recovery samples were processed and analysed analogously. The limit of detection (LOD) and limit of quantitation (LOQ) for HPLC MS/MS analysis of the combined soil extracts corresponded to 1 and 3% of the nominal SAR (test item equivalents), respectively.



under

The HPLC-MS/MS method was validated with regard to linearity, accuracy and precision. The mass selective detector was operated in the positive electrospray ionization selected reaction monitoring mode, tuned for the mass transitions of parent and a significant product ion. The linearity range of the mass spectrometer was tested in pure extraction solvent. Therefore, multi-point calibration curves using ISTDs were established covering a range from 1% to 120%, 120% 60% and 60% of the nominal SAR (test item equivalents) for CGA 357261, CGA 373466, NOA 413163 and NOA 409480, respectively. The nominal concentrations of the ISTDs were 10% of the nominal SAR (test item equivalents) for the method was assessed on the basis of the recovery rates determined for each soil after fortification with test item CGA 357261 and reference items CGA 373466, NOA 413163 and NOA 409480 at LCQ level (corresponding to 3% of the nominal SAR (test item equivalents)) and application rate level (corresponding to 100%, 100%, 50% and 50% of the nominal SAR (test item equivalents) for CGA 357261, CGA 373466, NOA 413163 and NOA 409480 at LCQ level (corresponding to 100%, 50% and 50% of the nominal SAR (test item equivalents) for CGA 357261, CGA 373466, NOA 413163 and NOA 409480 at LCQ level (corresponding to 100%, 50% and 50% of the nominal SAR (test item equivalents)) and application rate level (corresponding to 100%, 50% and 50% of the nominal SAR (test item equivalents) for CGA 357261, CGA 373466, NOA 413163 and NOA 409480, respectively). The fortified samples were processed and analysed as described for the degradation samples. Blank soil matrix solutions were used to determine the background abundance of the test item in the respective soils.

The degradation kinetics of the test item was determined according to FOCUS kinetics (2006), bising the software KinGUI 2 with three different kinetic models: single first order, first order multi compartment and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The best-fit kinetic model was selected on the basis of the chi<sup>2</sup> scaled-error criterion and on the basis of a visual assessment of the goodness of the fits. DF<sub>50</sub> and DT<sub>90</sub> values were calculated from the resulting kinetic parameters

FIL RESULTS AND DISCUSSION

Results indicated that the anticipated standardized aerobic conditions were maintained and that the soils were microbially active over the duration of the laboratory andy.

### A. DATA

	ŝ	A	Ű	×,	×,0°		ð	•		,		
	Mean 14		Č.		× ô	, and a second	DAT	_				
Compound	SDÒ	O	0,08/	0.25	<u> </u>	3	7	14	30	58	90	121
CGA 357261	Mean	100.6	<b>Q</b> .2	121	<i>B</i> .3	<b>Q</b> .1	2.0	1.5	1.0	<lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""></lod<></td></lod<>	<lod< td=""></lod<>
Ö <sup>y</sup>	SD	¢±0.5	510.8	¢۲0.3 ه	\$¥0.2₀	$_{\pm 0.0}^{0.0}$	±0.4	±0.3	$\pm 0.1$			
CGA 373466	Mean	<lqd< td=""><td><sup>∞</sup>58:2<sub>√</sub></td><td>91.9</td><td>°96.3©</td><td>92.2</td><td>84.7</td><td>66.9</td><td>47.9</td><td>28.7</td><td>17.4</td><td>12.5</td></lqd<>	<sup>∞</sup> 58:2 <sub>√</sub>	91.9	°96.3©	92.2	84.7	66.9	47.9	28.7	17.4	12.5
	SĎ∕ຶ	Ĩ¢,	±095	±0,1	4026	$\pm 1.2$	±1.1	±0.2	±0.6	±0.7	$\pm 0.0$	$\pm 0.0$
NOÅ 413163	Mean	n.d.	fi.d.	<i>S</i> LÓD,	LOD	1.2	3.8	5.5	9.6	12.2	11.0	10.6
	SD 3	۰ ر				$\pm 0.1$	±0.3	±0.2	±0.1	±0.9	±0.4	±1.0
NOA 409480	Meany	n để	n.d.	n.Ø	n.d.	<lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""><td>1.1</td><td>1.1</td><td>1.1</td></lod<></td></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""><td><lod< td=""><td>1.1</td><td>1.1</td><td>1.1</td></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""><td>1.1</td><td>1.1</td><td>1.1</td></lod<></td></lod<>	<lod< td=""><td>1.1</td><td>1.1</td><td>1.1</td></lod<>	1.1	1.1	1.1
	<u>s</u> d	$\rho^{\circ}$	$\langle \rangle$	~Q						±0.1	$\pm 0.0$	$\pm 0.0$

Table T.1.2-2: Degradation of CGA 357261 in soil

n.d.: not setected DAT: days after treatment, SD: standard deviation

CGA/35726 equivalents

Bayer CropScience Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

John Star

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Table 7.1.2.1.	.2-3:	Degrad	lation	of CG	A 3572	61 in s	oil	1 0/		u	inder a	ierobic
		conditi	ons (m	ean val	ues and	a SD ex	presse	d as %	AA)		c	
	Mean <sup>1</sup>			_		_	DAT	_	. 8	ř		
Compound	SD	0	0.08	0.25	1	3	7	14	30	58	9.0	12
CGA 357261	Mean	100.1	48.2	14.2	6.3	4.0	2.8	2.6	<u>م</u> 2.1	1.4	A.4	,≰î≱OD
	SD	±2.1	±1.1	$\pm 0.1$	$\pm 0.0$	±0.2	$\pm 0.1$	±0.5 🖋	<b>∕_</b> ₽0.2	±0.2	$O_{\pm 0.2}$ (	
CGA 373466	Mean	<lod< td=""><td>54.1</td><td>90.2</td><td>94.1</td><td>93.7¢</td><td>90.2</td><td>77.3</td><td>62.9</td><td>39.8</td><td>26.0</td><td>17.2</td></lod<>	54.1	90.2	94.1	93.7¢	90.2	77.3	62.9	39.8	26.0	17.2
	SD		±1.2	$\pm 0.9$	$\pm 1.3$	$\pm 0.0$	$\pm 1.5$	±005	±0.2	±0,1	£9.8	<b>±0</b> .2
NOA 413163	Mean	n.d.	n.d.	<lod< td=""><td><lod< td=""><td><i>1</i>.1</td><td>2.7</td><td><b>A</b>.6</td><td>7.3</td><td><b>%</b>9.2</td><td>Q9.6</td><td>5<sup>≫</sup>8.6 §</td></lod<></td></lod<>	<lod< td=""><td><i>1</i>.1</td><td>2.7</td><td><b>A</b>.6</td><td>7.3</td><td><b>%</b>9.2</td><td>Q9.6</td><td>5<sup>≫</sup>8.6 §</td></lod<>	<i>1</i> .1	2.7	<b>A</b> .6	7.3	<b>%</b> 9.2	Q9.6	5 <sup>≫</sup> 8.6 §
	SD				ŀ	$\pm 0.1$	±0.1 🖗	$2 \pm 0.1$	° ±0.1≪	±0.3	±0.00	±0,2
NOA 409480	Mean	n.d.	n.d.	n.d.	n.do	-LOD	<lød< td=""><td>&lt;ŕ @Ď</td><td><lod< td=""><td><k@d< td=""><td><lød< td=""><td><lod< td=""></lod<></td></lød<></td></k@d<></td></lod<></td></lød<>	<ŕ @Ď	<lod< td=""><td><k@d< td=""><td><lød< td=""><td><lod< td=""></lod<></td></lød<></td></k@d<></td></lod<>	<k@d< td=""><td><lød< td=""><td><lod< td=""></lod<></td></lød<></td></k@d<>	<lød< td=""><td><lod< td=""></lod<></td></lød<>	<lod< td=""></lod<>
	SD				, ¥		_°O`	$\sim$	1 Cor	$\gg$	s 🔊	Š

n.d.: not detected, DAT: days after treatment, SD standar deviation <sup>1</sup> CGA 357261 equivalents Ź

SD

Table 7.1.2.1.2- 4:	Degradation of	CGA 35726	to in soul		
	aerobic condition	s (mean val	ues and SDe	xpressed	as AA

	a		conup	alaup (X	ucan wa	nucs au	ha She	Apr Cas	cu as 😪	U AAU	<i>Č</i> o	
			Ś	The second se			$\sim$	- A	Ň		×,	
	Mean <sup>1</sup>		Ą	Ô	Ô	ð	ÐÁT	0	<u>~</u> 0	Õ	°	
Compound	SD	0	<b>@</b> .08 。	<b>≪0.25</b>	$\hat{\mathcal{O}_1}$	\$3	©″7 _	⊙ <sup>≫</sup> 14	° 30 %	🖓 58 🔇	, 90	121
CGA 357261	Mean	98.4	49,9	16.2	6.4	3.9	2.3	1,70	1.4	1.1 <sup>O</sup>	<lod< td=""><td><lod< td=""></lod<></td></lod<>	<lod< td=""></lod<>
	SD	$\pm 0.6$	±233	±130	$\pm @2$	$\pm 0.5$	±0.3	±0:0	±0.0	<b>0</b> .1		
CGA 373466	Mean	∛∳¢́OD	<sub>4</sub> 51.8	<b>\$9</b> .1	25.7	\$5.0	<b>\$</b> 94.0	<sup>%</sup> ₹99.5 <sub>s</sub>	65.4 🖉	A1.1	25.6	16.3
	SD 🛒		₹£1.9¢	¢±0.3 (	$\widetilde{\mathbb{D}}\pm 0.6$	±0.4	10.2	* ±07	±0.20	) ±0.6	±0.2	$\pm 0.2$
NOA 413163	Mean	n.d.	n	<l@d< td=""><td><lød< td=""><td><lød< td=""><td>1.8</td><td>2 *</td><td>4.5</td><td>5.9</td><td>5.1</td><td>4.4</td></lød<></td></lød<></td></l@d<>	<lød< td=""><td><lød< td=""><td>1.8</td><td>2 *</td><td>4.5</td><td>5.9</td><td>5.1</td><td>4.4</td></lød<></td></lød<>	<lød< td=""><td>1.8</td><td>2 *</td><td>4.5</td><td>5.9</td><td>5.1</td><td>4.4</td></lød<>	1.8	2 *	4.5	5.9	5.1	4.4
	SD.	Å.		4	<u>ه</u> .	~Õ	0.3	,( <b>±</b> 0.1	@≠0.0	$\pm 0.1$	$\pm 0.0$	$\pm 0.4$
NOA 409480	Mean	n.d. /	Ç∕n.d.∢	n.d. <i>*</i>	⊳n.d. "	<b>∛</b> LOD∗	Ĵ×LOD.	<b>KLOD</b>	≫LOD	<lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""></lod<></td></lod<>	<lod< td=""></lod<>
2	SD	ľ.O	Ő	í L		Č I	- A	<u>_</u>				

n.d.: not detected, DAT: days after meatment, SD: standard deviation

<sup>1</sup> CGA 357261 equivalents

Table 7.1.2.1.2-	5: 🕅	Degra	dation	of	CGA 357	264 i	1 sõil		under
	S	condit	ions (m	iean/v	values and	SD ex	pressed	l as % AA)	

	~~ £	<u>ڳ ∛ ڏ</u>		8 %	ñ L	y L	ÿ					
	Mean <sup>®</sup>	» ش	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u> </u>	<u> </u>	S.	DAT					
Compound	SD	$\gg$	Ø.98	035	Ø) <sup>×</sup>	ð	7	14	30	58	90	121
CGA 357201	Mean	99.0	65.4	\$3.4 <	7.9	3.2	1.7	1.1	<lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""></lod<></td></lod<>	<lod< td=""></lod<>
M.	SD 🗞	$2 \pm 1.6^{\circ}$	±1.4	±1.1	$\pm 0.5$	é±0.1	±0.0	$\pm 0.0$				
CGA 373466	Mean	<lqd< td=""><td>360</td><td>70</td><td>93.2</td><td>96.6</td><td>94.7</td><td>84.7</td><td>74.2</td><td>55.1</td><td>43.0</td><td>35.2</td></lqd<>	360	70	93.2	96.6	94.7	84.7	74.2	55.1	43.0	35.2
<u>~</u>	SD	Ø.	Å∰.2	£₽.1	ð1.6	±0.2	±1.3	±0.2	±0.3	±0.3	±0.1	±0.3
NOA 413163	Mean	n.d.	n.d.	KLOD	⊁LOD	n.d.	1.3	2.5	4.1	5.6	4.8	3.6
× (C	≶ SD-Ĵ		Ś		i I		±0.1	±0.2	±0.1	±0.1	±0.1	±0.3
NOA 409480	Mean	And.	√n,d.	~nod.	n.d.	<lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<></td></lod<></td></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<></td></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""><td><lod< td=""></lod<></td></lod<></td></lod<>	<lod< td=""><td><lod< td=""></lod<></td></lod<>	<lod< td=""></lod<>
<u> </u>	a SD	Û d	p I	v			1 1		1 1	1 1		

n.d.: not detected, DAT: days after treatment, SD: standard deviation <sup>1</sup> CGA 357261 equivalents

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#### **METHOD VALIDATION** B.

The HPLC-MS/MS method was successfully validated prior to application of the degradation samples The correlation coefficients ( $R^2$ ) of the multi-point calibration curves ranged from 0.9997 to 0.0000. The recovery rates ranged from 72.5 to 113.7% of applied amount [% AA] for all soils, analytes and concentrations. The relative standard deviations for each recovery set ranged from 0.4 to 10.8%, showing a good repeatability of this method. Background abundance in blank soil matrix was far below 30% of the limit of quantitation in all soils and in interference by other matrix components occurred. The combination of the selective MS/MS detection method used with the preceding HELC separation leads to a high specificity of the method.

In addition, the extraction efficiency was demonstrated by concurrent recovery samples at each sampling interval. The overall mean concurrent recoveries were 99.6% AA (range from 951 to 103.5% AA) for CGA 357261, 100.2% AA (range from 97.1 to 1055% AA) for CGA 373466, 92.7% AA (range from 76.0 to 103.6% AA) for NOA 493163 and 909% AA (range from 93.9 to 105.3% AA) for NOA 409480.

### C. DEGRADATION OF PARENT COMPOUND

Ŵ The amount of CGA 357261 in the soil extracts decreased from 1066, 1001, 98,4 and 29.0% AA at study start (DAT-0) to < LOD (limit of detection) of DAT-38, DAT-120 (study end), DAT-90 and DAT-30 days in soils

. Degradation of OGA 357261 was accompanied by the formation of its degradation and products CGA 373466, NOA 413163 and NOA 409480.

CGA 373466 amounted to maxima (CGA 35726) equivalents of 96.5% (DAT-1), 94.1% AA (DAT-1), 95.7% A& (DAT-1) and 96.6% AA (DAT-3) in sols

respectively.

4a and

n NOA 413163 amounted to maxima (CGA 357261 equivalents) of \$2.2% AA (DAT-58), 9.6% AA (DAT-90) 9.9% AA (DAT-58) and 5,5% AA (DAT-58) in cools respectively. la and

K,  $\mathcal{A}$ NOA 409480 amounted to values above LOD only n soil.

with maxim.

Table 7.1.2.1.2- 6:Best-fit degradation kinetics of CGA 357261 in soils under aerobic<br/>conditions for trigger evaluation according to FOCUS

						N.
	Best-Fit	DT <sub>50</sub>	DT90	Chi <sup>2</sup> Erxor	Visual	Ũ.
Soil	Kinetic Model <sup>1</sup>	[days]	[days]	[%]	Assessment 20	
	DFOP	0.1	0.3	4.0		~
	DFOP	0.1	0.3	4.3		Ž,
4a	DFOP	0.10	0.4	3.4		Ø
	FOMC	0.1	0.9	2.5		A
	DECR 1 1	m 1		. %/		, ♥

<sup>1</sup> FOMC: first order multi compartment, DFOP: double first order in parallel

<sup>2</sup> visual assessment: + = good

S

III. CONCLUSIONS

CGA 357261, a major photodegradation product of triflox strokin, was fapidly degraded in soil under aerobic conditions in the dark in the laboratory. The calculated best-fit half-life was 0.1 days (corresponding to approximately 2 hours) in the tested soils. The major trifloxystrobin photodegradation products CGA 373466 and NOA 413163, which are derived from CGA 357261, were formed and declined towards study end.

It is concluded that CGA 35726/1 and its degradation products have no potential for accumulation in the environment.

The results are included in the summary of the degradation rates of trifloxy trobin and its major degradation products in soil in the laboratory given in section CAC7.1.2,1.

Report:	KCA 7.1.24,2 /11;
Title:	BCS-CU98569 (Sodium Salt of CGA 381 18): Aerobic Degradation in Four
	European Soils
Report No.	$EnSa 12-06 \pi$
Document No:	M-462102601-1
Guidelines:	- OECD Fest Guideling No. 307
	DRAFT SANCO 1802 2010/0ev 1 in accordance with Regulation (EC)
(	? Ng 107/2009 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
GLP:	Y e
Justification	New date / guideline requirement:
4	Degradation rate of major photodegradation product CGA 381318
20.	

Executive Summary

The degradation rate of BCS-CU98569 (sodium salt of CGA 381318, a photodegradation product of trifloxystrobing was studied in four soils under aerobic conditions in the dark in the laboratory for 122 days at 20.3 °C and 54.5% of the maximum water holding capacity:

	~\$ <sup>°</sup>	Soil	1 ~~	Source	Texture (USDA)	pH *	OC [%]
				Monheim, Germany	sandy loam	5.2	1.9
4				Monheim, Germany	loamy sand	5.9	1.8
			4a	Burscheid, Germany	silt loam	6.2	2.2
				Blankenheim, Germany	loam	7.2	5.1

\* pH value was derived from aqueous 0.01 M CaCl\_2 suspension



A study application rate of 35.7 µg per kg soil dry weight was applied based on a single geld application rate of trifloxystrobin of 187.5 g per hectare and a maximum formation of approximately 7% of CGA 381318 in a trifloxystrobin soil photolysis study.

The amount of BCS-CU98569 in the soil extracts decreased from study start (DAT-0) to study (DAT-122) from 96.9 to 4.0% of applied amount [% AA] in soil , from 93.9 to 3.9% AA in soil 97.0 to 8.4% AA in soil

and from 97.2 to 2.9% AA in soil

A kitetic mic c inche model fo U98369 inder ser o have bo potential fee accumulation METHOPS were lak proper s. The experimental data could be well described by a double first order in parallel kinetic model for soils and 4a and

conditions was 11.3, 20.4, 22.8 and 20.4 days in soil 4a and respectively

It is concluded that BCS-CU98569 and therefore also CGA in the environment.

#### **MATERIALS** A.

#### 1. **Test Item**

unlabelled BCS-CU2\$569 (Sodium salt of CC Certificate of Analysis: AZ 27880 B&S-CU98569-RIT Batch Code: Chemical Purit °94%&w/w

#### 2. **Test Soils**

Four soils were used (see The 7, 2.1.2- ). The soils were faken from agricultural use areas representing different geographical origin and different soil properties as required by the guidelines. No plant protection products were used for the previous 5 years. The soils were sampled freshly from the fields (upper perizon of 0 to 20 cm) and seved to a particle size of  $\leq 2$  mm. Soil collection and



\_ 0

#### Table 7.1.2.1.2-7: Physico-chemical properties of test soils

Parameter		Results	/ Units		S. S.
Soil Designation			4a		0
Geographic Location			.1		Ĉa
City		6			
State	North-Rhine Westphalia	North-Rhine Westphalia	North-Rhin Westphatia	North-Rhine Westpoalia	,0 <sup>5</sup>
Country	Germany	German	Germany	Germany	7
GPS Coordinates					
Soil Taxonomic Classification (USDA)	loamy, mixed,	sandy, mixed,	boamy, mixed, mesico Typic	∫ fine-toamy, ∘ mixed active	
	Argudalf	Cambradoll		frigid Typic	
Soil Series		~Cno informati	on available	U .	
Textural Class (USDA)	sandy loam	Joamy Sand	sik Joam 🔊	, ≪Joam	
Sand $[50 \mu\text{m} - 2 \text{mm}]$	\$ 55%		25%°	× 39%	
Silt $[2 \mu m - 50 \mu m]$	28% 0	L 14%	<u>62</u> ∲€	≶ 36%	
Clay $[< 2 \mu m]$	Č <sup>9</sup> 17% L	₯ 7% >	2 1 <b>3</b> %	25%	
pH (soil/0.01 M CaCl <sub>2</sub> 1/2)	6 5 <b>Q</b>	<u>5</u> 89 vV	~ 6.2	7.2	
pH (soil/water 1/1)	ð.4 ~ <sup>0°</sup>	<u></u> , Õ <sup>*</sup> 6.1 ⟨∠	6.45 <sup>×</sup>	7.4	
pH (saturated paste)	5.6 \$	× 6.3° (	66	7.5	
pH (soil/1 N KCl 145)	4.9	ST 2	<sub>Ø</sub> , 6.0	7.1	
Organic Carbon 🖉 🔬	19%	≈ĩ.8%©	2.2%	5.1%	
Organic Matter 🖉 🖉 🕜 🔿	& 3.3% × <sup>1</sup>	3.12	3.8%	8.8%	
Cation Exchange Capacity [meq/100 g]	104	Ş <sup>7</sup> 9.4 <sub>K</sub>	11.3	20.0	
Water Holding Capacity 🖉					
maximum [g H2O ad 200 g sof DW]	\$8.2 O	≪ <sup>v</sup> 53,90	65.3	81.0	
at 0.1 bar (pF 2.0)	<u></u> ○ <sup>2</sup> 20.1%	13-29%	29.9%	42.6%	
Bulk Density (dispred) [g/cm <sup>3</sup> ]	k <u>k</u> 99	⊘1.23	1.05	0.95	
Microbial Biomass [mg microbuil		Ĩ,			
$[ carbon per k_{O} oil D ] ^{2} $	0 70 G	0	1156	2822	
	168 207 W	090 161 / 150	622 / 630	2032 1004 / 1070	
DAT= 22 (BIO - / BIO +)	# +40% 394 \$P7 / 298	368 / 343	557 / 477	1867 / 2059	
		5007 545	5511711	100772039	

<sup>1</sup> % organic matter % organic carbon x b/24
 <sup>2</sup> BIO- samples were applied with 200 µL water, BIO+ samples were applied with solvent of application solution (400 µL methanol/water 1/1 (v/v)).

Child Contraction DAT: days aper treatment DW: dry weight GPS: global positioning system Ŷ

USDA, United State Department of Agriculture



#### B. **STUDY DESIGN**

#### **Experimental Conditions** 1.

The static test system for degradation in soil under aerobic conditions consisted of Erlenme glass flasks (volume e.g. 300 mL). Each flask was closed with a polyurethane (PU) from plug allowing free oxygen exchange.

For preparation of the test systems, 100 g dry weight equivalents of the seved soils were weighed into each flask. Soil moisture was adjusted to 55 ± 5% of the maximum water holding apacito (MWHC) for the individual test systems by addition of de-ionized water. The flasks were then closed with PU foam plugs and equilibrated to study conditions for 3 days prior to application.

The study application rate (SAR) was based on a single field application rate of trifloxystrobin of 187.5 g per hectare and a maximum formation of approximately 7% of CGA 381018 in soil photolysis study M-462074-01-1 (Supplemental Dossier, KCA7.1.1, 9/04), Pesulting in a nominal SAR of 36,18 BCS-CU98569 per kg soil dry weight.

The test item was applied dropwise onto the soil surface of the respective test systems in 400 µL methanol/water 1/1 (v/v) using a pipette. After application, the test versels (except DAT-@samples) were closed with PU foam plugs.

20**∂** °C 122 days at The test systems were incubated in the dark for and a will moisture of 54.5% MWHC in a walk-in climate chamber.

#### 2. Sampling

Ô Eight sampling intervals were distributed over the entire incontion period of 122 days. Duplicate samples were processed and analysed 0, 3, 7, 14, 30, 60, 91 and 122 days after treatment (DAT). Microbial soil biomass, was determined at start, middle and end of the study (DAT-0, DAT-63 and DAT-122).

At each sampling interval, concurrent recovery samples were prepared freshly by fortification of a ) with the test item at LQQ level (corresponding to 5% of the representative soil ( nominal SAR) and application rate level (corresponding to 190% of the nominal SAR). Duplicate samples were prepared and processed in parallely to the degradation samples of the respective sampling interval for each fortification level.

### Analytical Procedures 3.

The entire soil of each test system was estracted three times at ambient temperature using a mechanical shaker and aceton file/water 4/1 (v/v). Furthermore, two accelerated extraction steps using a microwave with a pagnetic stinger were performed, first with acetonitrile/water 1/1 (v/v) at 70 °C and second with methanof water  $\mathcal{P}1$  (v/) at 50 °C. After each extraction step, extract and soil were separated by centrifugation ( $\geq 0000 x g$ ) and decantation. The soil extracts were combined and an aliquot of the combined soft extract was analysed by reversed phase HPLC-MS/MS in selected reaction monotoring mode using matrix matched external multi-point calibration curves. Concurrent recovery samples were pocessed and analysed analogously. The limit of detection (LOD) and limit of quantitation (LOO) for HPLOMS/MS analysis of the combined soil extracts corresponded to 1 and 5% of the non-inal SAR, respectively.



The HPLC-MS/MS method was validated with regard to linearity, accuracy and precision. The mass selective detector was operated in the positive electrospray ionization selected reaction monitoring mode, tuned for the mass transitions of parent and a significant product ion. The linearity range of the mass spectrometer was tested in pure extraction solvent and in blank soil matrix solutions matrixmatched). Therefore, multi-point external calibration curves were established covering a range from 1 to 125% of the nominal SAR. The accuracy and precision of the method was assessed on the basis of the recovery rates determined for each soil after fortification with the test item a LOO level (corresponding to 5% of the nominal SAR) and at application rate level (corresponding to 100% of the nominal SAR). The fortified samples were processed and analysed as described for the degradation samples. Blank soil matrix solutions were used to determine the background abundance of the tes item in the respective soils.

The degradation kinetics of the test item was determined according to FOCUS kinetics (2006) Using the software KinGUI 2 with three different kinetic models: single first order, first order multi compartment and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was mcluded in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The best-fit binetic mode was selected on the basis of the chi2 scaled-error criterion and on the basis of a visual assessment of the goodness of the Dis. D. Do and DT90 values were calculated from the resulting kinet@parameters

## RESULTS AND DISCUSSION &

Results indicated that the anticipated standardized aerobic conditions were mainstained and that the soils were microbially active over the duration of the laboratory study.

A. DATA

Degradation of BCS-CU98569 in soils, under aerobic conditions (mean Table 7.1.2.1 Ļ values and SD expressed as %

	~ ~ ~	· (	Nº C	( <i>a</i> ) n	11/12				
	Mean J		, C	Å.	_∽DA	١T			
Soil 🖉 🦕	🔊 SD 🚿	<b>&amp;</b> ^`	ູຼາ	≪ <b>⊅</b> ′	<u>4</u>	30	60	91	122
· · · · · · · · · · · · · · · · · · ·	Mean	<b>\$</b> .9	≪ <b>J</b> 8.7 ∫	<b>%</b> 61.4 Å	§ 42.9	16.0	6.4	4.1	4.0
	SD 🐇	J± 1.6√	$0^{\circ} \pm 0.7^{\circ}$	$\pm 0$	$\pm 2.6$	± 1.6	$\pm 0.4$	$\pm 0.4$	$\pm 0.2$
	Mean	97 0%	86.6	72.0	60.8	35.2	16.8	9.5	8.4
	SĎ≯	<b>£</b> 9.8	°£±0.8 ¢	± 0.3	$\pm 1.3$	$\pm 1.4$	$\pm 0.6$	$\pm 0.7$	$\pm 0.1$
42	Moan	\$3.9	83.1 ©	71.4	64.2	34.4	15.1	7.1	4.9
\$ \$	SD Ø	$1 \pm 0.5$	±0,4	$\pm 1.6$	$\pm 0.2$	$\pm 0.1$	$\pm 0.9$	$\pm 0.0$	$\pm 0.2$
J. Y A	Mean	9 <i>7</i> ,2	s <b>88</b> .2	79.4	65.1	32.5	11.3	5.6	2.9
	SD .	Q 0.3	\$£ 1.4	$\pm 0.4$	± 4.7	$\pm 5.0$	$\pm 0.4$	$\pm 1.0$	$\pm 0.0$

DAT: days after treatment, SD: standard deviation





### **B. METHOD VALIDATION**

The HPLC-MS/MS method was successfully validated prior to application of the degradation samples. The correlation coefficients (R<sup>2</sup>) of the multi-point external calibration curves ranged from 0.9981 to 1.0000. The recovery rates ranged from 70.4 to 108.6% of applied amount [% AA] for all soils and concentrations. The relative standard deviations for each recovery set ranged from 0.7 to 37%, showing a good repeatability of this method. Background abundance in blank soil, matrix was far below 30% of the LOQ in all soils and no interference by other matrix components occurred. The combination of the selective MS/MS detection method used with the preceding HPLC separation leads to a high specificity of the method.

In addition, the extraction efficiency was demonstrated by concurrent recovery many samples at each sampling interval. The overall mean concurrent recovery was 95.7% AA (range from 83% to 109.5% AA).

### C. DEGRADATION OF PARENT COMPOUND

The amount of BCS-CU98569 (sodium salt of CGA 3813 (s) in the soil extract decreased from study start (DAT-0) to study end (DAT-122) from 96.9 to 4.0% AA in soil 97.0 to 8.4% AA in soil of rom 8.9 to 4.9% AA in soil

4a and from 97.2 to 2.9% &A in soil

The degradation of BCS-CU98569 followed double first order in parallel (DFOP) kinetics in soils and and single first order (SFO) kinetics in soils 4a and according to the lowest chi<sup>2</sup> error values and visual

4a and 4a and 4a according to the lowest chi<sup>2</sup> error values and visual assessments. Table 77.2.1,2-9 summarizes the best-fit results of the DT<sub>50</sub> and DT<sub>90</sub> calculations.

Table 7.1.2.1.2-9: Best-fit degradation kinetics of BCS-CU98569 in soils under aerobic conditions for trigger evaluation according to FOCUS

	Soil	ð	З <sup>р</sup> к	Best-Fit inetic Mod		DT50 [days]	DT [d@ys]	Chi <sup>2</sup> Error [%]	Visual Assessment <sup>2</sup>
			× ×	∕ DFÔP		<b>≰</b> 1.3	ي 43.3	2.3	+
			Ű.	, DFOP	Ŵ.	Q0.4 🗞	, 95.7	1.6	+
			4a)	SFO SFO	) *	S 22.8 S	75.9	4.1	+
		, 		y SFQ		20.4	67.8	3.5	+

<sup>1</sup> SFO: single first order, DOP: The first order in parallel <sup>2</sup> visual accessment:  $+ \Rightarrow$  and 2

visual assessment:  $+ = ggood Q' Q' \gamma \gamma$ 

# <sup>7</sup> H. CONCLUSIONS

BCS-CU98569 (sodium salt of CGA 3815)8, a major photodegradation product of trifloxystrobin) was well degraded in soil under activitic conditions in the dark in the laboratory. The calculated best-fit half-lives were between 16.3 and 22.8 days in the tested soils.

It is concluded that BCS-CU98569 and therefore also CGA 381318 have no potential for accumulation in the environment

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 7.1.2.1.







Report:	KCA 7.1.2.1.2 /12; ; 2010 。
Title:	NOA 413161: Aerobic Degradation in Three European Soils
Report No:	MEF-09/460
Document No:	M-371172-01-1
Guidelines:	- OECD Test Guideline No. 307
	- Commission Directive 95/36/EC amending Council Directive 91/414 EEC
GLP:	Yes S S S
Justification:	New data / guideline requirement:
	Degradation rate of major degradation product NOA 413161

### **Executive Summary**

The degradation rate of NOA 413161, a degradation produce of trivioxystrobin, was studied in three soils under aerobic conditions in the dark in the laboratory for 126 days at 20.0 °C and 52.9% of the maximum water holding capacity:

		$\alpha$ $i$ $\gamma$ $\gamma$	
Soil	Source O .	Texture (USDA)	©pH *☆ OC *%]
	Monheim, Germany S	sandy loam	5.20 2.0
4a .	Burscheid, Germany	S silt Jam D	at 12.5
	Blankenheim, Germany	clay loan	⊙ 7.1 <sub>≪</sub> 5.0
* 11 1 1 1 1 0			

\* pH value was derived from aqueous 0.01 M GaCl<sub>2</sub> suspension

A study application rate of 66.4 µg por kg soil dry weight was applied based on a single field application rate of trifloxystropin of 250 g per he fare and a maximum formation of approximately 10% of NOA 413161

The amount of NOA 419161 in the soil extracts decreased from study start (DAT-0) to study end (DAT-120) from 92.8 to 46.3% of applied amount [% AA] in soil from 91.3 to 55.7% AA in soil 40 and from 91.2 to 32.9% AA in soil

The experimental data could be well described by a double first order in parallel kinetic model for all soils. The half-life of NOA 413061 under acrobic conditions was 82.8, 173 and 80.9 days in soil 4a and 4a and 40.9 days in soil 40.9 days in s

Ô

AND METHODS

It is concluded that NOA 493161 will be degraded in the environment.

a. «Materials

1. Test Item unlabelled OA 413161 Certificate of Analysis Batch Code: Chemical Purity: Chemical P



#### 2. **Test Soils**

Three soils were used (see Table 7.1.2.1.2- 10). The soils were taken from agricultural use areas representing different geographical origin and different soil properties as required by the guidefines. No plant protection products were used for the previous 5 years. The soils were sampled freship from the fields (upper horizon of 0 to 20 cm) and sieved to a particle size of  $\leq 2$  from. Soil collection and handling were in accordance to ISO 10381-6. Ş Ò A

Table 7.1.2.1.2- 10:       Physico-chemica	d properties of test so	ils	
Parameter	, second s	Results / Units	
Soil Designation		2 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
Geographic Location	× 6° 5		
City		à <b>de la c</b> à	
State	A North Rhine	🖉 North-Rhime	O North Rhine
	Westphatia	🔊 Westphana 🏑	Westphaka
Country	Germany Sermany	O'Gerphany	Germany
GPS Coordinates			
Soil Taxonomic Classification (USDÅ) 🤸	loamy, mixed, mesic	loarhy, mixed, mesto,	no information
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Typic Argudalf	fypic Arguda	available 🗸
Soil Series	or or no	ityformation avadable	
Textural Class (USDA)	sandy loam	silt loann s	clay loam
Sand 39%			29%
Silt $36\%$ $0^{y}$ $$			38%
Clay 25% C	<u> 19% 27 0</u>	19%	33%
pH (soil/0.01 M CaCl <sub>2</sub> 1)(2)	5,37 5		7.1
pH (soil/water O1)	\$\$ \$ D	6.7	7.2
pH (saturated paste)	5.3	6.6	7.1
pH (soil/1/1) 2 2		~~~~ 6.2	6.9
Organic Carbon	20 <sup>%</sup> ×20 <sup>%</sup>	2.5%	5.0%
Organic Matter $1$ $\sqrt{2}$ $\sqrt{2}$	O* \$3.4% \$	4.3%	8.6%
Cation Exchange apacity [meq. 90 g]	10.5	13.7	27.4
Water Holding Capacity	N N N		
maximum (SH2O dd 100 Osoil DW)	× × 56.7 ~	66.9	79.0
at 0.33 bár (pF 2.5)	× , \$16.2%	21.1%	32.0%
Bulk Desity (disturbed) g/cm	jan 1340	0.99	0.97
Microbial Biomass [mg/microbial carbon per gg soil DW] <sup>2</sup>			
DAT-0	1314	1422	3228
DAT-120 🖉 🔬 🧳	<i>™</i> 143	767	2596

<sup>1</sup> % organic matter = % organic carbon x 1924

 $^2$  Mean of duplicates, microbial biomass samples were applied with solvent of application solution (500  $\mu$ L methanol/water 1/1 ( $\nu/\nu$ )). O DAT days after treatment 2DW dry weight

CPS: global positioning system

USDA: Winited States Department of Agriculture



#### B. **STUDY DESIGN**

#### **Experimental Conditions** 1.

The static test system for degradation in soil under aerobic conditions consisted of Erlenmeyer glass flasks (volume e.g. 300 mL). Each flask was closed with a cotton wool plug allowing free oxygen exchange.

For preparation of the test systems, 100 g dry weight equivalents of the seved soils were weighed into each flask. Soil moisture was adjusted to  $55 \pm 5\%$  of the maximum water holding capacity (MWLIC) for the individual test systems by addition of de-ionized water. The fasks were then closed with cotton wool plugs and equilibrated to study conditions for 4 days prior to application.

The study application rate (SAR) was based on a single field application rate of trifloxystropin of 250 g per hectare and a maximum formation of approximately 10% of NOA 403161, resulting in a nominal SAR of 69 µg NOA 413161 per kg soil dryweigh?

The test item was applied dropwise onto the soil surface of the respective test systems in 500 µL methanol/water 1/1 (v/v) using a pipette. After application, the test vere closed with cotton wool plugs.

The test systems were incubated in the dark for soil moisture of 52.9% MWHC in a climatic capinet. \*>

#### 2. Sampling

Ten sampling intervals were distributed over the entire ncubation period of 120 days. Duplicate samples were processed and analysed 0, 3, 7, 14, 21, 30, 45062, 20 and 120 days after treatment (DAT). Microbial soft biomass was determined at start and end of the study (DAT-0 and DAT-120).

At each sampling interval, concurrent receivery samples were prepared freshly by fortification of a 46) with the test item at LOQ level (corresponding to representative Soil ( 5% of the nominal SAR) and application rate level (corresponding to 100% of the nominal SAR). Duplicate samples were prepared and processed in parallel to the degradation samples of the respective sampling interval for each fortification level. S

#### Analytical Procedures 3.

The entire soil of each test system was extracted three times at ambient temperature using a mechanical staker, once using water and wice using acetonitrile/water 1/2 (v/v). After each extraction step, extragt and soil were separated by centralized (4450 x g) and decantation. The soil extracts were confined and an aliquer of the combined soil extract was analysed by reversed phase HPLC-MS/MS in multiple reaction montoring mode using matrix-matched external multi-point calibration curves. Concurrent recovery samples were processed and analysed analogously. The limit of detection (LOD) and limit of quantitation (LQQ) for HPLC-MS/MS analysis of the combined soil extracts

corresponded to 1 and 5% of the nominal SQR, respectively.



The HPLC-MS/MS method was validated with regard to linearity, accuracy and precision. The mass selective detector was operated in the positive electrospray ionization multiple reaction monitoring mode, tuned for the mass transitions of parent and a significant product ion. The linearity range of the mass spectrometer was tested in pure extraction solvent and in blank soil matrix solutions matrixmatched). Therefore, multi-point external calibration curves were established covering a range from 1 to 120% of the nominal SAR. The accuracy and precision of the method was assessed on the basis of the recovery rates determined for each soil after fortification with the test item  $\hat{\omega}^* LO\hat{\phi}^*$  level (corresponding to 5% of the nominal SAR) and at application rate level (corresponding to 100% of the nominal SAR). The fortified samples were processed and analysed as described for the degradation samples. Blank soil matrix solutions were used to determine the background abundance of the test item in the respective soils.

The degradation kinetics of the test item was determined according to FOCUS kinetics (2006) Sing the software KinGUI 1.1 with three different kinefic models: single first order, first order multi compartment and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of tit, the value, was allowed to be estimated by the model. The best-fit binetic mode was selected on the basis of the chi2 scaled-error criterion and on the basis of a visual assessment of the goodness of the Dis. D. Do and DT90 values were calculated from the resulting kinet@parameters

## RESIATS AND DISCUSSION

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Results indicated that the anticipated standardized aerobic conditions were maintained and that the soils were microbially active over the duration of the laboratory study.

A. DATA

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NOA 413161 in soils under aerobic conditions (mean values Table 7.1.2.1. Degradation of expressed as

	õ ŝ		ş" ©	<i>C</i>	Å.	_^yØA	ΛT				
🔊 Soil 💊	Ø, Ø	Dean 🔊 0	%3 ,	, Ož	×¥4	° <b>~21</b>	30	45	62	90	120
	≪y″N	/lean 92.	<u>8</u> 0°95.3<	96.0	∉ 81.4 ª	<sup>≜</sup> 72.5	68.3	56.2	51.1	50.8	46.3
<i></i>	a N	Acan 91	8 92.A	89.9	81@	76.2	78.9	69.4	68.4	57.2	55.7
	N A	lean 01	2 86.1	80.3	<i>7</i> ¥.4	69.6	66.0	59.8	52.4	44.1	32.9

#### В. METROD VALID

The HPLC-MS/MS method was successfully value ated prior to application of the degradation samples. The correlation coefficients (R<sup>2</sup>) of the multi-point external calibration curves ranged from 0.9997 to 0.9999. The recovery rates ranged from 70 to 106% of applied amount [% AA] for all soils and concentrations. The relative standard devotions for each recovery set ranged from 3.4 to 6.7%, showing a good repeatability of this method. Background abundance in blank soil matrix was far below 30% of the limit of quantitation in all soils and no interference by other matrix components occurred The combination of the selective MS/MS detection method used with the preceding HPLC separation leads to a thigh specificity of the method.

In addition, the extraction efficiency was demonstrated by concurrent recovery samples at each sampling interval. The overall mean concurrent recovery was 94% AA (range from 86 to 103% AA).

The amount of NOA 413161 in the soil extracts decreased from study start (DAT-0) to study (DAT-120) from 92.8 to 46.3% AA in soil , from 91🔧 to 55.7% A 4a and from 91.2 to 32.9% AA in soil

The degradation of NOA 413161 followed double first order in parallek (DFOP) kineties in a soils according to the lowest chi2 error values and visual assessments. Table 7.1.2.1.2- 12 summarize best-fit results of the DT<sub>50</sub> and DT<sub>90</sub> calculations.

under Gerobie Table 7.1.2.1.2-12: Best-fit degradation kinetics of NOA413161° in soils ۱Ó conditions for trigger evaluation according to FOCUS

	Best-Fit DTso DTso Chi <sup>2</sup> Error
Soil	Kinetic Model 1 [days] T [days] [%]
	$\swarrow$ DFOP $\searrow$ 82.8 $\clubsuit$ $\circlearrowright$ 1000, $\checkmark$ 4.2 $\checkmark$
4a	$\mathcal{O}^{\mathcal{P}}$ $\mathcal{D}^{\mathcal{F}}OP$ $\mathcal{O}^{\mathcal{P}}$ $\mathcal{O}^{\mathcal{P}}$ $17\mathcal{O}^{\mathcal{P}}$ $\mathcal{O}^{\mathcal{P}}$ $713\mathcal{O}^{\mathcal{P}}$ $\mathcal{O}$ $2.7\mathcal{O}^{\mathcal{P}}$
	2 2 DFOR 0 1.1

<sup>1</sup> DFOP: double first order in parally

NOA 413161, a major degradation product of to loxystrobin, was moderately degraded in soil under aerobic conditions in the dark in the laboratory. The calculated best-fit half-lives were between 80.9

The results aroundled in the summary of the degradation sates of trifloxystrobin and its major





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Report:	KCA 7.1.2.1.2 /13; ; 2010 。
Title:	NOA 413163: Aerobic Degradation in Three European Soils
Report No.:	MEF-09/461
Document No:	M-387169-01-1
Guidelines:	- OECD Test Guideline No. 307
	- Commission Directive 95/36/EC amending Council Directive 91/414 EEC
GLP:	Yes $\sqrt{2}$ $\sqrt{2}$
Justification:	New data / guideline requirement:
	Degradation rate of major photodegradation product NOA 413162 $\Im$

### **Executive Summary**

The degradation rate of NOA 413163, a photodegradation product of triflexystrobin, was studied in three soils under aerobic conditions in the dark in the laboratory for 120 days at 20.0 °C and 52.1% of the maximum water holding capacity:

Soil	Source 0 .	Textine (USDA)	_∽рН *☆ ОС №/)
	Monheim, Germany S	sandy loam	5.0 1.9
4a .	Burscheid, Germany	sandy Toam O	2.6
 	Blankenheim, Germany	boam 📎	0 7.3 <sub>6</sub> 5.2
* pH value was derived from aqueo	ous 0.01 M GaCl2 suspension		0 08

A study application rate of 73.2 µg per kg soil dry weight was applied based on a single field application rate of trifloxystrobin of 250 g per hectare and a maximum formation of approximately 10% of NOA 413163

The amount of NOA 410163 in the soil extracts decreased from study start (DAT-0) to study end (DAT-120) from 74.0 to 25.9% of seplied amount [% AA] in soil **14.8%** AA is soil **14.8%** A

The experimental data could be well described by a first order multi compartment kinetic model for soil 44 and 44 and 44 and 44 and 44 and 44 and 54 and 54

It is concluded that NOA 413463 will be degraded in the environment.

MATERIALS AND METHODS

A. MATERIALS

1. Test Item unlabelled NOA 413163 Certificate of Analosis: AZ 15124 Batch Code: AE 1344149 00 1B98 0001 Chemicar Purity: 99.2% w/w



#### 2. **Test Soils**

Three soils were used (see Table 7.1.2.1.2-13). The soils were taken from agricultural use areas representing different geographical origin and different soil properties as required by the guidefines. No plant protection products were used for the previous 5 years. The soils were sampled freship from the fields (upper horizon of 0 to 20 cm) and sieved to a particle size of  $\leq 2$  from. Soil collection and handling were in accordance to ISO 10381-6. Ş Ò A

Table 7.1.2.1.2- 13:         Physico-chemica	nl properties of test so	ils	
Parameter	, S	Results / Units 🔬	
Soil Designation			
Geographic Location	4. 6° 5)		
City			
State	A North Rhine	Q North-Rhine	O North Rhine
	Westphakia 🤇	Westph a	Westphalta
Country	Germa@y 🔬	O'Germany C	Germany
GPS Coordinates			
Soil Taxonomic Classification (USDA)	loamy?mixed@mesic@	loamy, mixed, mesic,	no information
	Typic Argudalf	Typic Arguda	🖇 available
Soil Series	no no	information available	<u> </u>
Textural Class (USDA)	Sandy loam	Sandy Joam	loam
Sand 39%	\$\$ 57% OF	49%	33%
Silt 36%	30%	Š <sup>9</sup> Š <sup>0</sup> Š	42%
Clay 25%	A 3% 5 . C		25%
pH (soil/0.01 M GaCl <sub>2</sub> 1/2)	× 5.6× ~		7.3
pH (soil/water bI)	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	×4.0	7.5
pH (saturated paste)	\$5.7 \$	<b>6.9</b>	7.4
pH (soil/1 WKCl 1/1)	ð 4.1 °C	<b>6.5</b>	7.0
Organie Carbon	10% 2	0 2.6%	5.2%
Organic Matter <sup>1</sup>	Ô <sup>°</sup>	4.5%	9.0%
Cation Exchange Capacity [meq/200 g]	7 JO 10.8 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	14.9	28.5
Water Holding Capacity			
maximum ( H2O dd 100 g soil DW)	× × × × × × × ×	69.0	85.7
at 0.33 bar (pF 2.5)	2 6 <sup>2</sup> 16.4%	23.1%	35.7%
Bulk Dewity (disturbed) g/cm		1.02	0.98
Microbial Biomass	Í N		
[mg microbial carbon per kg soil DW] <sup>2</sup>		10.50	2465
DAT-0	695	1059	3467
DAT-120 2 2 2 2	r 234	518	2180

<sup>1</sup> % organic matter 3% organic carbon x 12/24

 $^2$  Mean of applicates, mispobial biomass samples were applied with solvent of application solution (500  $\mu$ L methanel/water 1/1 (v(v)). DAT days after treatment DW dry weight GPS: global positioning system

UŠDA: Onited States Department of Agriculture



#### B. **STUDY DESIGN**

#### **Experimental Conditions** 1.

The static test system for degradation in soil under aerobic conditions consisted of Erlenmeyer glass flasks (volume e.g. 300 mL). Each flask was closed with a cotton wool plug allowing free oxygen exchange.

For preparation of the test systems, 100 g dry weight equivalents of the seved soils were weighed into each flask. Soil moisture was adjusted to  $55 \pm 5\%$  of the maximum water holding capacity (MWLIC) for the individual test systems by addition of de-ionized water. The fasks were then closed with cotton wool plugs and equilibrated to study conditions for M days prior to application,

The study application rate (SAR) was based on a single field application rate of trifloxystrobin of 250 g per hectare and a maximum formation of approximately 10% of NOA 403163, resulting in a nominal SAR of 69 µg NOA 413163 per kg soil dryweigh?

The test item was applied dropwise ofto the soil surface of the respective test systems in 500 µL methanol/water 1/1 (v/v) using a pipette. After application, the test vere closed with cotton wool plugs.

The test systems were incubated in the dark for soil moisture of 52.9% MWHC in a climatic capinet. \*>

#### 2. Sampling

Ten sampling intervals were distributed over the entire ncubation period of 120 days. Duplicate samples were processed and analysed 0, 3, 7, 14, 21, 30, 45062, 20 and 120 days after treatment (DAT). Microbial soft biomass was determined at start and end of the study (DAT-0 and DAT-120).

Ĩ At each sampling interval, concurrent recovery samples were prepared freshly by fortification of a (corresponding to with the test itencat LOQ level (corresponding to representative Soil ( 5% of the nominal SAR) and application rate level (corresponding to 100% of the nominal SAR). Duplicate samples were prepared and processed in parallel to the degradation samples of the respective sampling interval for each fortification level. S

#### Analytical Procedures 3.

3. Analytical procedures The entire soil of each test system was extracted three times at ambient temperature using a mechanical spaker and methanel/water 1/1 (v/x). After each extraction step, extract and soil were separated by centrifugation (4050 x g) and decantation. The soil extracts were combined and an aliquot of the combined soil extract was analysed by reversed phase HPLC-MS/MS in multiple reaction monitoring woode using matrix-matched external multi-point calibration curves. Concurrent recovery samples were processed and analysed analogously. The limit of detection (LOD) and limit of quantitation (LOQ) for MPLC MS/MS analysis of the combined soil extracts corresponded to 1 and 5% of the nominal SAR, respectively,

JAK, respectively



The HPLC-MS/MS method was validated with regard to linearity, accuracy and precision. The mass selective detector was operated in the positive electrospray ionization multiple reaction monitoring mode, tuned for the mass transitions of parent and a significant product ion. The linearity range of the mass spectrometer was tested in pure extraction solvent and in blank soil matrix solutions matrixmatched). Therefore, multi-point external calibration curves were established covering a range from 1 to 120% of the nominal SAR. The accuracy and precision of the method was assessed on the basis of the recovery rates determined for each soil after fortification with the test item  $\hat{\omega}^* LO\hat{\phi}^*$  level (corresponding to 5% of the nominal SAR) and at application rate level (corresponding to 100% of the nominal SAR). The fortified samples were processed and analysed as described for the degradation samples. Blank soil matrix solutions were used to determine the background abundance of the test item in the respective soils.

The degradation kinetics of the test item was determined according to FOCUS kinetics (2006) Sing the software KinGUI 1.1 with three different kinefic models: single first order, first order multi compartment and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of tit, the value, was allowed to be estimated by the model. The best-fit binetic mode was selected on the basis of the chi2 scaled-error criterion and on the basis of a visual assessment of the goodness of the Dis. D. Do and DT90 values were calculated from the resulting kinetic parameters.

## RESIATS AND DISCUSSION

m

Results indicated that the anticipated standardized aerobic conditions were maintained and that the soils were microbially active over the duration of the laboratory study.

A. DATA

Ĩ

NOA 413163 in soils under aerobic conditions (mean values Table 7.1.2.1. Degradation of expressed as

	õ	Å.		0	Q	Ž,	⊅ØA	۸T				
🔊 Soil	<u> </u>	Mean	~~ <u>0</u>	_~ <sup>™</sup> 3 °	ŐŤ	≪¥4́	° <b>~</b> 21	30	45	62	90	120
	L.	Mean	74.00	73.3≪	65.8	∉ 62.9 ≄	<sup>≜</sup> 57.5	51.5	40.5	29.7	29.9	25.9
	<b>≜</b> a	Mean	821	84.6	79.1	6508	59.1	47.0	37.2	28.2	20.2	14.8
		Mean	Ċ <b>7</b> 9.2	76.9	66.1	<i>\$</i> <b>3</b> .4	49.1	38.1	27.4	19.4	11.6	7.1

#### В. METROD VALID

The HPLC-MS/MS method was successfully valuated prior to application of the degradation samples. The correlation coefficients (R<sup>2</sup>) of the multi-point external calibration curves ranged from 0.9999 to 1.0000. The recovery rates ranged from 70 to 90% of applied amount [% AA] for all soils and concentrations. The relative standard devotions for each recovery set ranged from 0.6 to 3.4%, showing a good repeatability of this method. Background abundance in blank soil matrix was far below 30% of the limit of quantitation in all soils and no interference by other matrix components occurred The combination of the selective MS/MS detection method used with the preceding HPLC separation leads to a thigh specificity of the method.

In addition, the extraction efficiency was demonstrated by concurrent recovery samples at each sampling interval. The overall mean concurrent recovery was 80% AA (range from 72 to 87% AA).

**Bayer CropScience** Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

#### **DEGRADATION OF PARENT COMPOUND** С.

soil

The amount of NOA 413163 in the soil extracts decreased from study start (DAT-0) to study (DAT-120) from 74.0 to 25.9% AA in soil , from 82 to 14.8% A 3 in 4a and from 79.2 to 7.1% AA in soil

The degradation of NOA 413163 followed first order multi compartment (FOMC) kipetics in soils and double first order in parallel (DFOP) whetics in 4a and

according to the lowest chi<sup>2</sup> error values and visual assessments

Table 7.1.2.1.2-15 summarizes the best-fit results of the  $DT_{50}$  and  $DT_{90}$  calculations.

Table 7.1.2.1.2-15: Best-fit degradation kinetics of NDA 413963 in soils under acrobic conditions for trigger evaluation according to FOCUS

			ť Přal	2
	A Best-Fit 🖉	<b>Q</b> T50	<b>₽Т</b> 90 Ф <sup>*</sup> С	hi² <b>@</b> rror
Soil	Kinetic Model	⊘days	Days] (	1%
	JFOP DFOP	530 ×	> 1000	4.0°
4a _Ô	≶ ⊈FOMÇ ∕Ş		LSK Q	3.8
	FOMC	27.7	ر 13 ک	<b>_≪2</b> .7

FOMC: first order multi compartment, DFOR: doubte first order in paraller

III CONCLUSIONS

NOA 413163, a major photodegradation product of triflos strobin, was well a graded in soil under aerobic conditions in the dark in the laboratory. The calculated best-fit half lives were between 27.7 and 53.6 days in the ested soils.

 $\bigcirc$ It is concluded that NOA 413163 will be degraded in the environment. a

The results are included in the summary of the degradation rates of trifloxystrobin and its major

The results are included in the summary of the degradation rates of the



Report:	KCA 7.1.2.1.2 /14; ; ; ; ; 2013 。
Title:	CGA 357276: Aerobic Degradation in Four European Soils
Report No:	EnSa-13-0413
Document No:	M-465697-01-1
Guidelines:	- OECD Test Guideline No. 307
	- DRAFT SANCO 11802/2010/rev 0
	- DRAFT SANCO 11844/2010/rev 0
GLP:	Yes $\mathcal{O}$ $\mathcal{O}$ $\mathcal{O}$ $\mathcal{O}$
Justification:	New data / guideline requirement:
	Degradation rate of major degradation product CGA 357276 2 Q

### **Executive Summary**

The degradation rate of CGA 357276, a degradation product of triflox strobin was studied in four soils under aerobic conditions in the dark in the laboratory for 20 days at 19.9 °C and 55.4% of the maximum water holding capacity:

Soil     Source     Texture (USDA)     pH¢     QC [%]       Monheim, Germany     Sandyloam     50     2.0       Monheim, Germany     Ioatay sate     6.0     2.1       Barscheid, Germany     Sift Ioam     6.4     1.7       Blankerheim     Germany     Ioatay     53     4.8				N N	$\sim$
Monheim, Germany Sandy Joam 50 2.0 Monheim, Germany Joan 6.0 2.1 4a Burscheid, Germany Orit Ioam 6.4 1.7 Blanketheim Germany Joan 5 4.8	Soil	Source 🖉 🗸	Texture (LSDA)	pHØ	QC [%]
Montheim Germany     Ioatay sate     6.0     2.1       Montheim Germany     Onthe Instruction     6.4     1.7       Burscheid, Germany     Onthe Instruction     6.4     1.7       Burscheim Germany     Ioatay     7.3     4.8		Monheim, Germany	Sandy Doam	<u>,</u> 50	≪ي 2.0
4a Burscheid, Germany Orit loam 6.6 1.7 Blankerheim-Germany Joan 3 4.8	(A)	Monheim Germany	Diamay same	6.0	♥ 2.1
Blankerheim-Germany Joan 3 48	44	Burscheid, Germany 🖑	Silt loam	<sup>€</sup> 6.€	1.7
		Blankenheim Germany	🦻 loam 🖓	<i>B</i> .3	4.8

\* pH value was derived from aqueous 0.0 CM CaS2 suspension

A study application rate of 23.0 kg per kg soft dry veight was applied based on a single field application rate of utiloxystrobin of 1875 g per hectage and a maximum formation of approximately 6% of CGA 357278 in a utiloxystrobin aerobit soil degradation study.

The amount of CGA 357276 in the soil extracts decreased from study start (DAT-0) to study end (DAT-120) from 102.7 to 18.8% of applied amount [%AA] in soil and the soil and the soil amount [%AA] in soil and the soil and from 99.2 to 5.9% AA in soil and from 99.2 to 5.9% AA in soil and the soil amount [%AA] in soil and the soil a

The experimental data could be well described by a first order multi compartment kinetic model for all soils. The half-life of 6 A 3 276 under a robic conditions was 22.0, 21.5, 21.3 and 12.0 days in soil 4a and 4a and

It is concluded that CGR 357276 has no potential for accumulation in the environment.

MATERIALS AND METHODS

A. MATERIALS 1. Test Hem unlabelled CGX 357276 Certificate of Analysis: AZ 16891 Batch Code. BCS-AB39835-PU-01 Chemical Purity: 97.8% w/w


## 2. Test Soils

Four soils were used (see Table 7.1.2.1.2- 16). The soils were taken from agricultural use areas representing different geographical origin and different soil properties as required by the guidelines. No plant protection products were used for the previous 5 years. The soils were sampled freshly from the fields (upper horizon of 0 to 20 cm) and sieved to a particle size of  $\leq 2$  cm. Soil collection and handling were in accordance to ISO 10381-6.

Fable 7.1.2.1.2- 16:    Physico-chemic	cal properties o	f test soils	ý č	
Parameter		🤇 Results	7 Units 🔬	
Soil Designation			z 4,aÔ	
Geographic Location	%, <i>(</i>			
City	, Ø			
State	North-Rhine	North-Rhme	North Rhine	North-Rhipe
_	Westphalia	Westhalia	Westphalia	Westphatra
Country	© Germany	Germany	Germany	Germany
GPS Coordinates				
Soil Taxonomic Classification (USDA)	loamy, mixed	saudy, mixed,	loamy, noxed,	∀ fine-loamy,
L <sup>y</sup> L	mésic, Typic	mesic, Typic 🦻	mesic Typic	mixed, active,
	Argudølf	Cambudoll	Angudalf ?	frigid Typic
Soil Series		Qio informati	an available	Eutrudept
Textural Class (USD)	andy loom	Accent and	sik koom	loom
Sand [50 us 2 min]				10am 13%
Silt $[2 \text{ fim} - 50 \text{ µm}]$		211% V	57%	33%
Clay $2 \mu m$ $0$	\$14%	82	18%	24%
pH (soil/0.04 M CaCl 1/2)	A 507 0		6.4	7.3
pH (soil/avater 1/1)	5.3		6.6	7.4
pH (saturated paste)	5.4	<sup>4</sup> , <sup>3</sup> 6.4	6.7	7.4
pH (soil/1 N KCl 129)	× 4 ± 4	5.8	6.0	7.0
Organic Carbon 🖗 🌧 🖉 🖉	2.0%	2.1%	1.7%	4.8%
Organic Matter 1	<u>3.4%</u>	Ø <sup>¥</sup> 3.6%	2.9%	8.3%
Cation Exchange Capacity [meq/100/g]	J 108	<b>9</b> .7	10.9	20.4
Water Holding Capacity				
maximum [g H2O ad 100 g son DW]	\$60.3	49.4	56.6	79.7
at Q.1 bar (pF 2.0)	28.6% <sup>3</sup>	21.6%	37.1%	43.3%
Bulk Density (disturbed) @cm <sup>3</sup> ]	108	1.21	1.08	1.01
Microbial Biontass [mg microbial				
carbon per kosoil $DW$ <sup>2</sup>			500	2.120
	418	660 278 / 285	532	2439
	18//206	3/8/383 275/258	407/400	1929 / 1865
$DA_{2}-120$ (BOD- / BUD+) $\sqrt{2}$	114/121	213/238	200/209	13/0/13/4

<sup>1</sup> % organi@natter % organic carbon x 1.724

<sup>24</sup>BIO- samples were left intreated, BIO+ samples were applied with solvent of application solution (400  $\mu$ L methanol/water 1/1 (*v*/*v*)).

DAT: days after treatment

DW: dry weight

GPS: global positioning system

O

**Bayer** CropScience **Document MCA: Section 7 Fate and behaviour in the environment** Trifloxystrobin

USDA: United States Department of Agriculture

#### B. STUDY DESIGN

#### 1. **Experimental Conditions**

The static test system for degradation in soil under aerobic conditions consisted of Erlenneyer głą flasks (volume e.g. 300 mL). Each flask was closed with a polyurethane (PU) foam plug allowing free oxygen exchange.

For preparation of the test systems, 100 g dry weight equivalents of the sieved soils were weighed into each flask. Soil moisture was adjusted to 55 ± 5% of the maximum Water holding capacity (MWHC) for the individual test systems by addition of de-ionized water. The flasks were then closed with foam plugs and equilibrated to study conditions for 10 days prior to application?

The study application rate (SAR) was based on a single field application rate of trifloxystrobin of 187.5 g per hectare and a maximum formation of approx mately 6% of CGA 357276 in acrobic soil degradation study M-033394-01-1 (Baseline Dossier, KGA 7.1.1.1 /03), resulting in a nominal SAR of 25 µg CGA 357276 per kg soil dry weight.

The test item was applied dropwige onto the soul surface of the respective first sestems in 400 µL the test es sels (except DAT, 0 samples) methanol/water 1/1 (v/v) using a pipette. After application, were closed with PU foam plug

120 days The test systems were incubated in the dark for soil moisture of 55.4% MWHC in a walk in climatic chamber.

#### 2. Sampling

Eight sampling intervals were distributed over the entire incubation period of 120 days. Duplicate samples were processed and analysed 0, 3, 7, 15, 29, 52, 85 and 120 days after treatment (DAT). Microbial soil bromass was determined at start, middle and end of the study (DAT-0, DAT-53 and DAT-120).

At each sampling interval, concurrent recovery samples were prepared freshly by fortification of a with the test item at LOQ level (corresponding to 5% of the representative soil ( nominal SAR) and application rate level (corresponding to 100% of the nominal SAR). Duplicate samples were prepared and processed in parallel to the degradation samples of the respective sampling interval for each fortification level.

#### Analytical Procedures 3.

The entite soil of each test system was extracted three times at ambient temperature using a mechanical shaker and acetonitrile water 4 (v/p) Furthermore, two accelerated extraction steps using a microwave with a magnetic stiffer were performed, first with acetonitrile/water 1/1 (v/v) at 70 °C and second with methanol/water 1/1 (v/v) at 90 °C. After each extraction step, extract and soil were separated by centrifugation (4200 xg) and decantation. The soil extracts were combined and an aliquot of the combined soil extract was analysed by reversed phase HPLC-MS/MS in selected reaction monitoring mode using a mature matched external multi-point calibration curve. Concurrent recovery sample were processed and analysed analogously. The limit of detection (LOD) and limit of quantitation (GOQ) for HPIC-MS/MS analysis of the combined soil extracts corresponded to 1 and 5% of the norminal SAR, respectively.



The HPLC-MS/MS method was validated with regard to linearity, accuracy and precision. The mass selective detector was operated in the positive electrospray ionization selected reaction monitoring mode, tuned for the mass transitions of parent and a significant product ion. The linearity range of the mass spectrometer was tested in pure extraction solvent and in blank soil matrix solutions matrixmatched). Therefore, multi-point external calibration curves were established covering a range from 1 to 150% of the nominal SAR. The accuracy and precision of the method was assessed on the basis of the recovery rates determined for each soil after fortification with the test item, a LOO level (corresponding to 5% of the nominal SAR) and at application rate level (corresponding to 100% of the nominal SAR). The fortified samples were processed and analysed as described for the degradation samples. Blank soil matrix solutions were used to determine the background abundance of the tes item in the respective soils.

The degradation kinetics of the test item was determined according to FOCUS kinetics (2006) Using the software KinGUI 2 with three different kinetic models: single first order, first order multi compartment and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was mcluded in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The best-fit binetic mode was selected on the basis of the chi2 scaled-error criterion and on the basis of a visual assessment of the goodness of the Dis. D. Do and DT90 values were calculated from the resulting kinet@parameters

## RESULTS AND DISCUSSION &

Results indicated that the anticipated standardized aerobic conditions were maintained and that the soils were microbially active over the duration of the laboratory study.

A. DATA

Degradation of CGA 357276 in soils under aerobic conditions (mean values Table 7.1.2.1 Ľ and SP expressed as %

	A		Nº C		(1)3				
	Mean	) ·	, C	Ŕ	_∽ <b>D</b> A	١T			
🕺 Soil 🦯 🤅	🔊 SD 🚿	<b>\$</b> ~`	<u>`</u>	~¶'	<b>~</b> 95	29	52	85	120
)"~~	Mean	s.1 <b>0</b> 2.7	<b>%9</b> 6.6	∛82.6 ≉	§ 61.5	43.4	29.9	21.6	18.8
	∭S∕Ď ≰	∫≟ 2.6∢	Ø ± 2.4 <sup>©</sup>	″±1∂>	$\pm 0.6$	$\pm 0.5$	$\pm 0.0$	$\pm 0.4$	$\pm 0.3$
	Mean ?	104.4/	929	729	60.5	45.6	33.0	22.3	17.6
	∫ SD≯	<b>₽</b> 0.3	<u>`</u> \$2.0	±1.8	$\pm 0.2$	$\pm 0.3$	$\pm 2.1$	$\pm 0.3$	$\pm 0.6$
	Moan	<b>B</b> 03.3	\$97.2 @	<sup>9</sup> 79.3	62.5	44.3	25.7	16.4	11.9
	<sub>s</sub> ∂ <sup>S</sup> D ∅	$t \pm 0.2$	± 0.5	$\pm 2.2$	$\pm 0.2$	$\pm 0.6$	$\pm 1.1$	$\pm 0.0$	$\pm 0.5$
	Meâny	99 Ž	<b>\$%</b> .7	64.1	43.9	25.7	13.3	8.0	5.9
	sp .	@ 0.3 ^	©± 2.2	$\pm 2.0$	$\pm 0.6$	$\pm 0.1$	$\pm 0.2$	$\pm 0.0$	$\pm 0.0$

DAT: days after treatment, SD: standard deviation





## **B. METHOD VALIDATION**

The HPLC-MS/MS method was successfully validated prior to application of the degradation samples. The correlation coefficient (R<sup>2</sup>) of the multi-point external calibration curve was 0.9998. The percent rates ranged from 89.8 to 117.3% of applied amount [% AA] for all soils and concentrations. The relative standard deviations for each recovery set ranged from 1.4 to 5.4%, showing a bood repeatability of this method. Background abundance in blank soil matrix was far below 30% of the limit of quantitation in all soils and no interference by other matrix components occurred. The combination of the selective MS/MS detection method used with the preceding HPL separation leads to a high specificity of the method.

In addition, the extraction efficiency was demonstrated by concurrent recovery samples at each sampling interval. The overall mean concurrent recovery was 96.7% AA (range from 709) to 108.7% AA).

## C. DEGRADATION OF PARENT COMPOUND

The amount of CGA 357276 in the soil extracts decreased from study start @AT-69 to study end (DAT-120) from 102.7 to 18.8% A& in soil and the soil of the soil of

, from 103.3 to 1°R9% AA in soil 42° and from 99.2 to 5.9% AA in soil

The degradation of CGA 357276 followed first order multi compartment (EQMC) deinetics in all soils according to the lowest  $d\tilde{\mu}^2$  error values and visual assessments. Table 7.2.1 18 summarizes the best-fit results of the DT<sub>50</sub> and DT<sub>90</sub> calculations.

Table 7.1.2.1.2- 18 Best fit degradation kinetics of CGA 357276 in soils under aerobic conditions for trigger evaluation according to FOCUS

			/ 🏷	, SY	· ·	
O*		Best-Fit	DC 50	DT <sub>90</sub>	Chi <sup>2</sup> Error	Visual
ू 🖗 Soil	×,	Kinetie Model	[days]	days,	[%]	Assessment <sup>2</sup>
, and the second s		FOMC	S 22.0 S	190	3.4	+
	2 m	FOMC '	21.5	237	1.2	+
	4a	FOMC	Q1.3	123	2.6	+
		FOMC	12.0	71.8	1.8	+
			4 (0.5			

<sup>1</sup> FOMC: first order multi compartment O'<sup>2</sup> visual assessment: = good A'

ill. Conclusions

CGA 357276, a major degradation product of prifloxystrobin, was well degraded in soil under aerobic conditions in the dark in the taboratory. The calculated best-fit half-lives were between 12.0 and 22.0 days in the tested soils

It is concluded that CGA \$7276 has no potential for accumulation in the environment.

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation produces in sold in the laboratory given in section CA 7.1.2.1.



## Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.1.2 /15: 2012: amended 2	013-01-08	
Title:	Amendment No 1 to Report – NOA 409480: A	erobic Degradation in Four	ð
	European Soils		Ş
Report No:	S11-01625		,
Document No:	M-445349-02-1	A A A	
Guidelines:	- OECD Test Guideline No. 307		
GLP:	Yes		2
Justification:	New data / guideline requirement:	A JANA	6
	Degradation rate of major photodegradation product		d.

## **Executive Summary**

The degradation rate of NOA 409480, a photodegradation product of triflexystrobin, was studied in four soils under aerobic conditions in the dark in the aboratory for 15 days at 194 °C and 55 ± 5% of the maximum water holding capacity:

			A
Soil	Source 🖉 🚬	(USDA)	р́Н *☆ ОС҈*%]
	Monheim, Germany	sandy loam	5.00 2.1
	Monheim, Germany	sandy droam	57 🔍 🗸 1.9
$4a_{\mathscr{O}_{\mathscr{I}}}$	Burscheid Germany	sitt loan	6.1 1.8
	Blankenheim, Germany	Chay logm	7.2 5.0

\* pH value was derived from aqueous 0.01 AFCaCle suspension

A study application rate of 71 dig per kg soil dry weight was applied based on a single field application rate of trifloxystrobin of 180.5 g per hectare and a maximum formation of approximately 9% of NOA 409480 in a trifloxystrobin soil photolysis study

The amount of NOA 009480 in the soil or tracts decreased from study start (DAT-0) to study end (DAT-115) from 792 to 181% of applied amount [%AA] it soil to 10.2% AA in soil 107.4 to 20.0% AA in soil

4a and from 02.7 to 7.9% A in soil

The experimental data could be well described by a first order multi compartment kinetic model for soils and a single first order kinetic model for soil and a single first order kinetic model first order kinetic model firs

It is concluded that NOA 409480 has no cotential for accumulation in the environment.

MATERIALS AND METHODS

A. MATERIALS

R

 1. Test Item
 Item

 unlabelled XOA 409480
 Item

 Certificate of Analysis:
 AZ 17177

 Batch Gode:
 BCS-CR74871-01-01

 Chemical Purity:
 98.7%



#### 2. **Test Soils**

Four soils were used (see Table 7.1.2.1.2-19). The soils were taken from agricultural use aceas representing different geographical origin and different soil properties as required by the guidelines. No plant protection products were used for the previous 5 years. The soils were sampled freship from the fields (upper horizon of 0 to 20 cm) and sieved to a particle size of  $\leq 2$  from. Soil collection and handling were in accordance to ISO 10381-6. S Ò 1

Parameter		K Results	9 Units 🔬	ã și
Soil Designation			2 2 4a	
Geographic Location	<u> </u>			
City	, Ø			( <i>"</i>
State	North-Rhine	North-Rhme	North-Rhine C	North-Rhipe
	Westphalia	Westhalia	Westphalia	Westphatta
Country	"Germany	Ger⁄many⊘″	Germany	Germany
GPS Coordinates				
Soil Taxonomic Classification (USDA)	bamy mixed	sandy, mixed	loanny, mi⊗ed,	fine-loamy,
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mesic, Typi	mesic, Typic	mesic, Ppic	mixed, active,
× 4	Argudalf	Cambridgoll	Argadalf	frigid Typic
Soil Series		A the informati	on savailable	Eutrudept
Textural Class (USDA)	sandy loan	Acamy eard	silt horn	clay loam
Sand [50 um <sup>2/2</sup> mm]				27%
Silt $[2 \text{ uns} 50 \text{ and}]$	30%		© 60%	42%
Clay [Sum]	35% X	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	× 17%	31%
$r H (soil/0.01) $ $r CaCl \sqrt{1/2}$	× <u> </u>	53 0	61	7.2
pH (soil/water 1/1)	A. 67	59	6.4	7.2
nH (sate are )	53 @	360	6.4	73
pH (soil/1 N KCl 1/1)	¥ 4.7 ×	× 545¥	5.8	6.9
Organic Carbon	× 210% (	al 9%	1.8%	5.0%
Organic Matter <sup>1</sup>	3,6%	3.3%	3.1%	8.6%
Cation Exchange Capacity [neq/100.g]	011.00	9.8	11.8	22.0
Water Holding Capacity		þ,		
maximum [g H2O ad 100 g soil DW]	F 57.7 V	47.5	53.8	85.5
at 0.35 bar (pF 2.5)	<b>6.7%</b>	10.9%	21.3%	32.2%
Bull Density (disturbed) [grom <sup>3</sup> ] , 0	1.13	1.24	1.09	1.00
Microbial Biomass [mg microbia]				
carbon per kg son DW] ?	ÿ Q¥			
DAT-0 $\mathcal{O}^{\vee}$ $\mathcal{A}^{\vee}$ $\mathcal{A}^{\vee}$	<sup>°</sup> 284	324	297	354
DAT-30	<b>Q</b> 290	315	326	455
DAT-145 O	190	135	206	412

<sup>1</sup> % organic matter w organic carbon x 1.724

<sup>2</sup> Merobial Biomass samples were left untreated.

DAT: dave after treatment

DW: (iry weight

GPS: global positioning system

USDA: United States Department of Agriculture



#### B. **STUDY DESIGN**

#### **Experimental Conditions** 1.

The static test system for degradation in soil under aerobic conditions consisted of Erlenne flasks (volume e.g. 300 mL). Each flask was closed with a cotton wool plug allowing free exchange.

For preparation of the test systems, 100 g dry weight equivalents of the sieved soils were weighed in each flask. Soil moisture was adjusted to  $55 \pm 5\%$  of the maximum water holding capacity (MWHC) for the individual test systems by addition of de-ionized water. The flasks were then closed with cotton wool plugs and equilibrated to study conditions for days prior to application.

The study application rate (SAR) was based on a single field application rate of trifloxystrobin of 187.5 g per hectare, a maximum formation of approximately 9% of NOA 409480 in soil photolysis study M-049459-01-1 (Supplemental Dossier, KCA 7:1,1.3 (Q3) and a 2-fold application rate due to analytical reasons, resulting in a nominal SAR of 72 µg NOA 409480 per kg soil dry weight.

The test item was applied dropwise onto the set surface systems on 200 uL acetone/water 1/1 (v/v) using a pipette.

Ô The test systems were incubated in the dark for 115 days an wil moisture of and  $55 \pm 5\%$  MWHC in a climatic cabinet. Ŵ

#### Sampling 2.

Õ Eight sampling intervals were distributed over the entire incontine period of 115 days. Duplicate samples were processed and analysed 0, 3, 7, 14, 29, 58, 87 and 115 days after treatment (DAT). Microbial soil biomass, was determined at start, middle and end of the study (DAT-0, DAT-30 and DAT-115).

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At each sampling interval, concurrent recovery samples were prepared freshly by fortification of a representative soil ( ) with the test item at LOO level (corresponding to 10% of the nominal SAR) and at 11-fair LOQ level (corresponding to \$10% of the nominal SAR). Duplicate samples were prepared and processed in parallel to the degradation samples of the respective sampling interval for each fortification level.

### Analytical Procedures 3.

The entire soil of each test system was extracted tonce at ambient temperature using a shaker and acetonitrife/water 4/1 (19). Furthermore, two accelerated extraction steps using a microwave were performed, first with acetonitrile/water  $4/\sqrt{(v/v)}$  at 60 to 70 °C and second with methanol/water 1/1(v/v) at 50 °C. After each extraction step, extract and soil were separated by centrifugation (1295 x g) and decantation. The soft extracts were combined and an aliquot of the combined soil extract was analysed by reversed phase HPLC MS/MS in selected reaction monitoring mode using matrixmatched external multi-point calibration curves. Concurrent recovery samples were processed and analysed analogously.



The HPLC-MS/MS method was validated with regard to linearity, accuracy and precision. The mass selective detector was operated in the positive electrospray ionization selected reaction monitoring mode, tuned for the mass transitions of parent and a significant product ion. The linearity range of the mass spectrometer was tested in pure extraction solvent and in blank soil matrix solutions matrixmatched). Therefore, multi-point external calibration curves were established covering a range from approximately 1 to 175% of the nominal SAR. The accuracy and precision of the method was assessed on the basis of the recovery rates determined for each soil after fortification with the testitem a LOQ? level (corresponding to 10% of the nominal SAR) and at 41-fold LOQ4evel (corresponding to 119% of the nominal SAR). The fortified samples were processed and analysed as described for the degradation samples. Blank soil matrix solutions were used to determine the background abundance of the test item in the respective soils.

The degradation kinetics of the test item was determined according to FOCUS kinetics (2006) Sing the software KinGUI 1.1 with three different kinetic models: single first order, first order multi compartment and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of tit, the value was allowed to be estimated by the model. The best-fit binetic mode was selected on the basis of the chi2 scaled-error criterion and on the basis of a visual assessment of the goodness of the Dis. D. Do and DT90 values were calculated from the resulting kinet@parameters

## RESULTS AND DISCUSSION &

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Results indicated that the anticipated standardyzed aerobic conditions were mainstained and that the soils were microbially active over the duration of the laboratory study.

A. DATA

Degradation of NOA 409489 in soils under aerobic conditions (mean values Table 7.1.2.1. and SP expressed as %

	. //	1.5	4	$\gamma$		(1)				
	õ	Mean	¢'``	, C		_∽ <b>D</b> A	ΛT			
Soil 🖉	<u> </u>	🔊 SD ベ	<u></u>	S, S	<b>~</b> 7	<u>_</u> 4	29	58	87	115
	, /	Mean	<b>\$</b> 9.2	≪73.3 €	∛66.6 ≜	§ 52.7	37.6	26.4	19.4	18.1
- În constanți și constanți	r r	ŠÓ 1	€J≟ 5.8∡	$0^{\circ} \pm 0.6^{\circ}$	″±4⊗9≁	$\pm 2.4$	$\pm 1.7$	$\pm 3.0$	$\pm 1.1$	$\pm 0.3$
	)"	Mean <sub>e</sub> ?	107,4/	10491	9225	79.1	53.1	30.5	29.2	26.0
~	ů ő	Ś. Ś.D.≫	±₹.9	<u>`</u> \$3.9	±1.8	$\pm 1.1$	$\pm 0.6$	± 7.7	$\pm 1.5$	$\pm 0.5$
	Dă	Moan	<b>3</b> 3.1	~69.0	<b>65</b> .1	46.5	25.7	17.1	11.3	10.2
Ĩ	, Ô	<sub>∭</sub> SD ∅	N/A N/A	± 5.8	$\pm 1.9$	$\pm 0.8$	$\pm 7.6$	$\pm 1.4$	$\pm 0.7$	$\pm 1.6$
a a	× A	Meân	7257	<b>. 69</b> .2	64.9	43.6	22.0	11.0	5.4	4.9
No.	~ \$	SD	<b>4.9</b>	©± 2.1	± 1.6	$\pm 4.4$	$\pm 5.6$	$\pm 2.6$	$\pm 0.1$	$\pm 0.9$
DAT: days after tre	atment, SD	: standard	deviation	ı, N/A: no	ot applica	able				
<sup>1</sup> One replicate wa	s an outlier	and was n	ot used f	or evalua	tion, ther	efore no	SD could	d be calcu	ılated.	
			~Ç							





## **B. METHOD VALIDATION**

The HPLC-MS/MS method was successfully validated prior to application of the degradation samples. The correlation coefficients (r) of the multi-point external calibration curves were  $\geq 0.995$ . The recovery rates ranged from 78.6 to 111.5% of applied amount [% AA] for all coils and concentrations. The relative standard deviations for each recovery set ranged from 1.5 to 13.8%, showing a good repeatability of this method. Background abundance in blank soil matrix was far below 20% of the limit of quantitation in all soils and no interference by other matrix components occurred. The combination of the selective MS/MS detection method used with the preceding HPLC separation leads to a high specificity of the method.

In addition, the extraction efficiency was demonstrated by concurrent recovery samples at each sampling interval. The overall mean concurrent recovery was 100.5% AA (range from 96.6 to 105.8% AA).

## C. DEGRADATION OF PARENT COMPOUND

The amount of NOA 409480 in the soil extracts decreased from study start @AT-67 to study end (DAT-115) from 79.2 to 18.1% AA in soil and from 73.9 to 10.2% AA in soil and from 72.7 to 4.9% AA in soil and from 73.9 to 10.2% AA in soil and from 72.7 to

The degradation of NOA 409480 followed first order multi compartment (FOMC) kinetics in soils order (SFO) kinetics in soil according to the towest chi<sup>2</sup> error values and visual assessments. Table 7, 2.1.2 21 summarizes the best-fit results of the T<sub>50</sub> and DT<sub>90</sub> calculations.

 Table 7.1.2.1.2-21:
 Best-fit degradation kinetics of NOA409489 in soils under aerobic conditions for trigger evaluation according to FOCUS

Soil		Best-Fit Kinetic Model 1	DT50 @ S]daysS	DT® [days]	Chi <sup>2</sup> Error [%]	Visual Assessment <sup>2</sup>
	Y Y	FOXAC SY	27.8	275	2.6	+
	~~	FOMC ~	گۆل.2 🔊	239	4.7	+
	4a 🎺	₩ FOMC #	r 20.1 🖉	113	7.2	+
		SĘ©́, SĘ	19.0	63.4	7.5	+

<sup>1</sup> SFO: single first order, FOMC: first ord@multi@mpartment

<sup>2</sup> visual assessment: + = good  $\mathcal{F}$   $\mathcal{F}$ 

NOA 409480, a major photodegradation product of trifloxystrobin, was well degraded in soil under aerobic conditions in the dark in the laboratory. The calculated best-fit half-lives were between 19.1 and 30.2 days in the tested soils.

It is concluded that NOA 409480 has no potential for accumulation in the environment.

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 7.1.2.1.



## Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.1.2 /16; ; .; ; 2013 。	
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin Metabolite CGA 321	P
	under Aerobic Soil Conditions in Laboratory According to FOCUS Kingtics	
	Using the KinGUI 2 Tool	
Report No:	EnSa-13-0714	
Document No:	M-467654-01-1	
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>	
GLP:	No S A S S	<i></i> ]]
Justification:	New data / guideline requirement:	,
	Kinetic analysis of the degradation of major degradation product CGA0321115 for	
	modelling purpose	

## **Executive Summary**

A kinetic analysis of soil residue data from the aerobic son degradation study M-069897-01, 1 (Baseline Dossier, KCA 7.1.2.1.2 /08) was performed according to FOCUS finetics (2006) to derive half-lives for CGA 321113, a degradation product of arifloxy strobin which are suitable for modelling purpose. The kinetic evaluation was performed with the software KinGU02.

Single first order was the most appropriate kinetic model for modelling purpose for the degradation of CGA 321113 in soil where aerobic conditions in the darkon the laboratory at 20 °C and 40% of the maximum water holding capacity.

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**.** 

The half-life of CGA 32 11/13 was 223.2 days

Soil residue data from the aerobic soil degradation study 01-069897-01-1 (Baseline Dossier, KCA 7.1.2.1.2 08) were used. In this study the degradation of GA 321113, a degradation product of trifloxystrobin, was studied in soil (loany sand) under aerobic conditions in the dark in the laboratory for 120 days at 20 °C and 46% of the maximum water holding capacity.

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The degradation kinetics was determined according to FOCKS kinetics  $(2006)^{1}$  using the software KinGUI 2 with four different kinetic models: angle first order, first order multi compartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessement of the goodness of the fits, chi<sup>2</sup> scaled error criterion, t-test significance correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters.





### II. RESULTS

Single first order (SFO) was the most appropriate kinetic model for modelling purpose for the degradation of CGA 321113 in soil **Table 7.1.2.1.2-22** summarizes the results of the kinetic analysis.

 Table 7.1.2.1.2-22:
 Kinetic parameters for the degradation of CGA 321113 in soil inder aerobic conditions for modelling purpose according to FOCUS

			ÿ	40 <sup>-</sup>		_ K
	Kinetic Model <sup>1</sup>	DT50	Chi <sup>2</sup> Error	<sub>r</sub> 0 <sup>♥</sup> t-test	🗸 Vişaşal	¢ (
Soil		[days]	[%]	×	PAssessment 2	ĺ,Ű
	SFO	22302	1.8	2 <b>3</b> x 10 Q		<u>a</u>
<sup>1</sup> SFO: single first o	rder	~		N R		~~

<sup>2</sup> visual assessment: + = good

## III: CONCLUSION

The calculated half-life for modelling purpose for the degradation of the major prifloxystrobin degradation product CGA 321113 in Soil under aerobic conditions in the date in the laboratory was 223.2 days in the tested soil.

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the vaboratory given in section CX 7.1.2.1.

Report:	K@A 7.121.2/107; ; ; ; 2013
Title:	Knetic Evaluation of the Degradation of Trifloxystrobin and its Metabolite under
,	Aeroba Soil Conditions in Laboratory According to FOCUS Kinetics Using the
. 0	King UI 2 Tool & A A A
Report No: 🔊	EpSa-13-9715 V & & & &
Document No:	M-467655-01 A A O O A
Guidelines:	- FQCUS konetics $(2006)^{1}$ $(2006)^{1}$
GLP:	Not the second s
Justification:	New data / guideline requirement:
(	Kinetic analysis of the degradation of orfloxystrobin and its major degradation
<i>a</i> ,	product CGA 321-13 for modelling purpose

## Executive Summary

A kinetic analysis of soil residue data from the aerobic soil degradation study M-033459-01-1 (Baseline Dossier, KCA  $(1.2.1)^{\circ}/04$  and KCA (7.1.2.1.2/04) was performed with the software KinGUI 2 according to FOCUS kinetics  $(2006)^{1}$  to derive half-lives for trifloxystrobin and its degradation product CGA 321113 as well as formation fractions for CGA 321113, which are suitable for modelling purpose. Only the results for CGA 321113 are described here.

The single first order kinetic model was used for modelling purpose to describe the degradation of CGA 301113 as soil and the service of the under aerobic conditions in the dark in the laboratory at different temperature (20 and 10 %), soil moistures (60 and 30% of the field capacity at 1/3 bar (FC)) and test concentrations (1.0 and 0.1 mg/kg).

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The half-life of CGA 321113 was 120.0 days (20 °C, 60% FC, 1.0 mg/kg), 262.7 days (20 °C, 30% FC, 1.0 mg/kg), 369.5 days (10 °C, 60% FC, 1.0 mg/kg) and 35.1 days (20 °C, 60% @C 0.1 mg/kg).

The formation fraction of CGA 321113 was 0.951 (20 °C, 60% FC, 1.0 mg/kg), 1.000 30% FC, 1.0 mg/kg), 0.996 (10 °C, 60% FC, 1.0 mg/kg) and 1.000 (20 °C, 60% FC, 0.1 mg/kg

#### I. **METHODS**

Methods are summarized under KCA 7.1.2.1.1 /11 of the Supplemental Dossier.

#### П. ROSULTS

The single first order (SFO) kinetic model was used for modelling purpose to describe the degradation summarizes the results of the kinetic of CGA 321113 in soil analysis.

Table 7.1.2.1.2-23: Kinetic parameters for degradation of CGA 321113 in soils inder aerobic conditions for modelling pyrpose according to FOCUS

			$\cdot \circ \circ$	$\sim$
Soil	FF Kinetic Mode	DI 50 Chi <sup>2</sup> Error	O t-test	Visual
		[days] 🖌 🚺		Assessment <sup>2</sup>
A <sup>3</sup>	0.951 SFQ	2.3	≪2× 10 <sup>-16</sup>	+
B <sup>4</sup>	\$,000 SEO S	2,62.7	_~\$2 x 10 →6	+
C <sup>5</sup>	,0.996 SFO	≈\$69.5 O <sup>™</sup> 4k3	9.76 x 0 0-12	+
D <sup>6</sup>	▼ 1.000 SFQ	\$ 35.k 9.5 Å	$<2 \times 10^{-16}$	+

FF: formation fraction

- <sup>1</sup> SFO: single first order
- <sup>2</sup> visual assessment: + good
- <sup>3</sup> 20 °C, 60% of the field capacity at 1/3 bar, 1.0 mg/kg
  <sup>4</sup> 20 °C, 30% of the field capacity at 1/3 bar, 1.0 mg/kg
- <sup>5</sup> 10 °C, 69% of the field capacity at 1/3 par, 1.0 mg/kg
- 20 °C, 60% of the fight capacity at 1/S bar, 0.1 mg/kg

#### ∦n.̃ CONCLOSIONS

The calculate whalf wes for modelling purpose for the degradation of the major trifloxystrobin degradation product CGA \$211 (3) in soil under aerobic conditions in the dark in the laboratory were between 251 and 369.5 days in the fested spils. The formation fractions were between 0.951 and 1.000.

The results are included in the summary of the degradation rates of trifloxystrobin and its major





## Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.1.2 /18; ; ; ; ; 2013 。
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin and its Metabolite unser
	Aerobic Soil Conditions in Laboratory According to FOCUS Kinetics Using the
	KinGUI 2 Tool
Report No:	EnSa-13-0716
Document No:	M-467663-01-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>
GLP:	No S A A A
Justification:	New data / guideline requirement:
	Kinetic analysis of the degradation of trifloxystrobin and its major degradation
	product CGA 321113 for modelling purpose $Q$

## **Executive Summary**

A kinetic analysis of soil residue data from the aerobic sol degradation study M-033453-01-1 (Baseline Dossier, KCA 7.1.2.1.1 /05 and KCA 7.1.2.1.2 /05) was performed with the software KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> to derive habilities for triboxystrobin and its degradation product CGA 321113 as well as formation fractions for CGA 321143, which are suitable for modelling purpose. Only the results for CGA 321113 are described here.

The single first order kinetic model, was used for podelling purpose to describe the degradation of CGA 321113 in soils **1000000**, **10000000** and **10000000** under aerobic conditions in the dark in the laboratory at 20 °C 40% of the maximum water holding capacity and a test concentration of 1.0 mg/kg.

The half-life of CGA 321113 was 355.6 cays in Soil **1997**, 428@ days in soil and and 358.0 days in soil

The formation fraction of CGA 32013 was 0.944 in soil 0.970 in soil and 0.946 in soil

Methods are summarized under & CA 7. N.2.1. 1912 of the Supplemental Dossier.

Q. RÊSULPS

The single first order (SFO) kinetic model was used for modelling purpose to describe the degradation of CGA\$21113 in soits analysis. (a) and (b) and (c) and (c) analysis. (c) and (c) and (c) and (c) and (c) analysis. (c) and (c)

 Table 7.1.2.1.2
 Xinetic parameters for degradation of CGA 321113 in soils under aerobic

 Conditions for modelling purpose according to FOCUS

	×	<u> </u>					
Soil	S.	ĈFF ≪	<sup>*</sup> Kinetic Model <sup>1</sup>	DT50	Chi <sup>2</sup> Error	t-test	Visual
	с. °С			[days]	[%]		Assessment <sup>2</sup>
, s	Ş	0,944	SFO	755.6	0.9	$< 2 \text{ x } 10^{-16}$	+
L.	<i>"</i> 0"	<b>£</b> .970	SFO	428.4	1.2	$< 2 \text{ x } 10^{-16}$	+
ů.		0.946	SFO	358.0	1.5	$< 2 \text{ x } 10^{-16}$	+

FF: formation fraction

<sup>1</sup> SFO: single first order

<sup>2</sup> visual assessment: + = good





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Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

### **III. CONCLUSIONS**

The calculated half-lives for modelling purpose for the degradation of the major trifloxystrobin degradation product CGA 321113 in soil under aerobic conditions in the dark in the laboratory were between 358.0 and 755.6 days in the tested soils. The formation fractions were between 0.944 and 0.970.

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 7.1.21.

Report:	KCA 7.1.2.1.2 /19; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
Title:	Kinetic Evaluation of the Degradation of Tufloxystrobin and its Metabolite under
	Aerobic Soil Conditions in Laboratory According to FOCUS Kinetics Using the
	KinGUI 2 Tool
Report No:	EnSa-13-0717
Document No:	M-467664-01-1
Guidelines:	- FOCUS kinetics 2006
GLP:	No L O' Y V V X X X X
Justification:	New data / guideline requirement: 3
	Kinetic analysis of the degradation of terfloxystrobin and its major degradation
	product CGA 321113 for modelling purpose 0

### **Executive Summary**

A kinetic analysis of soil residue data from the aerobic soil degradation study M-073242-01-1 (Baseline Dossier, KCA-7,1.2,10/08) was performed with the software KinGUI 2 according to FOCUS kinetics (2006)<sup>1</sup> to derive half-lives for trifloxystrobin and its degradation product CGA 321113, to well as formation fractions for CGA 321115, which are suitable for modelling purpose. Only the results for CGA 321113 are described here.

The single first order kinetic model was used for model in purpose to describe the degradation of CGA 321113 in soil the under aerobic conditions in the dark in the laboratory at 20 °C, 40% of the maximum water hading capacity and are st concentration of 337  $\mu$ g/kg.

The half-life of CGA 521113 Was 380.4 days.

The formation fraction of CGA \$21113 was 0.983.

**METHODS** 

Methods are summarized under KCA7.1.2.1cP/13 of the Supplemental Dossier.



#### П. RESULTS

The single first order (SFO) kinetic model was used for modelling purpose to describe the degradation of CGA 321113 in soil . Table 7.1.2.1.2- 25 summarizes the results of the kinetic analysis.

Table 7.1.2.1.2-25: Kinetic parameters for degradation of CGA 321113 in soil under aerobic conditions for modelling purpose according to FOCUS

Soil	FF	Kinetic Model <sup>1</sup>	DT500 [datys]	Chi <sup>2</sup> Error [%]	t-test	Assessment <sup>2</sup>
	0.983	SFO	\$80.4	2,5	₀6.11 <b>x</b> 90 <sup>-6</sup>	

FF: formation fraction

<sup>1</sup> SFO: single first order

<sup>2</sup> visual assessment: + = good

pr the major Friflox Strobin The calculated half-life for modelling purpose for the degradation degradation product CGA 321113 in soil up der aerobic conditions in the dark in the laboratory was 380.4 days in the tested soil. The formation fraction was 0.983

The results are included in the summary of the degradation rates strobing and its major degradation products in soil in the aborately given in section CM 7

n

Report:	KCA 7.1 21.2 /20; ; ; ; 20(3
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin and its Metabolite under
į.	Aerobe Soil Conditions in Laboratory Seconding to FOCUS Kinetics Using the
	King UI 2 Tool & A A A A A A A A A A A A A A A A A A
Report No: 🛇	Epsa-13-9718
Document No:	M-468172-01
Guidelines:	- FQCUS konetics $(2006)^{1}$ $(2006)^{1}$
GLP:	Not in the intervention of
Justification:	New data / guideline requirement:
(	Kinetic analysis of the degradation of oifloxystrobin and its major degradation
	product CGA 321-13 for modelling purpose
\$ <b>0</b>	

## Executive.Summary

A kinetic analysis of soil residue data from the aerobic soil degradation study M-033008-01-1 (Basetine Dossier, KCA 7.1.2.1.2./01) was performed with the software KinGUI 2 according to FOCIOS kinetics (2006)<sup>1</sup> to derive half-lives for trifloxystrobin and its degradation product CGA 320113 as well as formation fractions for CGA 321113, which are suitable for modellin purpose? Only the results for CGA 321113 are described here.

The single first order kinetic model was used for modelling purpose to describe the degradation of CGA 321113 An soil under aerobic conditions in the dark in the laboratory at 19 °C, 75% of the field apacity and a test concentration of 1.0 mg/kg.

The half life of CGA 321113 was 80.3 days.

The formation fraction of CGA 321113 was 0.969.

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Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

## I. METHODS

Methods are summarized under KCA 7.1.2.1.1 /14 of the Supplemental Dossier.

## II. RESULTS

The single first order (SFO) kinetic model was used for modelling purpose to describe the degradation of CGA 321113 in soil **Table 7.1.2.1.2-**36 summarizes the results of the kinetic analysis.

 Table 7.1.2.1.2-26:
 Kinetic parameters for degradation of CGA 324113 in soil under aerobic conditions for modelling purpose according to FOCUS

		1.	a 0 4		."0" """"	
Soil	FF	Kinetic Model <sup>M</sup>	<b>DT</b> 50 KG	hi <sup>2</sup> Exror	t-test	Vişual
		4	#days]	<u> </u>		✓ Assessment <sup>2</sup> °
	0.969	SFQ	80.3	3.2 A	$< 3 \times 10^{-16}$	
FF: formation fraction						
<sup>1</sup> SFO: single first orde	er	Q vy		to a	Û S (	
<sup>2</sup> visual assessment: +	= good		J W		Ý NÝ LÝ	
		Q, a ca	· 沟	ð o		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
		ิ่ √เป็น (⊘อัง	ICICITISION		× . 0	<i>V</i>

The calculated half-life for modelling purpose for the degradation of the major trifloxystrobin degradation product CGA 321119 in soil under aerobic conditions in the dark in the laboratory was 80.3 days in the tested soil. The formation fraction was 0.969.

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 74.2.1

Report: 🖉	KCA,7,1.2.1,2/21;
Title:	Kinetic Evaluation of the Degradation of Tritlexystrobin and its Metabolite under
k∿'	Accobic Soil Conditions in Laboratory According to FOCUS Kinetics Using the
	SinGUT2 Tool &
Report No:	©EnSa43-0749
Document No;	$M = \frac{68202}{101} = 1$
Guidelines:	- $\Phi$ OCUS kineties (2006) <sup>1</sup>
GLP: A	No Q' AN Q' IV
Justification:	New data / guideline requirement.
	Kinetic analysis of the degradation of trifloxystrobin and its major degradation
	product CGA 321112 for modelling purpose

Executive Summary

A kinetic analysis of soil restrice data from the aerobic soil degradation study M-033147-01-1 (Baseline Dossier, KCA 7.1 $\hat{O}$ .1.1/02 and KCA 7.1.2.1.2/02) was performed with the software KinGUV2 according to EQCUS kinetics (2006)<sup>1</sup> to derive half-lives for trifloxystrobin and its degradation produce CGA 321113 as well as formation fractions for CGA 321113, which are suitable for modeling purpose. Only the results for CGA 321113 are described here.

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The single first order kinetic model was used for modelling purpose to describe the degradation of CGA 321113 in soil under aerobic conditions in the dark in the laboratory at 19 of the field capacity and a test concentration of 1.0 mg/kg.

The half-life of CGA 321113 was 99.2 days.

The formation fraction of CGA 321113 was 0.947.

I. MIETHODS Methods are summarized under KCA 7.1.2.1.1 /15 of the Supplemental Dossier II. RESULTS

The single first order (SFO) kinetic model was used for modelling purpose to describe the degradation the results of the kinetic of CGA 321113 in soil summarizes analysis.

Table 7.1.2.1.2- 27:	Kinetic parameters for	degradation	of CGA 321113 in	self under	aerobic
	conditions for modelling	s purpose acc	ording to FOGUS	õ v	

		$0$ $\sim$	ч <b>0</b>				& <i>"</i>
Soil	FF S	Kinetic M	lødel 1	DT 50	Chi <sup>2</sup> Error	t-test C	Visual 🔰
	~	×		🗸 [days]	<b>^%</b> ]_```		Assessment <sup>2</sup>
	<b>Q9</b> 47	S S S S S S S S S S S S S S S S S S S		99.2		$x^{2} x^{10^{16}}$	+
FF: formation fraction			N.		Š &, ,	~ . 65°	
<sup>1</sup> SEO: single first orde		\$ I	~	I. N	' 0 <sup>*</sup> %		

visual assessment

The calculated half-life for modelling purpose for the degradation of the major trifloxystrobin degradation product CGA 321413 in soil under acrobic conditions in the dark in the laboratory was 99.2 days in the tested woil. The formation fraction was 0.947. O

The results are included in the summarry of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 7.1.2.1.



## Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.1.2 /22; ; ; ; 2013 。
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin and its Metabolites
	under Aerobic Soil Conditions in Laboratory According to FOCUS Kingits
	Using the KinGUI 2 Tool
Report No:	EnSa-13-0720
Document No:	M-468203-01-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>
GLP:	No & A A A
Justification:	New data / guideline requirement:
	Kinetic analysis of the degradation of trifloxystrobin and its major degradation
	products CGA 321113 and CGA \$57276 for modelling purpose

## **Executive Summary**

A kinetic analysis of soil residue data from the aerobic soil degradation study M-033394-01-1 (Baseline Dossier, KCA 7.1.2.1.1/03 and KCA 7.1.2.1.2/03) was performed with the software KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> to derive half-lives for triboxystrobin and its degradation products CGA 321113 and CGA 357276 as well as formation fractions for CGA 321113 and CGA 357276, which are suitable for modelling purpose. Only the results for CGA 221113 and CGA 357276 are described here.

The single first order kinetic model was used for modelling purpose to describe the degradation of CGA 321113 and CGA 357276 in soil. The field capacity of 1/3 bar and test conditions on the dark in the laboratory at 25 °C, 75% of the field capacity of 1/3 bar and test concentration of 0.5 mg/kg.

METHODS

The half-life of CGA 321113 was 257.2 days and could not be calculated for CGA 357276.

The formation fraction of CGA 321113 was 0,822 and could not be calculated for CGA 357276.

Methods are summarized under KCAS.1.2.1.1 /16 of the Supplemental Dossier.

The single first order GFO) contact model was used for modelling purpose to describe the degradation of CGA 321193 and CGA 957276 in son the s

Table 7.1.2.1.2- 28: Kinetic parameters for degradation of CGA 321113 in soil under aerobic conditions for modelling purpose according to FOCUS

	$\sim$	2						
	Sojl		, Ka	Kinetic Model 1	DT 50	Chi <sup>2</sup> Error	t-test	Visual
	Ś		Ŭ,	Ç Ý	[days]	[%]		Assessment <sup>2</sup>
			0.8220	SFO	257.2	1.7	7.64 x 10 <sup>-16</sup>	+
EE al		. 4						

FF: formation Praction

<sup>1</sup> SEO: single first order

<sup>2</sup> visual assessment: + = good

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### **III. CONCLUSIONS**

The calculated half-life for modelling purpose for the degradation of the major trifloxystrobing degradation product CGA 321113 in soil under aerobic conditions in the dark in the laboratory was 257.2 days in the tested soil. The formation fraction was 0.822. No valid alf-life and tormation fraction could be derived for the major trifloxystrobin degradation product CCA 357276.

The results are included in the summary of the degradation rates of trifloxystrobin and its ma degradation products in soil in the laboratory given in section CA 7.1.21.

Report:	KCA 7.1.2.1.2 /23; ; ; ; ; 2003 Q O O O
Title:	Kinetic Evaluation of the Degradation of Tuiloxystrobin and its Metabolite under
	Aerobic Soil Conditions in Laboratory According to FOCUS Kinetics Using the
	KinGUI 2 Tool
Report No:	EnSa-13-0721 $\sqrt{2}$ $\sqrt{2}$ $\sqrt{2}$ $\sqrt{2}$ $\sqrt{2}$ $\sqrt{2}$
Document No:	M-468174-01-1
Guidelines:	- FOCUS kinetics 2000
GLP:	No L' à v v v v v v v v
Justification:	New data / guideline requirement: 3
	Kinetic analysis of the degradation of terfloxystrobin and its major degradation
	product CGA 321113 for modelling purpose 0

### **Executive Summary**

A kinetic analysis of soil residue data from the actobic soil degradation study M-033464-01-1 (Baseline Dossier, KCA-7.1.2.10)/07, and KCA 7.52.1.2.07) was performed with the software KinGUI 2 according to FOCUS kinetics (2006), to derive had-lives for trifloxystrobin and its degradation product COA 321113 as well of formation fractions for CGA 321113, which are suitable for modelling purpose. Only the results for CGA 321110 are described here.

The single first order kinetic model was used for modelling purpose to describe the degradation of under agrobic conditions in the dark in the laboratory at CGA 321113 in soils and 19.2 °C, 40% of the maximum water holding expacity and test concentrations of 0.3 and 1.0 mg/kg.

(00 mg/kg) and 235.0 days (1.0 mg/kg) in soil The half-life of CGAO21113 was and 157.4 days in soil

Ò

was The formation fraction of CGA .000 (0.3 mg/kg) and 0.957 (1.0 mg/kg) in soil 321113 Methods are summarized under KCA 7 2.1.1 /17 of the Supplemental Dossier.



#### II. RESULTS

The single first order (SFO) kinetic model was used for modelling purpose to describe the degradation of CGA 321113 in soils and . Table 7.1.2.1.2- 29 summarizes the result of kinetic analysis.

Table 7.1.2.1.2- 29: K	inetic parameters for degradation of CGA	A 32 H 13 in	soil, un	der æ	robic	
co	onditions for modelling purpose according t	o <b>FOCUS</b>	z,		Ş	<i>a</i> r

			¥.			
Soil	FF	Kinetic Model <sup>1</sup>	DT 50	Chi <sup>2</sup> Error	t-testK	Visual V
			[days]	[%]		Assessment <sup>2</sup>
A <sup>3</sup>	1.000	SFO	@1 <sup>7</sup> 12.4	2.4	2.68Q 10 <sup>-13</sup>	
B <sup>4</sup>	0.957	SFO	235.0	2.1 ×	1,35 x 19-	
3	1.000	SFO 🖇	159.4	0.6	2 x 10 16	
FF: formation fraction			N C			Y and so
<sup>1</sup> SFO: single first order			° ~	× 4	A U	
2	and	s ~				ř kQř

- visual assessment: + = good<sup>3</sup> test concentration of 0.3 mg/kg
- <sup>4</sup> test concentration of 1.0 mg/kg

0

 $\bigcirc$ 

The calculated half-lives for modelling purpose for the degradation of the major trifloxystrobin degradation product CGA 22111 Don continued of the major trifloxystrobin degradation product CGAØ2111Din soiDunder derobic conditions in the dark in the laboratory were between 112.4 and 235.0 days in the tested soils. The formation fractions were between 0.957 and K, 1.000.  $\bigcirc$ 

The results are instuded in the summary of the degradation rates of trafloxystrobin and its major degradation products in soil in the laboratory given in section CA 9.1.2.

(?a	
Report:	KCA 7.1.2 2 /24 ; ; ; ; 2013
Title:	Kinetic Evaluation of the Degradation of Prifloxystrobin and its Metabolites
	under Aerobic Soil Conditions in Laboratory According to FOCUS Kinetics
(	Vsing the King UI 2 Tool 9 0
Report No:	ĔnSQ-13-QŽŽ4 🖉 🔆 🛇
Document No:	M-467669-01-1~ ~ ~ ~
Guidelines: *	- FOCOS kinetics (2006) $\frac{1}{2}$
GLP:	No & V V X X
Justification:	New data / guideline requirement:
s the second sec	Kinetic analysis of the degradation of trifloxystrobin and its major degradation
· ¥	produces CGA 321113, Nor 413161 and CGA 357276 for modelling purpose
, O	

Executive Summary

A kineti@analysis of soil residue data from the aerobic soil degradation study M-464420-01-1 (Supplemental Dossier, KCA 7.1.2.1.1/10) was performed with the software KinGUI 2 according to FOCUS kinetics (2006), to derive half-lives for trifloxystrobin and its degradation products CGA 321173, NOA 413161 and CGA 357276 as well as formation fractions for CGA 321113, NOA 410161 and CGA 357276, which are suitable for modelling purpose. Only the results for CGA 321113, NOA 413161 and CGA 357276 are described here.

The single first order kinetic model was used for modelling purpose to describe the degradation of CGA 321113, NOA 413161 and CGA 357276 in soils under aerobic conditions in the dark in the 4a and laboratory at 20.1 °C, 53.4% of the maximum water holding capacity and test concentration 480 µg/kg. The half-life of CGA 321113 was 70.1 days in soil 71.6 days in soft , 55.5 days in soil 4a and 77.4 days in soil . Fre half-life of NOA 413161 was 90.4 days in soil 48.1 days in soil , 35.1 days in soil 4a and 30.9 days in sol The half-life of CGA 357276 could not be calculated. The formation fraction of CGA 321113 was 0.917 in soil Ø.996 m soil 4a and 0.961 in soil , 0.973 in soil The formation fraction of NOA 413161 was \$1735 in soil , 0.164 in solf , 0.132 in soil da and 0.213 in soil The and 0.027 in soil formation fraction of CGA 357276 was 0043 in soil METHODS As of the Supplemental Dos Methods are summarized under KOA IP. RESULTS The single first order (SFO) kinetic model was used for modelling purpose to describe the degradation of CGA 321113 NOA 41316 and CGA 35 276 m soils Table 7.1.2.1.2- 30 to Table 7.1.2.1.2- 32 🖣 an 🌡 are summarizing the results of the kinetic analysis. Ø Kinetio parameters for degradation of CGA 321113 in soils under aerobic Table 7.1.2.1.2-30: conditions for modelling purpose according to FOCUS Soil Kinetic Model & DT Chi<sup>2</sup> Error t-test Visual Ø O Assessment<sup>2</sup> [days] [%] 70.1  $< 2 \times 10^{-16}$ + 0.91SFO 4.6  $< 2 \ge 10^{-16}$ 0.996 71.6 3.6  $^+$ SF 0.973 **SFO** 55.5 1.9  $< 2 \text{ x } 10^{-16}$ +4a√ Ì ∛ SFQ 2.9 77.4  $< 2 \times 10^{-16}$ + FF: formation fraction <sup>1</sup> SFO: single First order <sup>2</sup> visual assessment: 4 = good0.961

#### Table 7.1.2.1.2-31: Kinetic parameters for degradation of NOA 413161 in soils under aerobic conditions for modelling purpose according to FOCUS Ô

							S
Soil	FF	Kinetic Model <sup>1</sup>	DT <sub>50</sub>	Chi <sup>2</sup> Error	test	Visoal	0
			[days]	[%]	Č?	Assessment	
	0.135	SFO	90.4	3.3	5.39 x 10 <sup>-7</sup>	+ *	
					×	Ô' Ĝ' 4	Ô,
	0.164	SFO	48.4	5.1	4.48 x 10 <sup>-15</sup>		
4a	0.132	SFO	35.1	4.0	$< 2 \times 10^{3}$		Ľ
	0.213	SFO	£30.9	40 <sup>7</sup> Y	$< 2 \times 10^{-16}$		, O'
FF: formation fraction		L.	<u>Ø</u>		Å í.	y O (	

<sup>1</sup> SFO: single first order

<sup>2</sup> visual assessment: + = good



	Soil <sup>1</sup> ( ) Soil <sup>2</sup> ( ) Soil <sup>1</sup> ( ) Soil <sup>1</sup> ( ) Soil <sup>2</sup> ( ) ( ) Soil <sup>2</sup> ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (
1	No kinetic parameters could be derived for CGA 357276 in soils
	4a and data.
2	CGA 357276 residues did not reach the maximum antil the end of the study,
	thus no degradation ates could be estimated
	V V III CONCLUSIONS V V. V

The calculated half-lives for modelling purpose for the degradation of the major trifloxystrobin degradation products CGA 32/113 and NOA 413161 in stil under aerobic conditions in the dark in the laboratory were between 55.5 and 774 days for CG@ 3211 3 and between 30.9 and 90.4 days for NOA 413161 in the tested soils. The half-lives for the major tritloxystrobin degradation product CGA 357276 could not be calculated. The formation fractions were between 0.917 and 0.996 for CGA 32 13, between 0.1 2 and 0.213 for SOA 442 161 and between 0.027 and 0.043 for CGA 357276.





## Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.1.2 /25; ; ; 2013 。
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin Metabolite CGA 357261
	and its Metabolites under Aerobic Soil Conditions in Laboratory According to
	FOCUS Kinetics Using the KinGUI 2 Tool
Report No:	EnSa-13-0725
Document No:	M-468206-01-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>
GLP:	No & A A A
Justification:	New data / guideline requirement:
	Kinetic analysis of the degradation of the major frifloxystrobit photogegradation
	products CGA 357261, CGA 372466 and NOA 13163 for modelling purpose

## **Executive Summary**

A kinetic analysis of soil residue data from the aerobic soil degradation study M-459997-04-1 (Supplemental Dossier, KCA 7.1.2.1.2/10) was performed with the software KinGUI 2 according to FOCUS kinetics (2006)<sup>1</sup> to derive half-lives for the triloxystrobin photodegradation products CGA 357261, CGA 373466 and NOA 413163 as well as formation fractions for CGA 373466 and NOA 413163, which are suitable for modeling purpose. CGA 373466 and NOA 413163, are derived from CGA 357261.

First order multi compartment was the most appropriate kinetic model for modelling purpose for the degradation of CGA 357261 in soils as well as double and first order in parallel in soils and 4a under aerobic conditions in the dark in the sooratory at 20.2 °C 55% of the maximum water holding capacity and a test concentration of 494 µg/kg. The single first order kinetic model was used for modelling purpose to describe the degradation of CGA 973466 and NOA 403163. The kinetic malysis was also suitable to derive half-lives for trigger evaluation. The half-life of CCA 357261 was 0.06 days in soil , 0.07 days in soil 0.08 days in soil 4a and 0.14 days in soil The half life of CGA \$73466 was 31.3 days in soil , 44.6 days in soil 4407 days/in soil 4a and 72.3 days in soil The half-life of NOA41316, was \$6.0 days in soil 53.6 days in soil 40.0 days in sôil 4a and 25.4 days in soil

 The formation fraction of CCA 373466 was 0.980 in soil
 4a and 1.000 in soil
 1.000 in soil

 Image: A state of the soil
 4a and 1.000 in soil
 1.000 in soil

 Image: A state of the soil
 4a and 1.000 in soil
 1.000 in soil

 Image: A state of the soil
 4a and 0.260 in soil
 1.000 in soil

METHODS

Soil residue data from the aerobic soil degradation study M-459997-01-1 (Supplemental Dossier, KCA (1.2.1/2/10) were used. In this study, the degradation of trifloxystrobin was studied in soils (sandy loam), (san

4a (silt @am) and @am (clay loam) under aerobic conditions in the dark in the laboratory for 121 days at 20.2 °C, 55% of the maximum water holding capacity and a test concentration of 494  $\mu$ g/kg.







The kinetic analysis was performed according to FOCUS kinetics  $(2006)^{1}$  using the software KinGUI 2 with four different kinetic models: single first order, first order multi compartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial receivery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessement of the goodness of the trie, chi<sup>2</sup> scaled-error criterion, t-test significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters. The degradation of degradation products was described with the single first order model. The resulting DT<sub>50</sub> Calues from the first order multi compartment and double first order in parallel models were not calculated as DP<sub>90</sub>/3.32 and from the slow k-rate, respectively, as recommended by FOCUS. These procedures produce the worst case DP<sub>50</sub> for the parent compound, which, however, does not describe the worst case cenario for the following degradation products. The DT<sub>50</sub> value taken for modelling are based on the deratively calculated values from KinGUI 2.

First order multi compartment (FOMC) was the most appropriate kinetic model for modelling purpose for the degradation of CGA 3572Q in soils and and and and a second a second and a second a second

Table 7.1.2.1.2-33 Kinetic parameters for degradation of CGA 357261 in soils under aerobic conditions for modelling purpose according to FOCUS

			- K' ' ' >>	, <u>,</u> , , , , , , , , , , , , , , , , ,	Ť	
O*		Kinetic Model 1.	DT <sub>50</sub>	ChiOError	t-test <sup>3</sup>	Visual
<u>s</u> ØSoil			days]	@ [%]		Assessment <sup>4</sup>
	Â	FOMC	<b>\$</b> ,06	\$ 6.5	3.26 x 10 <sup>-3</sup>	+
		<sup>™</sup> <sub>≪</sub> DFOP <sup>≪</sup>	$\sim 0.07$	<u>_</u> 5B	k <sub>2</sub> : 6.66 x 10 <sup>-3</sup>	+
4a <sup>《</sup>		DFOP C	0.08	7.9	k <sub>2</sub> : 2.10 x 10 <sup>-2</sup>	0
	ð <sup>v</sup> o	Ĵ <sup>™</sup> , FØMC O	0.14	3.1	2.73 x 10 <sup>-9</sup>	+

<sup>1</sup> FOMC: first order multi compartment, DFOP: double first order in parallel

<sup>2</sup> for FOMC: DT<sub>50</sub> was not calculated as  $\frac{1}{10}$  for FOMC: DT<sub>50</sub> was not calculated as  $\frac$ 

for DFOP: DT<sub>50</sub> was not calcoated from the sow k-rate, DT<sub>50</sub> is based on fit of the decline curve

<sup>3</sup> for FOMC: worst case value of rate parameters alpha and beta

<sup>4</sup> visual assessment  $\mathcal{A} = g \mathcal{Q} \mathcal{Q} \mathcal{Q}$ , o = froderate

Table 7.1.2.1.2<sup>23</sup>4: Kinetic parameters for degradation of CGA 373466 in soils under aerobic conditions for trigger evaluation and modelling purpose according to FOCUS

J.	Soil	A C	Z Z Z Z Z Z	FF F	Kinetic Model <sup>1</sup>	DT50 [days]	DT90 [days]	Chi <sup>2</sup> Error [%]	t-test	Visual Assessment <sup>2</sup>
4				0.980	SFO	31.3	103.8	4.7	$< 2 \ge 10^{-16}$	+
				1.000	SFO	44.6	154.2	1.7	$< 2 \ge 10^{-16}$	+
			4a	1.000	SFO	44.7	152.2	1.9	$< 2 \ge 10^{-16}$	+
				1.000	SFO	72.3	240.2	2.5	$< 2 \ge 10^{-16}$	+



FF: formation fraction

<sup>1</sup> SFO: single first order

<sup>2</sup> visual assessment: + = good

Table 7.1.2.1.2- 35:Kinetic parameters for degradation of NOA 413163 in soils under perobic<br/>conditions for modelling purpose according to FOCUS

					V	
Soil	FF	Kinetic Model <sup>1</sup>	DT50	Chi <sup>2</sup> Error	, t-test	Visana 🖓
			[days]	[%]	· · · · · · · · · · · · · · · · · · ·	Assessment
	0.229	SFO	76.0	5.00	3.8 x 100	
	0.246	SFO	£53.6	30° ×	< 2  x	
	0.162	SFO 🔬	Ø 40.0	Q3.7 °	$< 2 x^{10^{-16}}$	T & A A
4a			¢		<i>Q</i> , 0	
	0.260	SFO	25.4	¢ 6.2	$\approx 2 \text{ x} \approx 0^{16}$	
FF: formation fraction		<u> </u>				. 1

<sup>1</sup> SFO: single first order

<sup>2</sup> visual assessment: + = good

The calculated half-lives for modelling purpose for the degradation of the major triffoxystrobin photodegradation products CGA 357201, CGA 378466 and NGA 41363 in soil, under aerobic conditions in the dark in the laboratory were between 0.06 and 0.14 days for CGA 377261, between 31.3 and 72.3 days for CGA 373466 and between 25.4 and 76.0 days for NOA 413163 in the tested soils. The formation fractions were between 0.080 and 1.000 for CGA 373466 and between 0.162 and 0.260 for NOA 413163.

The results are included in the spinmary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 74.2.1

0	
Report: 🔊	KCA_7.1.2.1,2/26; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin Metabolite NOA 409480
K~y <sup>v</sup>	under Actobic Soil Conditions in Laboratory According to FOCUS Kinetics
	Osing the KinGUI 2 Jool 🖉 🦉
Report No:	SEnSa413-0726 2 0
Document No:	M - 467675 = 01 - 1 C' C C C C C C C C C C C C C C C C C
Guidelines	- $OCUS$ kineties (2006) <sup>1</sup>
GLP:	No V AV BY
Justification:	New data / guideline requirement.
	Kinetic analysis of the degradation of major photodegradation product
L.	NOA 409480 for modelling purpose
/	

Executive Summary

A kinetic analysis of sol restrue data from the aerobic soil degradation study M-445349-02-1 (Supplemental Dossier, KCA).1.2.1.2/15) was performed according to FOCUS kinetics (2006)<sup>1</sup> to derive half-lives for NOA 499480, a photodegradation product of trifloxystrobin, which are suitable for modelling purpose. The kinetic evaluation was performed with the software KinGUI 2.

Single first order was the most appropriate kinetic model for modelling purpose for the degradation of NOA 409480 in soils , 4a

Page 136 of 278 **Bayer** CropScience 2013-11-25 Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin under aerobic conditions in the dark in the laboratory at 20 °C, 55% of the and maximum water holding capacity and a test concentration of 71 µg/kg. The half-life of NOA 409480 was 45.3 days in soil 39.3 days in so , 24.9 days in soil 4a and 19.1 days in soil I. **METHODS** Soil residue data from the aerobic soil degradation study M-445309-02-1 (Supplemental Dossier KCA 7.1.2.1.2 /15) were used. In this study, the degradation of NOA 409480 a photodegradation product of trifloxystrobin, was studied in soils °(sandy loant), (sandy loam), Aa (silt loam)∕and (clay loam) under aerobic conditions in the dark in the laboratory for \$1°5 days at 20°C, 55% of the maximum water holding capacity and a test concentration of  $7 \Omega \mu g/kg$ . The degradation kinetics was determined according to FOCUS kinetics (2006) using the software KinGUI 2 with four different kinetic models; single first order, firstorder multi compartment, bockeystick (double first order sequential) and double first order in parallel. Model mput datasets were the residual amounts found in each replicate test system at each sampling interval. The initiakrecovery at DAT-0 was included in the parameter optimization proceeding, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic prodel was selected on the basis of a detailed statistical analysis including visual assessment of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, t-test significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters Single first order (SFQ) was the most appropriate for modelling purpose for the kinetic model degradation of NOA 499480 in soils 36 summarizes the results of the kinetic analysis. 4a and Table₄7.1.2 **"**[??**2**-Kinetio parameters for the degradation of NOA 409480 in soils under Table 7.2.1.2-36: robic condition for modelling purpose according to FOCUS Kinetic Model<sup>1</sup> Chi<sup>2</sup> Error Visual t-test [days]0 Soil Assessment<sup>2</sup> [%] 9.2 2.20 x 10<sup>-7</sup> 4**5**3 SKØ 0 1.84 x 10<sup>-8</sup> **∕⊗**FO **\$3**9.3 8.2 0 SFO 24.9 9.1 2.67 x 10<sup>-7</sup> 0 19.1 7.5 5.26 x 10<sup>-9</sup> SF 0 SFO: single first order moderate visual assessment:

ر من من Conclusions

The calculated half-lives for modelling purpose for the degradation of the major trifloxystrobin photoegradation product NOA 409480 in soil under aerobic conditions in the dark in the laboratory were between 19.1 and 49.3 days in the tested soils.

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 7.1.2.1.







## Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.1.2 /27; ; ; ; ; 2013
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin Metabolite NOA 413163
	under Aerobic Soil Conditions in Laboratory According to FOCUS Kingitics
	Using the KinGUI 2 Tool
Report No:	EnSa-13-0727
Document No:	M-467678-01-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>
GLP:	No S A A A A
Justification:	New data / guideline requirement:
	Kinetic analysis of the degradation of major photodegradation product k
	NOA 413163 for modelling purpose

## **Executive Summary**

A kinetic analysis of soil residue data from the aerobic son degradation study M-387169-01-1 (Supplemental Dossier, KCA 7.1.2.1.2/13) was performed according to FOCUS kinetics (2006) to derive half-lives for NOA 413163, a photodegradation product of frifloxy trobin, which are suitable for modelling purpose. The kinetic evaluation was performed with the software kinGL 2.

Single first order was the most appropriate kinetic model for frodelling purpose for the degradation of NOA 413163 in soils 4a and 4a and 4a and 4a under aerobic conditions in the dark in the laboratory at 20 °C, 55% of the maximum water holding capacity and a test concentration of 69 µg/kg.

m

The half-life of NOA 413163 was 6129 day in sol

Soil residue data from the aerobic soil degradation study M-387 69-01-1 (Supplemental Dossier, KCA 7.1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2, 1.2,

METHODS

The degradation kinetics was determined according to FOCUS kinetics  $(2006)^{1}$  using the software KinGUI 2 with four different kinetic foodels single first order, first order multi compartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT<sup>2</sup>0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessement of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, t-test significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters.



### II. RESULTS

Single first order (SFO) was the most appropriate kinetic model for modelling purpose to degradation of NOA 413163 in soils . Table 7.1.2.1.2- 37 summarizes the results of the kinetic analysis Table 7.1.2.1.2-37: Kinetic parameters for the degradation of NOA 413163 in aerobic conditions for modelling marpose according to FOGUS Kinetic Model<sup>1</sup> DA 50 Chi<sup>2</sup> Era 'isua**f** Soil [days] [**%**] Assessment 061.9 SFO 5.9 9.12 🛠 SFO 39.6 4.4 4aSFO SFO: single first order visual assessment: + = good, o = moderatem The calculated half-lives for modelling purpose for the degradation of the major trifloxystrobin photodegradation product NOA2413169 in sold under aeroldic conditions in the dark in the laboratory were between 29.6 and 61.9 days in the tested soils. The results are included in the summary of the degradation rates of traffoxystrobin and its major degradation products in soil in the laboratory given in section CA.7 **Report:** ; 2013 KCA 7.1.2.1.2 /28: Kinetic Evaluation of the Degradation of Triffoxystrobin Metabolite NOA 413161 Title: under Aerobic Soil Conditions in Laboratory According to FOCUS Kinetics Using the KinGUI 2 tool Report No: EnS&13-0228 Document No: M-467683-01-1 Guidelines: FOCUS kinetics GLP: New data duideline requirement: Justification: Kinetic analysis of the degradation of major degradation product NOA 413161 for modelling puppose Ô R **Executive Summar** A kinetic analysis of soil residue data from the aerobic soil degradation study M-371172-01-1

(Supplemental Dossier, KC  $\sqrt{7.1.2.9.2}$  /12) was performed according to FOCUS kinetics (2006)<sup>1</sup> to derive half-byes for NOA 413161, a degradation product of trifloxystrobin, which are suitable for modelling purpose. The kinetic evaluation was performed with the software KinGUI 2.

Single first other was the most appropriate kinetic model for modelling purpose for the degradation of NQA413161 in solds the dark in the laboratory at 20 °C, 55% of the maximum water holding capacity and a test concentration of 69  $\mu$ g/kg.

Page 140 of 278 **Bayer CropScience** 2013-11-25 **Document MCA: Section 7 Fate and behaviour in the environment** Trifloxystrobin The half-life of NOA 413161 was 89.6 days in soil 149.3 days in soil 4a and 85.0 days in soil I. **METHODS** Soil residue data from the aerobic soil degradation study M-371172-01-1 Supplementar Dossier KCA 7.1.2.1.2 /12) were used. In this study, the degradation of NOA 413161, a degradation product of trifloxystrobin, was studied in soils (sandy loam), (loam) under aerobie conditions in the dark in the laboratory for 4a (sandy loam) and 120 days at 20 °C, 55% of the maximum water holding capacity and dest concentration of 69 µg/kg. The degradation kinetics was determined according to FOCUS kinetics (2006)<sup>1</sup> using the software KinGUI 2 with four different kinetic models: single first order, first order multi compartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test@ysten@at each/sampting interval. The initial regovery at DAT-0 was included in the parameter optimization procedure but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessment of the goodness of the firs, chi<sup>2</sup> scaled-error criterion, t-test significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kipetic parameters. Single first order (SFO) was the most appropriate kinetic model for modelling purpose for the degradation of NOA 4133161 in soils la and . Table 7,42.1.2,538 summarizes the results of the kmeticanalysis Kinetic parameters for the degragation of NOA 413161 in soils under Table 7.1.2.1.2acrobic conditions for modelling purpose according to FOCUS Ø Kinetic Model Chi<sup>2</sup> Ergor DTS t-test Visual Ô Soil [days] [%0 Assessment<sup>2</sup> 89.6 Ðľ 2.54 x 10<sup>-9</sup> <\$FO 0 3.3 140.3 1.78 x 10<sup>-11</sup>  $^+$ SFØ ~ ŞÊÒ 89.0 2.9 1.52 x 10<sup>-15</sup> + SFO: single first order = moderate visual assessments  $\mathcal{P} \stackrel{\vee}{=} g_0 \mathcal{G}_{\mathcal{A}}$ , o CONCLUSIONS The calculated half fives for modelling purpose for the degradation of the major trifloxystrobin degradation product NO4/413 of in sol under aerobic conditions in the dark in the laboratory were between 85.0 and 149.3 days in the tested solls.

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 7.1.2.1.

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## Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.1.2 /29; ; ; .; 2012;
	amended 2013-10-16
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin Metabolite NOA 413761
	under Aerobic Soil Conditions in Laboratory According to FOCUS Kenetics
	Using the KinGUI 2 Tool
Report No:	EnSa-13-0729
Document No:	M-467681-02-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup> $\bigcirc$ $\checkmark$ $\checkmark$ $\checkmark$
GLP:	No V Q Q V X
Justification:	New data / guideline requirement: $\int $
	Kinetic analysis of the degradation of major degradation product NQA 413 61 for
	modelling purpose $\mathcal{O}^{\mathcal{O}}$ $\mathcal{O}^{\mathcal{O}}$ $\mathcal{O}^{\mathcal{O}}$ $\mathcal{O}^{\mathcal{O}}$

## **Executive Summary**

A kinetic analysis of soil residue data from the aerobic soil degradation study M-08260-01-1 (Baseline Dossier, KCA 7.1.2.1.2 /09) was performed according to FOCUS kinetics (2006)<sup>1</sup> to derive half-lives for NOA 413161, a degradation product of trifloxystrobin, which are suitable for modelling purpose. The kinetic evaluation was performed with the software KinGUI 2.

Single first order was the most appropriate kinetic model for modeling purpose for the degradation of NOA 413161 in soil with the acrobic conditions in the dark in the laboratory at 20 °C, 40% of the maximum water holding capacity and a test concentration of 100 gg/kg

The half-life of NOA 413161 spars 25907 day

Soil residue data from the aerobic soil degradation, study M-068260-01-1 (Baseline Dossier, KCA 7.1.2.1.2/09) were used. In this study, the degradation of NOA 413161, a degradation product of trifloxystrobin, was studied in soil (Gamy sand) under acrobic conditions in the dark in the laboratory for 126 days at 20 °C, 40% of the maximum water holding capacity and a test concentration of 100 µg/kg.

METHODS,

The degradation kinetics was determined according to EOCUS kinetics  $(2006)^{1}$  using the software KinGUI 2 with four different kinetic models: single first order, first order multi compartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessement of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, t-test significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters.

La contraction of the second s



#### II. RESULTS

Single first order (SFO) was the most appropriate kinetic model for modelling purpose to degradation of NOA 413161 in soil . Table 7.1.2.1.2- 39 summarizes the results of the analysis.

Table 7.1.2.1.2-39: Kinetic parameters for the degradation of NOA 413161 soil@under aerobic conditions for modelling purpose according to FOCUS

			v	Q.	((	71	×
	Kinetic Model <sup>1</sup>	DT <sub>50</sub> SC	hi² Error	∬ <sup>©™</sup> t-test	Ŕ	Visical	<u>s</u>
Soil		[days]	[%] 🔍	×	A	ssessment	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
	SFO	253	3.6 🥿	1.80 x 1	0-%	0°0 0	) _ Ô
<sup>1</sup> SFO: single first of	order	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Į.	× .	6		

## <sup>2</sup> visual assessment: o = moderate

The calculated half-life for modelling purpose for the degradation of the major trifloxystrobin degradation product NOA 413161 in soil under acrobic conditions in the dark in the laboratory was 253.7 days in the tested soil. 0

The results are included in the summary of the degradation sites trob<sup>®</sup> and its major degradation products in soil in the soboratory given in section C

Report: KCA 7.1.2.1.2. (30; ; ; ; ; ; 2013	
Title: Kinetic Evaluation of the Degradation of Trifloxystrobin Metabolite CGA 35	7276
Junder Aerobic Soil Conditions in Laboratory According to FOCUS Kin	etics
O Using the KinGU 2.1 Tool of a straight	
Report No: EpiSa-13-0730 $\sim$ $\sim$ $\sim$ $\sim$ $\sim$ $\sim$	
Document No: M-467686-01 A	
Guidelines: - FOCUS tinetics 2006) 1 5 5	
GLP: NO	
Justification: New data / guideline requirement:	
Kinetic analysis of the degradation of major degradation product CGA 35727	6 for
<u>nodelling purpose of or </u>	

### Executive-Summary

A kinetic analysis of soil residue data from the aerobic soil degradation study M-465697-01-1 (Supplemental Dossier, KCA 7,4,2.1.2,0,4) was performed according to FOCUS kinetics (2006)<sup>1</sup> to derive half-lives for CGA 357276, a degradation product of trifloxystrobin, which are suitable for modelling purpose. The kinetic evaluation was performed with the software KinGUI 2.

Hockey stick was the most appropriate kinetic model for modelling purpose for the degradation of CGA 35 276 in soil , double first order in parallel in soils 4a, as well as first order multi compartment in soil and under aerobic conditions in the dark in the laboratory at 19.9 °C, 55.4% of the maximum water holding capacity and a test concentration of 25  $\mu$ g/kg.

The half-life of CGA 357276 was 66.5 days in soil	, 71.9 days in soil
, 79.0 days in soil	4a and 21.6 days in soil





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Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

## I. METHODS

Soil residue data from the aerobic soil degradation study M-465697-01-1 (Supplemental Dossie KCA 7.1.2.1.2 /14) were used. In this study, the degradation of CGA 357276, a degradation product o trifloxystrobin, was studied in soils (sandy loan), 4a (silt loam) and (loam) under acrobic (loamy sand), conditions in the dark in the laboratory for 120 days at 19.9 °C, 55.4% of the maximum water folding capacity and a test concentration of 25  $\mu$ g/kg. The degradation kinetics was determined according for FOCUS kinetics (2006) Using the softwark KinGUI 2 with four different kinetic models: single first order, first order multicompartment, hocked stick (double first order sequential) and double first order in parallel Model mput Qatasets were whe residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate Rinetic modeb was selected on the basis of a detailed statistical analysis including visual assessment of the goodness of the fits chi2 scaled-error criterion, t-test significance, correlation analysis, and standard deviation. The DT value was calculated from the resulting kinetic parameters II. @RESULTS 6 Hockey stick (HS) was the most appropriate kinetic model for model ling purpose for the degradation of CGA 357276 in soil double first order in parallel (DFOP) in soils 4a, as well as first order multi compartment and Fable @1.2.1. 40 summarizes the results of the Prinetic analysis. (FOMC) in soil Kinetic parameters for the degradation of CGA 357276 in soils under Table 7.1.2.1.2 acrobic conditions for modelling purpose according to FOCUS Ô Kinetic Model<sup>1</sup> DT 50 Chi<sup>®</sup>Error<sup>®</sup> t-test<sup>3</sup> Visual Soil [days] @ [%] Assessment<sup>4</sup> Æß. \$6.5 3.2 k<sub>2</sub>: 7.46 x 10<sup>-7</sup> +≪ DFOP 71.9 s12 k<sub>2</sub>: 6.17 x 10<sup>-7</sup> +79® k<sub>2</sub>: 2.91 x 10<sup>-2</sup> +DFØ**P** 2.8 2.24 x 10<sup>-6</sup> + FØMC 24.6 1.8 FOMC: firstorder politi compartment, DFOP: double first order in parallel, HS: hockey stick for FOMC: DT<sub>50</sub> was calculated as DT<sub>90</sub> 3.32 for DFQP, and HS: DT50 was calculated from the slow k-rate for FQMC: worst case value Q rate parameters alpha and beta visual assessment » good CONCLUSIONS

The calculated half-lives for modelling purpose for the degradation of the major trifloxystrobin degradation product CGO 357256 in soil under aerobic conditions in the dark in the laboratory were between 21.6 are 79.0 days in the tested soils.

The sesults are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 7.1.2.1.

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# Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.1.2 /31; ; ; 2013 。
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin Metabolite CGA 381298
	under Aerobic Soil Conditions in Laboratory According to FOCUS Kingtics
	Using the KinGUI 2 Tool
Report No:	EnSa-13-0731
Document No:	M-468502-01-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>
GLP:	No & A A A
Justification:	New data / guideline requirement:
	Kinetic analysis of the degradation of major photodegradation product
	CGA 381318 for modelling purpose

## **Executive Summary**

A kinetic analysis of soil residue data from the aerobic soil degradation study M-462102-01-1 (Supplemental Dossier, KCA 7.1.2.1.2/14) was performed according to FOCUS kinetics (2006) to derive half-lives for CGA 381318, a photodegradation product of frifloxy strobic, which are suitable for modelling purpose. The kinetic evaluation was performed with the software kinGL 2.

Single first order was the most appropriate kinetic model for foodelling purpose for the degradation of CGA 381318 in soils

m

4a and under aerobic conditions in the dark in the laboratory at 20.3 °C, 54.5% of the maximum water holding capacity and a test concentration of 36 µg/kg

The half-life of CGA 381318 was \$1.9 days in coil 4a and 20.4 days in soil 4a and 20.4 days in soil

Soil residue data from the aerobic soil degradation study M-462102-01-1 (Supplemental Dossier, KCA 7 2.1.2 /11) were used. In this study, the degradation of CGA 381318, a photodegradation product of trifloxystrobin, was studied in oils. (sandy loam), (loamy sand), (lo

conditions in the dark in the laboratory for 122 days at 203 °C, 54.5% of the maximum water holding capacity and otest concentration of 36 µg/kg.

The degradation kinetics was determined according to FOCUS kinetics  $(2006)^{1}$  using the software KinGUP with four different kinetic models: single first order, first order multi compartment, hockeystick double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found to each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessment of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, thest significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters.

4a and

### II. RESULTS

. Table 7.1.2.1.2- 41 summarizes the results of the kinetic analysis.

# Table 7.1.2.1.2- 41: Kinetic parameters for the degradation of CGA 381318 in soils under aerobic conditions for modelling purpose according to FOCUS

	Kinetic Model <sup>1</sup>	DT50	Chi <sup>2</sup> Error	t-test <sup>3</sup>	Xisual 💭
Soil		[days]	[%]	107	Assessment <sup>2</sup>
	SFO	11.9	5.2	<b>3.</b> 7 x 10 <sup>-12</sup>	
	SFO	22.8	5.0 گ	√1.69 x 10 <sup>-11</sup> x	
4a	SFO	22.8	4.1	2.76 x 10 <sup>-13</sup>	2°0 x x
	SFO	20,4	3.5	4.69 x 10	
<sup>1</sup> SFO: single first order		A	Ą.	8° Å 4	
<sup>2</sup> visual assessment: $+ = good$ .	o = moderate	Do	$\sim$	ذ °∛ ∖O	Č OS OČ

# III. CONCEUSION

The calculated half-lives for modelling purpose for the degradation of the major triffoxystrobin photodegradation product CGA 381318 in soil under aerobic conditions in the dark in the laberatory were between 11.9 and 22.8 days in the tested soils

The results are included in the summary of the degradation rate of trifloxystobin and its major degradation products in soil in the laboratory given in section CA 2(.2.1.

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Report:	KCA 7/1.2.1/2 /32;
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin and its Metabolite under
	Agrobic Soil Conditions in Laboratory According to FOCUS Kinetics Using the
	KinGUV2 Toop is a so is a
Report No:	$\mathcal{C}$ EnSa I3-07\$3 $\mathcal{C}$ $\mathcal{S}$ $\mathcal{S}$ $\mathcal{S}$
Document No.	MA6817701-1 0 40 20 20 20
Guidelines:	- $\mathcal{C}$ OCUS kinetics (2006) $\mathcal{L}$
GLP: 🔊	No to to to to to to the total
Justification:	New data Souidelfine requirement.
~ %	Kinetic analysis of the degradation of triffexystrobin and its major degradation
	product CGA 21113 for modelling purpose

## Executive Summary

A kinetic analysis of soil residue data from the aged residues column leaching/aerobic soil degradation study M-033599-01-1 (Baseline Dosper, KCA 7.1.2.1.1/06 and KCA 7.1.2.1.2/06) was performed with the software KinGUI 2 according to FOCUS kinetics  $(2006)^{-1}$  to derive half-lives for trifloxystrobin and its degradation produce CGA 321113 as well as formation fractions for CGA 321113, which are suitable for modelling purpose. Only the results for CGA 321113 are described here.

The single first order kinetic model was used for modelling purpose to describe the degradation of CGA 32113 in soils and and and and a service of under aerobic conditions in the dark in the laboratory at 20 °C different soil moistures (75% of the field capacity at 1/3 bar for soil and a test concentration of 1.0 mg/Q.

The half-life of CGA 321113 was 386.1 days in soil and 115.3 days in soil

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Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

The formetion for time of (	CA 221112 0.025	:	10.012	
The formation fraction of C	GA 321113 was 0.935	in soil	and 0.913 in soil	
	I. MI	THODS	J.	
Methods are summarized u	nder KCA 7.1.2.1.1 /19	of the Supplemen	tal Dossier.	
	II. R	ESULTS		
		1 and	Q Q	\$ \$ \$
The single first order (SFO	) kinetic model was use	d for modelling p	prose to describe t	be degradation
of CGA 321113 in soils	and	. Table 7.1Q.	1.2-42 summarizes	the results of
the kinetic analysis.	Ŕ			
Table 7 1 2 1 2 42. Kind	tia nonomotore forda			× V
1 able /.1.2.1.2- 42: Kine	litions for modelling n	gradation of Co.	A $326113$ $\mu$ solis i	inder aerobic
Conc			A A	
Soil	FF Kipetic Model	<sup>1</sup> DT <sub>50</sub> Chi	Error t-test	Visual
		<u> [days] 49</u>		Assessment <sup>2</sup>
			<u>.3</u> 2.37 x 1.05	× +
EE, formation function			0 $0$ $0$ $0$ $0$	*¥ +
<sup>1</sup> SFO: single first order		0' ~ <u>0</u> 4		1
$^{2}$ visual assessment: + = gog	d & S A			
\$ \$		A A K	У	
~ ~	j III. ČON	CLUSIONS 🌜		
			.0 <sup>4</sup> .4 <sup>4</sup> .	
The calculated half-lives	for modelling purpose	for the degradat	tion of the major	trifloxystrobin
between 115 3 and 386 1	days in the tested soil	The formettion	in the dark in the la	321113 were
between 0.91 and 0.935	ays in the tested so			JZIIIJ Wele
Section of the analysis of a		Ô,	, , , , , , , , , , , , , , , , , , ,	
The results are included i	n the summary of the	degradation rates	s of trifloxystrobin	and its major
degradation products in soi	Lin the laboratory giver	in section 🚱 7.1	.2.1.	·
Ş.				
CA 7.1.2.1.3 Anaerobi	c deeradation of the	active substance	e	
The degrad of the met of the			tions in the dayle in	the laboratory
The degradation rate of tri	noxystrooin in soil una	ongradiolabel pos	110 In the dark in $14$ GPl and	the laboratory
by the European Consonis	(SA SCO / 4339 / 24)	00-Final 7 Anril	2003). The follow	wing study is
included in the Baseline Do			2000). The follo	ing study is

Annex Point / Reference No <sup>©</sup> Author(s) <sup>©</sup>	Year	Document No
KCA 7.1.2.1.3 /01 3 2	1996	M-033427-01-1

An updated kinetic evaluation of the degradation behaviour of trifloxystrobin in soil under anaerobic conditions in the dark in the laboratory has been performed according to FOCUS kinetics (2006)<sup>1</sup> to derive kinetic parameters suitable for modelling purpose and environmental risk assessment and is submitted within this Supplemental Dossier for the trifloxystrobin renewal of approval. A summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory is given in section CA 7.1.2.1.







# Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.1.3 /02; ; ; 2013 。
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin and its Metabolite under
	Anaerobic Soil Conditions in Laboratory According to FOCUS Kinetics Bing
	KinGUI 2 Tool
Report No:	EnSa-13-0732
Document No:	M-468176-01-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>
GLP:	No S S No No
Justification:	New data / guideline requirement:
	Kinetic analysis of the degradation of trifloxystrobin and its major degradation k
	product CGA 321113 for modelling purpose Q

## **Executive Summary**

A kinetic analysis of soil residue data from the anaerobic son degradation study M-035427-01-1 (Baseline Dossier, KCA 7.1.2.1.3 /01 and KCA 7.1.2.1.4 /01) was performed with the software KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> to derive half-lives for triboxystrobin and its degradation product CGA 321113 as well as formation fractions for CGA 321113, which are suitable for modelling purpose. Only the results for artifloxystrobin are described here

Hockey stick was the most appropriate kinefic model for model for model for purpose for the degradation of trifloxystrobin in soil North Carolina under maerobic conditions in the dark in the laboratory at 25 °C and a test concentration of 159  $\mu$ gAg (based on soil/water combination).

The half-life of trifloxystrobin was 0 61 day

**METHODS** 

Soil residue data from the anaerobic soft degradation study M-033427-01-1 (Baseline Dossier, KCA 7.1.2.1.9/01 and KGA 7.1.2.1.4/01) were used to this study, the degradation of trifloxystrobin was studied in soil North Caroline (the anaerobic conditions in the dark in the laboratory for 365 days at 25 °C and a test concentration of 159  $\mu$ g/kg (based on soil/water combination).

The kinetic analysis was performed according to FOCOS kinetics  $(2006)^{1}$  using the software KinGUI 2 with four different kinetic models, single first order, first order multi compartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each eplicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessement of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, t-test significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters. The degradation of degradation products was described with the single first order model.



II. RESULTS

Hockey stick (HS) was the most appropriate kinetic model for modelling purpose for the degradation of trifloxystrobin in soil North Carolina. Table 7.1.2.1.3- 1 summarizes the results of the kinetic analysis.

# Table 7.1.2.1.3-1: Kinetic parameters for the degradation of triffoxystrobin in soil and an aerobic conditions for modelling purpose according to FQCUS

alla	actobic conditions it	л шоцен	ngg purpose a	ceptung to re		Y 0
		6	V .			, 
Soil	Kinetic Model <sup>1</sup>	DT50	Chi <sup>2</sup> Error	* t-test 🖉	Visual	k <sup>O</sup>
		[days]	[%]	· · ·	Assessment <sup>2</sup>	Ð″
North Carolina	HS	.008 Î	2,8	2: 2.48 10 <sup>-8</sup>		, P
		$\sim$		•		_

<sup>1</sup> HS: hockey stick

<sup>2</sup> visual assessment: + = good

# 

The calculated half-life for modelling purpose for the degradation of triflox strobin in sol under anaerobic conditions in the dark in the laboratory was 0.61 days in the tested sol.

The results are included in the summary of the degradation rates of to floxy probin and its major degradation products in soil in the laboratory given in section CA241.2.1.

m

# CA 7.1.2.1.4 Anaerobic degradation of metabolites breakdown and reaction products

The degradation rate of the major degradation product COA 32 013 in soil under anaerobic conditions in the dark in the lateratory was evaluated during the Annex Linclusion using one radiolabel position, [<sup>14</sup>C-GP], and was accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following study is included in the Baseline Dossier:

0			- '\ U		$\bigcirc$		
Annex Point / R	Referenc	e No 🌮	Author(s)	Ĩ.		Year	Document No
KCA 7.4.2.1.4 /(	)1 🖉	- C			Ň	1996	M-033427-01-1
		0					

Two additional studies have been performed for the major degradation products CGA 321113, NOA 413161 and NOA 413163, and are submitted within this Supplemental Dossier for the trifloxystrobin renewal of approval using one radiolabel position, [<sup>14</sup>C-GP]. Furthermore, updated kinetic evaluations of the degradation behaviours of major degradation products in soil under anaerobic conditions in the dark in the aboratory have been performed according to FOCUS kinetics (2006) <sup>1</sup> b derive kinetic parameters suitable for modelling purpose and environmental risk assessment. A summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory is given in section CA 21.2.1.

- degradation r. - degradation r. - serven in section CA



# Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.1.4 /02; ; ; ; 2013
Title:	CGA 321113: Anaerobic Degradation / Metabolism in One Soil
Report No:	EnSa-13-0616
Document No:	M-467759-01-1
Guidelines:	- OECD Test Guideline No. 307
	- DRAFT SANCO 11802/2010/rev 7 in accordance with Regulation (CC)
	No 1107/2009
	- US EPA OCSPP Test Guideline No. 35.4100 / 835.4200
GLP:	Yes $\sqrt[\infty]{}$ $\sqrt[\infty]{}$ $\sqrt[\infty]{}$ $\sqrt[\infty]{}$ $\sqrt[\infty]{}$
Justification:	New data / guideline requirement:
	Degradation rate of major degradation product CGA 321113 according to OECD
	Test Guideline No. 307 $\mathcal{O}^{\mathcal{O}}$ $\mathcal{O}^{\mathcal{O}}$ $\mathcal{O}^{\mathcal{O}}$ $\mathcal{O}^{\mathcal{O}}$ $\mathcal{O}^{\mathcal{O}}$ $\mathcal{O}^{\mathcal{O}}$

## **Executive Summary**

The route and rate of degradation of [<sup>14</sup>G-GP]CGA 321113, a degradation product of triffoxystrobin, were studied in one soil under anaerobic conditions following an aerobic meubation phase in the dark in the laboratory for 122 days at 20.1 C:

Soil	Ŷ	🗞 Souzse	ð de la de l	Pexture	USDA	) (Ṍ́́́́́́́́́́́́́́́́́́́́́́́) (*`>	OC [%]
	₿ Ø	urscheid, Ge	ermany 🦼	QÎt :	loam	ô 6.%	2.0
* "II las de miner d'frank	0				Ø .	0	

\* pH value was derived from aqueous 0.01 McaCl<sub>2</sub> suspension

[<sup>14</sup>C-GP]trifloxystrobin was used as test item due to the limited availability of radiolabelled CGA 321113 and due to the tapid and nearly quantative degradation of trifloxystrobin in soil under aerobic conditions in the dark to CGA 321113 with  $\gtrsim 80\%$  of the applied amount being converted within 1 day. Therefore, a study application rate of  $750 \ \mu g$  trifloxystrobin per kg soil dry weight was applied based on a single field application rate of trifloxystrobin of 187.5 g per hectare.

Mean material balance was 96.3% of applied radioactivity [% AR] (range from 93.4 to 98.8% AR).

The maximum amount of carbon dioxide was 10.2% AR at DAT-30 in the aerobic incubation phase and remained constant in the anactobic incubation phase until study end (122 days after soil flooding (DASF)). Formation of volatile organic compounds was insignificant as demonstrated by values of  $\leq 0.1\%$  AR at all sampling intervals.

Extractable residues decreased from 98.4% ARat study start (DAT-0) to approximately 70% AR from DASF-62 onwards.

Non-extractable residues increased from DAT-0 to DASF-122 from 0.4 to 16.3% AR.

The amount of trifloxystrobin decreased rapidly in the aerobic incubation phase from DAT-0 to DAT-2 from 95.7 to 8.7% AR and decreased further to 0.9% AR at DAT-30. In parallel, the amount of CGA 321113 reached a maximum of 89.3% AR at DAT-2 and decreased to 67.1% AR at DAT-30. CGA 321113 decreased further in the anaerobic incubation phase to 55.4% AR at DASF-122.

Besides the formation of carbon dioxide, two additional degradation products were identified: NQA413161 with a maximum amount of 4.7% AR at DASF-0, which slightly decreased in the anaerobic incubation phase to 4.2% AR at DASF-122, and CGA 357276 with a maximum amount of 2.2% AR at DASF-122. The total unidentified residues amounted to a maximum of 7.8% AR with no one component exceeding 4.7% AR at any sampling interval.



The experimental data could be well described by a single first order kinetic model. The half-life of

Less y a single first order kinetic model. The half-life of CGA 521113 under anaerobic conditions was 356 days. It is concluded that CGA 321113 will be slowly degraded under anaerobic conditions in the environment. I. MATERIALS AND METHODS A. MATERIALS 1. Test Item [benzeneacetic-phenyl-UL-<sup>14</sup>C]trifloxystrobin Sample ID: KML 9481 Specific Activity: 3.01 MBq/mg (84.4 μC/mg), Radiochemical Purity: > 98% Chemical Purity: > 98% Chemical Purity: > 99% 2. Test Soil Mas used (see Table 7.1.2, 4.4.4), the soft was taken from an agricultural the area? No plant protection products were used for the previous 5 years. The soil was sampled frightly from the field (upper horizon of 0 to 20 cm) and size d to a particle size of ≤ 3 mm. Soil collection and handling were in accordance to ISO 10981-6. scaken-form an agrical as The Soil was sampled upter size of 5 Ann. Soil out the size

Table 7.1.2.1.4- 1:	Physico-chemical	properties	of test	soil
	i nysico chemicai	proper cies	or cese	0011

Parameter			Results / Units	s (s
Soil Designation				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Geographic Location				-Ç
City				<sup>y</sup> by
State		Ĉa	North-Rhine Westphalia	
Country		A.	Germany	
GPS Coordinates		L.		× O
Soil Taxonomic Classificati	on (USDA)	<i>v</i>	Ramy mixed fresic, Typic Argud	alf
Soil Series	- A		no information available	Ŵ.
Textural Class (USDA)	Ϋ́,	\$°, N	sift Joam 🖉 🔗 😽 🕬	, Y
Sand	[50 µm – 2 mm] 🕺 🔘		Ø1% & O A	۱
Silt	[2 μm – 50 μm] A		×65%	Ĩ
Clay	[< 2 µm]	$\gamma$ $\dot{\mathcal{O}}$	14%	a a a a a a a a a a a a a a a a a a a
pH (soil/CaCl <sub>2</sub> 1/2)				
pH (soil/water 1/1)		$\sim$		
pH (saturated paste)		ð S		
pH (soil/1 N KCl)		Y L		
Organic Carbon (combustio	n) & S &		2.0%	
Organic Matter <sup>1</sup>		£	3,4% ~~ ~~	
Cation Exchange Capacity	meg400 g]			
Maximum Water Holding C	capacity [gH2O ad 100 g soil	DW C		
maximum			59.0	
at 0.1 bar (pF 2.0)		Y 54	Ø.7%~~~	
Bulk Density (Osturbe) [g			×1.11 ~~	
Microbial biomass (@robic	vacubation phase)		×.	
[mg microbral carbon per kg		, <sub>~</sub>	100 101034	
DAT-30 (BIO- / BIO			1103 / 956	
Microbial Viability anaero	bic includation phase) & FU/s	woil DW1 <sup>2</sup>		
DASF-122 (BIG / BIG)			17000 / 13300	
<sup>1</sup> % organic matter = $\bigcirc$ org	amic carbon x 1,704 . O	Ĩ.		
<sup>2</sup> BIO- samples were left up	preated, BIO+ samples were	applied with	solvent of application solution (200	μL
methanol).	J 6 3 .4			
DAT days after treatment				
DASF: days after soul flood				
DW: dry weight 🕺 🔗				
GPS: global postioning sys	tengy and a			
USDA: United States Depar	tenent of Agriculture			
	× v			
J & A	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
$co^{\prime}$				
$\bigcirc$				

Bayer CropScience **Document MCA: Section 7 Fate and behaviour in the environment** Trifloxystrobin

### 1. **Experimental Conditions**

**STUDY DESIGN** 

B.

The static test system for degradation in soil under anaerobic conditions consisted of Erlenme and glass flasks (volume e.g. 300 mL). For the aerobic incubation phase, each flask was fitted with a trap attachment (permeable for oxygen) containing soda lime for absorption of carbon dioxide and a polyurethane (PU) foam plug for adsorption of volatile organic compounds (VOC). For the anaerobic? incubation phase, the trap attachments were replaced by scalable two-valve glass stoppers connected with air-tight plastic gas sampling bags for the collection of volatiles.

For preparation of the test systems, 100 g dry weight equivalents of the sieved soil were weighed in @ each flask. Soil moisture was adjusted to  $55 \pm 5\%$  of the maximum water holding capacity (MWHC) for the individual test systems by addition of de-ionized water. The hasks were then fitted with trap attachments and equilibrated to study conditions for 5 days prior to application.

[14C-GP]trifloxystrobin was used as test item, due to the limited availability of radiolabelled CGA 321113 and due to the rapid and nearly quantitative degradation of willowystrobin in soil under aerobic conditions in the dark to CGA 32,14,13 with > 80% of the applied appl within 1 day. Therefore, the study application rate (SAR) was based on a single field application rate of trifloxystrobin of 187.5 g per Dectare and a 1.5-fold application rate due to analytical reasons, resulting in a nominal SAR of 750 µg (C-GP) infloxy strobin per kg soil by weight.

The test item was applied dropwise onto the soil surface of the respective test systems in 200 µL methanol using a pipette, After application, the test vessels (except DAT O samples) were fitted with trap attachments.

The test systems fere incubated in the dark for 30 days 20.1 °C and a soil moisture of at  $55 \pm 5\%$  MWHC for a walk-in climatic chamber.

30 days after Treatment (DAT-30 corresponding to DASF-6), the soil was flooded with 140 mL oxygen-depicted water and set under an atmosphere of nitrogen. The trap attachments were replaced by air-tight plastic gas, sampling bags. To ensure maintenance of oxygen-free conditions in the anaerobie incubation phase. the test systems were placed in a nitrogen-flooded box within the walk-in climatic chamber. The test systems were incubated in the dark under anaerobic conditions for 122 days at 20.1 °C.

2. Sampling of the entire incubation period of 152 days (30 days under aerobic conditions and 122 day under anaerobic conditions). Duplicate samples were processed and analysed 0, 2, 14 and 30 days after treatment@DAT) in the aerobic incubation phase and 0, 7, 14, 32, 62, 90 and 122 days after soil flooding (DASF) in the anaerobic incubation phase. Microbial soil biomass was determined in the aerobic incubation phase at study start (DAT-0) and DAT-30. The amounts of anaerobic bacteria were determined in the anaerobic incubation phase at study end (DASF-122).

### Analytical Procedures 3.

Carbon dioxide absorbed by Goda lime was liberated with 18% aqueous hydrochloric acid and trapped in a seintillation carktail selective for binding of carbon dioxide using an air-tight assembly. The radioactivity content was determined by liquid scintillation counting (LSC).

The PU foam plugs of the trap attachments were extracted with ethyl acetate in an ultrasonic bath to desorb VOC. The radioactivity content was determined by LSC.



O

Volatiles possibly present in anaerobic test systems were slowly purged through a soda lime trap for absorption of carbon dioxide, then through a catalytic oven for oxidative combustion of VOC @.g. methane), and its combustion exhaust through a scintillation cocktail selective for binding of carbon dioxide using an air-tight assembly. The radioactivity content was determined by LSC and the soda lime was further processed as described before for carbon dioxide.

At each sampling interval of the anaerobic incubation phase, pH, oxygen content and redox potential in the water and the pH and redox potential in the soil were determined. Water and soil were separated by decantation. The entire soil of each test system was extracted three times at anti-ient competature using a mechanical shaker and acetonitrile/water 4/k(v/v). Furthermore, two accelerated extraction steps using a microwave with a magnetic stirrer were performed, first with acetonitrile/water  $\sqrt{1}$  (v/Q) at 70 °C and second with methanol/water 1/1 (v/y/at 50 °C. After each extraction step extract and soil were separated by centrifugation (3480 x g) and decantation of the ratioactivity content of the Mater, the combined ambient soil extracts and the merowaye soil extract was determined by LSC. Aliquots of the soil extracts were combined. Water and combined soil extracts were concentrated and analysed by reversed phase HPLC/radiodetection. The limit of detection (LOD) and limit of quantitation (LOQ) for HPLC/radiodetection analysis of the water and combined soil extracts were 0.8 and 2.5% AR, respectively.

re air-dried, homogenized and non-extracted residues were The exhaustive extracted soils were . . determined by combustion/LSC

Test item and degradation products were dentified by HPLC co-chromatography with reference items and by HPLC-MS(/MS) including accurate mass determination.

 $\bigcirc$ The degradation kinetics of @A 321113 was determined according to FOCUS kinetics (2006) 1 using the software KinGUI2 with two different kinetic models single first order and first order multi compartment. Model input datasets were the residual amounts found in each replicate test system at each sampling intervator the anaerobic incubation phase (DASE to DASF-122). The initial recovery at DAT-0 was included in the parameter optimization proceeding, but for optimal goodness of fit, the value was ablowed to be estimated by the model. The best-fit kinetic model was selected on the basis of the chi scaled-error criterion and on the basis of a visual assessment of the goodness of the fits. DT<sub>50</sub> and DT<sub>90</sub> values were calculated from the resulting kinetic parameters.

# RESULPS AND DISCUSSION

Results indicated that the inticipated standardized conditions were maintained in the aerobic and anaerobic incubation phase, and that the soil was microbially active over the duration of the laboratory study. An erobic bacteria plate count assays performed at study end confirmed the establishment of an anaerobic microflora in the test systems.

The pH values in water and soit of the anaerooic incubation phase ranged from 6.9 to 7.7 and from 6.6 to 7.4, respectively

Oxygen contents in the mater decreased from a maximum concentration of 3.7 mg/L at DASF-0 to  $\leq 1.5 \text{ mg/}$  from DASF onwards demonstrating the shift from aerobic to anaerobic conditions.

Redox potential measurements indicated reducing conditions in the water and soil from DASF-14 onwards

## A. DATA

			<b>.</b>					ð
Table /.1.2.1.4- 2: Degradati	on of CC	A 32111.	5 in soi		1 & 0	( <b>A D</b> )	under	O <sup>7</sup>
anaerobic	conditions	(mean va	alues and	SD expr	essed as	/o AK)	С́ б	
	DAT	0	2	14		30 🔍	in the second se	
Compound	DASF	•	N	/A	A .		67 4	Ì,
trifloxystrobin	Mean	95.7	<b>8</b> 67	1.4	0.9	_≪ <b>1</b> .0 ∧	LOD	
,	SD	$\pm 0.8$	₹0.1	$\pm 0.0$	$\pm 0.1$	0.0		S
CGA 321113	Mean	n.d. 🦨	§ 87.3	80.1	67.1 🚿	68.0	68.4	
	SD	A	$\pm 0.3$	Q 0.3	$\circ \pm 0$	±0.9	℃ <u>±</u> 0.2	7
NOA 413161	Mean	ngo	n.d. 🔌	2.8	4.4	04.7 ĝ	4.30	
	SD			$\pm 0, 0$	<b>@</b> 0.0 <b>@</b>	$\pm 0.1$	±20.0	
CGA 357276	Mean	n.d.	n.đ	<i>≪</i> ∯∠OD	LOD	< LOD	<i>≤</i> ĽOD	
	SD 🛒			0°°°	, ·U	Ô I	F S	
Sum of Unid./Diff. Residues <sup>1</sup>	Mean	2.56	(≫LOD	<sup>™</sup> < LQQ	ð*í .	j 1.0 🖑	0.9	
	S₽	≥±¥0.0 @		Ő.	°≁ 0.0	± 0KJ	0.0 ه	
Total Extractable Residues <sup>2</sup>	Mean 🌾	≶ 98.4 <sup>∞</sup>	26,0	ل 4.3 ₹	73,5	<i>7</i> .9	73.5	
	SD 🔊	±0,8	≪0.2 ∾	$50\pm0.3$	±.0.4	£ 0.9	2 ± 0.2	
Carbon Dioxide	∕Q Mean	ga.a.	by 0.3 √ <sup>™</sup>	30	0.2 C	°° 9.7∼y°	10.0	
(sum aerobic and anaerobic) <sup>3</sup>	_SD <sup>≪</sup>	° S	* ± 000 /	0.0	$0\pm0.10$	±<0.0	$\pm 0.0$	
Volatile Organic Compounds	Mean 🔬	n.a.	б <u>м</u>	© 0.1 ©	< 0.1	©Ò.1	< 0.1	
(sum aerobic and anaerobic) <sup>3</sup>	SD O	Ű.	Ø≇ 0.1	<sup>♥</sup> ±0.0♥	s≠ 0.0	$ \ge 0.0 $	$\pm 0.0$	
Non-Extractable Residues <sup>3</sup>	Meán	§0.4 (	1.5	16Å	~\$12.3 ×	10.7	11.4	
	<u></u> §D (	$5 \pm 0.0$	$\pm 00$	( <u>k</u> ± 0.3		$\pm 0.7$	$\pm 0.2$	
Total Recovery $\sqrt[3]{2}$	Mean	9868	×97.9	0 94.3∛	95.9	95.3	94.9	
	SDC	±0.8	$\gg \pm 0.2$	$\pm 0.6$	± 0.3	± 1.6	$\pm 0.0$	

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0

## Table 7.1.2.1.4-2 (continued)

							S S
	DAT	44	62	92	120	152 📩	s S
Compound	DASF	14	32	62	≫,90	122	40°
trifloxystrobin	Mean	< LOD	< LOD	< LOD	🛇 n.d.	nd.	
	SD			"(	°		y <sup>v</sup>
CGA 321113	Mean	69.1	65.8	59,4	58.1	O*55.4	29
	SD	± 1.5 ©	> ± 0.2	±0.9	$\pm 0.5$	±Q.Y	S. a
NOA 413161	Mean	4.4 🕅	4.5	4.3	4. <i>5</i> 0	Q.2 s	
	SD	$\pm$	± 0.2 °	$\mathbb{O}_{\pm 0.2}^{\mathbb{V}}$	±0.1	$\mathcal{A} = 0.0$	r k <sup>O</sup> .
CGA 357276	Mean	₹LOD	1.1.Q <sup>*</sup>	1.2	L 1.8	× 2.20	"O <sup>v</sup>
	SD	°	±~Q,1 ″	<b>0.0</b>	$\mathbb{Q}^{\prime} \pm 0.0^{\circ}$	±20.1	Ũ
Sum of Unid./Diff. Residues <sup>1</sup>	Mean	∛ <lod< td=""><td>&lt;20°OD √</td><td>× 3.0 0</td><td>5.X</td><td>م<sup>™</sup>.8 م</td><td></td></lod<>	<20°OD √	× 3.0 0	5.X	م <sup>™</sup> .8 م	
	SD 🚿			±0,5	€0.6	<sup>™</sup> ± 0.0 <sup>™</sup>	
Total Extractable Residues <sup>2</sup>	Mean	<b>X1</b> 3.5 (	71,30	<b>O</b> .9	<sup>69.6</sup>	69	L°
	\$D >>	≠1.5¥	$\pm 0.0$	± 1.1 _	≥ ± 0.2	<b>₽</b> 0.2	Qʻ
Carbon Dioxide	Mean	10,0	£40.0	9.9~	ð,9	کي 9.9 ک	Ŷ
(sum aerobic and anaerobic) $^3$	SD SD	ي 0.0 ⊈	$\% \pm 0.0$	$\pm 0.0$	JE 0.0	$1000 \pm 0.0^{\circ}$	
Volatile Organic Compounds $\mathbb{Q}$	Mean <	$\sim 0.1$	< <u>0</u> ,9	× 0.1	S < 0.1	< @.1	
(sum aerobic and anaerobic) ${\bf Q}^{\mathbb{V}}$	s ŠD	±0,0	£0.0	$0.0$ $\pm 0.0$		≥€0.0	
Non-Extractable Residues <sup>3</sup>	∠ Meanov	1Q7.7	© 13.1 Å	146	م¢05.9 ∉	16.3	
	∕_S₽,	₽ <u>0.1</u> ▲	∕ ±0Ø	₺0.1	$0 \pm 0.10$	± 0.4	
Total Recovery 2 🧏	Mean	§ 95.2	94%4	گ¢92.5 گ	95,4	95.9	
	SD SD	±_1.4	_ ≠ 0.2 🔬	± 1.0×	±\$0.0	$\pm 0.2$	

n.d.: not detected, n.a.: not analysed, N/A; not applicable DAT, days after treatment, DASF: days

after soil flooding in the sum of unidentified diffuse vesidues, with no one

- Minor degradation products are support up to component exceeding 4.7% AR. Difference to Material Balance values due to rounding errors as well as clean up and chromatographic losses

### B. MASSERIAL BA

Mean material batance was 96.3% of applied adioactivity [% AR] (range from 93.4 to 98.8% AR). The complete material balances found at all sampling intervals demonstrated that there was no significant loss of radioactive dissipated from the test systems or during sample processing.

### EXTRACTABLE AND NON-FATRACTABLE RESIDUES С.

Extractable residues decreased from 98.4% AR a study start (DAT-0) to approximately 70% AR from DASE-62 onwards. Non-extractable residues prcreased from DAT-0 to study end (DASF-122) from 0.4 to 16.3% AR

### **VOLA** D.

The maximum amount of carbon dioxide was 10.2% AR at DAT-30 in the aerobic incubation phase and remained constant in the anaerobic incubation phase until 122 days after soil flooding (DASF). Formation of volatile organic compounds was insignificant as demonstrated by values of  $\leq 0.1\%$  AR at all sampling intervals.

**Bayer CropScience Document MCA: Section 7 Fate and behaviour in the environment** Trifloxystrobin

### E. **DEGRADATION OF PARENT COMPOUND**

The amount of trifloxystrobin rapidly decreased in the aerobic incubation phase from DATED DAT-2 from 95.7 to 8.7% AR and decreased further to 0.9% AR at DAT-30. Imparallel, the appoint of CGA 321113 reached a maximum of 87.3% AR at DAT-2 and decreased to \$7.1% AR at DAT \$0. CGA 321113 decreased further in the anaerobic incubation phase to 55.4% AR at DASF-122.

Besides the formation of carbon dioxide, two additional degradation products were identified: NOA 413161 with a maximum amount of 4.7% AR at DASF-0 which slightly decreased in the anaerobic incubation phase to 4.2% AR at DASF-122 and CGA 350276 with a maximum amount of 2.2% AR at DASF-122. The total unidentified residues amounted 30 a maximum of 7.8% AR with one component exceeding 4.7% AR at any sampling interval.

The degradation of CGA 321113 in the anaerobic incubation phase followed single first order (SFO) Table 7 kinetics according to the lowest chi2 error values and visual ascessments. summarizes the best-fit results of the DT and DT calculations. Ô

### Degradation konetics of CGA 321133 in soil Table 7.1.2.1.4-3: anaerobic conditions according to FOCUS (best fit)

under

	0
Best-Fit D4_50 ["O'DI 90 ] CDF Error"   O'Visuan &	,
Kinetic Model 🖉 [days] [days] 🛛 🖓 [%] 🖉 🖉 Assessment 🖯	1
SFO 356 356 > 1.4 4 + 6	
<sup>1</sup> SFO: single first order & & L ~ ~ ~ ~	_
<sup>2</sup> visual assessment $+ =$ good $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$ $\bigcirc$	
A A LA. CONCLUSIONS	

CGA 321113, Major degradation product of trifloxystrobin was stowly degraded in soil under anaerobic conditions in the dark in the laboratory. The calculated best fit half-life was 356 days in the tested soil.





# Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.1.4 /03; ; 2004 。
Title:	Anaerobic Soil Metabolism of NOA 413161 and NOA 413163
Report No:	MEF-04/254
Document No:	M-123509-01-1
Guidelines:	- OECD Test Guideline No. 307
	- SETAC Procedures for Assessing the Environmental Fate and Ecotoxicity of
	Pesticides
	- Commission Directive 95/36/EC amending Council Directive 91/4/14/EEC
GLP:	Yes Q Q X X
Justification:	New data / guideline requirement:
	Degradation rates of major degradation product NOA 413160 and NOA 4Q163

## **Executive Summary**

The route and rate of degradation of  $[^{14}C_4GP]NGA$  413-61 and  $[^{14}C_7GP]NGA$  413-63, degradation products of trifloxystrobin, were studied in one soil under anaerobic conditions following an aerobic incubation phase in the dark in the laboratory for 364 days at 20.0 °C.

							A
Soil	A	Source	"	Texture	SDA	** Fig	OC [%]
	Bur	cheid Germa	ŵy ĉ	Silt	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	6.7 🕅	2.1
* nH value was derived from active	115 0 0	M CaCla su@	ension	Q.		×	

\* pH value was derived from accessors 0.91 M CaCl<sub>2</sub> suspension

A study application rate of 32.5  $\mu$ g each of NO (41316) and NOA (47316) per kg soil dry weight was applied (sum of 65  $\mu$ g per kg soil dry weight) based on a single field application rate of trifloxystrobin of 250 g per hectare and a maximum formation of  $\mu$  sum 5.3% of NOA (41316) and NOA (41316) a

Mean material balance was 102/4% of applied radioactivity (% AB) (range from 94.1 to 109.1% AR).

The maximum amount of carbon dioxide was approximately 13% AR 30 days after treatment (DAT) in the aerobic incubation phase and remained constant in the anaerobic incubation phase until study end (364 days after soil flooding (DASF)). Formation of colatile organic compounds was insignificant as demonstrated by values  $\rho \leq 0.1\%$  AR at all sampling intervals.

Extractable residues decreased from 97.7% AR at study stort (DAT-0) to approximately 40% AR from DASF-14 onwards.

Non-extractable residues increased from 7.4% AR at DAT-0 to a maximum of 35.8% AR at DAT-30 and decreased to approximately 20% AR from DASF-60 onwards.

The amounts of NOA 43161 and NOA 413163 decreased in the aerobic incubation phase from 46.1% AR each at DAT-0 to 22 & and 27.9% AR at DAT-30, respectively. The amounts of NOA 413161 and NOA 415163 decreased further in the anaerobic incubation phase to 18.3 and 11.1% AR, respectively. The total unidentified residues amounted to a maximum of 36.5% AR with no one component exceeding 14.6% AR at any sampling interval. All components were < 5% AR if expressed as percentage of uniloxystrobin and considering the maximum formation of NOA 413161 and NOA 413163 in aerobic soil, and were therefore not identified.



The experimental  $DT_{50}$  and  $DT_{90}$  values for the anaerobic incubation phase were calculated using single first order kinetics. The half-lives of NOA 413161 and NOA 413163 under anaerobic conditions were 976 and 206 days, respectively.

Index stores were encluded using single first kinetics. The half-lives of NOA 413161 and NOA 413163 under anaerosic conditions were 976 and 206 days, respectively.
It is concluded that NOA 413161 and NOA 413163 will be slowly degraded under anaerosic conditions in the environment.
I. MATERIALS ANTENIETHONS
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Table 7.1.2.1.4- 4:	Physico-chemical	properties	of test soil
1 4010 / 11 2010 1 10	i nysico chemicai	properties	01 1051 5011

Parameter		Results / Units
Soil Designation		4a 0 ~
Geographic Location	n	The second secon
City		
State	Ĉ'n	North-Rune Westphalia
Country	₩¥	Germany O S
Soil Taxonomic Cla	ssification (USDA)	loamy, mixed, meste, Typio Arguerif
Soil Series (SCS)	A	Affisol, Judalf of A
Textural Class (USE	$(\mathbf{A})$	silt of the second seco
Sand	[50 μm – 2 mm] 🔬 🖉 🔊	
Silt	[2 μm – 50 μm]	
Clay	[< 2 μm]	
pH (soil/CaCl <sub>2</sub> )		
pH (soil/water)		
pH (soil/1 N KCl)		$\sqrt{9.0}$ $\sqrt{2}$ $\sqrt{2}$ $\sqrt{2}$ $\sqrt{2}$
Organic Carbon (con	mbustion)	
Organic Matter <sup>1</sup>		
Cation Exchange Ca	pacity [meq/100g]	
Maximum Water Ho	olding Capacity Qg H2Q ad 100 g soil DW]	
Bulk Density (distur	bed) [g/cm <sup>3</sup> ]	
Microbial biomass (	acrobic inovibation phase)	
DAT-0		14\$3 @
Microbial Viability	anaerobic incubation phase [CFU soil DW]	
DASF-122 (With /	without test items)	807 10,313
DASF-366 (with /	without test items)	8000/7670
<sup>1</sup> % organic matter =	= % organic@arbon@1.724	
CFU: colony formin	g thits of the second	Y
DAT: days after trea	I floading a straight of the s	۵ ۵
DW: dry weight		
USDA: United State	S Department of Agriculture	
• • • • • • • • • • • • • • • • • • •		
B. STUPY DESI	GN. N Strate	

1. Experimental Conditions of the static test system for degradation in soil under anaerobic conditions consisted of Erlenmeyer glass flasks (volume e.g. 300 mL). For the aerobic incubation phase, each flask was fitted with a trap attachment (permeable for exygen) containing soda lime for absorption of carbon dioxide and a polyurethane (PU), from phig for adsorption of volatile organic compounds (VOC). For the anaerobic incubation phase the trap attachments were replaced by sealable two-valve glass stoppers connected with air tright plastic gas sampling bags for the collection of volatiles.

The soil was equilibrated at approximately 23 °C in the laboratory for approximately one week.

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Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

The study application rate (SAR) was based on a single field application rate of trifloxystrobin of 250 g per hectare and a maximum formation of in sum 5.3% of NOA 413161 and NOA 413162 in field dissipation study M-033523-02-1 (Baseline Dossier, KCA 7.1.1.1/08), resulting in a nominal SAR of 33 µg each of NOA 413161 and NOA 413163 per kg soil dry weight (sum of 66 µg per kg soil dry weight).

The test items were simultaneously applied onto a air-dried soil aliquot and this soil aliquot was mixed with the bulk amount of the soil for 1 hour using a tumbling mixer.

For preparation of the test systems, 100 g dry weight equivalents of the applied soft were veighed into each test vessel. Soil moisture was adjusted to 50% of the maximum water holding capacity (MWHQ) for the individual test systems by addition of de jonized water. The test vessels were then fitted with trap attachments and incubated under aerobic conditions for 00 days at 20°C in a walk-in climatic chamber in the dark.

30 days after treatment (DAT-30 corresponding to DASF-0), the soil was flooded with 120 mL oxygen-depleted water (approx. 1 to 3 cm layer above soil level) and set under an atmosphere of nitrogen. The trap attachments were replaced by air-tight plastic gas sampling bass. To ensure maintenance of oxygen-free conditions in the anaerobic incubation phase, the test systems were placed in a nitrogen-flooded box within the walk-in climatic chamber. The test systems were incubated in the dark under anaerobic conditions for 364 days of 20 °C

## 2. Sampling

Ten sampling intervals were distributed over the entire incubation period of 394 days (30 days under aerobic conditions). Duplicate samples were processed and analysed 0 and 30 days after reatment (DAT) in the aerobic incubation phase and 14, 31, 60, 90, 122, 180, 270 and 364 days after soil flooding (DASF) in the anaerobic incubation phase. Microbial soil biomass was determined in the aerobic incubation phase at study start (DAT-0). The amounts of anaerobic bacteria were determined in the anaerobic incubation phase during and at the end of the study (DASF 022 and DASF 364).

## 3. Analytical Procedures

Carbon bioxide absorbed by odd lime was liberated with 18% aqueous hydrochloric acid and trapped in a scintillation contail selective for Onding of carbon dioxide using an air-tight assembly. The radioactivity contait was determined by liquid scintillation counting (LSC).

The PU foanoplugs of the pap attachments were extracted with ethyl acetate in an ultrasonic bath to desorb VOC. The radioactivity content was determined by LSC.

Volatiles possibly present in an aerobic text systems were slowly purged through a soda lime trap for absorption of carbon dioxide, then through a catalytic oven for oxidative combustion of VOC (e.g. methane), and its combustion exhaust through a scintillation cocktail selective for binding of carbon dioxide using an air-tight assembly. The radioactivity content was determined by LSC and the soda lime was further processed as described before for carbon dioxide.

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## Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

At each sampling interval of the anaerobic incubation phase, pH, oxygen content and redox potential in the water and the pH and redox potential in the soil were determined. Water and soil were separated by decantation. The entire soil of each test system was extracted. The soil of DAT-0 samples was extracted six times at ambient temperature using a mechanical shaker, once using water, twice using acetonitrile and three times using acetonitrile/water 1/1 ( $\nu/\nu$ ). The soil of DAT-30 and alkanaerobic samples was extracted four times at ambient temperature using a mechanical shaker, once using water and three times using acetonitrile/water 1/1 (v/v). After each extraction step, extract and so were separated by centrifugation and decantation. The radioactivity content of the water and the combined ambient soil extracts was determined by LSC. Aliquots of the water and the combined soil extracts were analysed by normal phase TLC/radiodetection. The limit of detection (LOD) and light of quantitation (LOQ) for TLC/radiodetection analysis of the water and the combined soil extracts 0.1% AR, respectively.

and non-extractable residues homogenized The exhaustive extracted soils were air-dried, were determined by combustion/LSC.

with reference items and by HPLC, MS(MS) Test items were identified by TLC co-classomatography

The degradation kinetics of the test nems was determined using the software Model Manager® with a single first order kinetic model. Model input datasets were the mean residual appoints found in the duplicate test systems at each sampling interval of the macrophe incidention phase (DASF-14 to DASF-364). DT<sub>50</sub> and DT<sub>90</sub> values were calculated from the resulting kinetic parameters.

> m RESULTS AND DISCUSSIO

Results indicated that the anticipated standardized conditions owere maintained in the aerobic and anaerobic incubation phase, and that the soil was microbially active over the duration of the laboratory study. Anaerobic Dacterio plate count assays performed during and at the end of the study confirmed the establishment of an anaerobic misroflora in the test systems.

The pH values in water and soil of the anaerobic incubation phase ranged from 7.4 to 7.7 and from 7.1 to 7.6, respectively.

Oxygen contents in the water were constant from DASF44 onwards and ranged from 0.08 to

Oxygen contents in the water were constant from DASF 4 onwards and ranged from 0.08 to 0.55 mg/L demonstrating anaerobic conditions

## A. DATA

<b>Table 7.1.2.1.4- 5:</b>	Degradation of NOA 413161 and NOA 413163 in soil
	4a under anaerobic conditions (mean values expressed as %

					¥°	$\sim$	L'
	DAT	0	30	44	61	<i>"</i> ⊘90 ,	Y <sup>v</sup>
Compound	DASF	N	Ά	14	31 💊	Q 60 0	L.S
NOA 413161	Mean	46.1 🖉	22.6	26.4	22.8	22,4	S a
NOA 413163	Mean	46.1 <sup>°</sup>	27.9	0.34.0	367	<b>\$</b> 8.3 ×	v s
Sum of Unid./ Diff. Residues <sup>1</sup>	Mean	15	2.5	<sup>♥</sup> 4.0	×9.1	Q 16.1	
Total Extractable Residues <sup>2</sup>	Mean	A93.7	53.Q	64.4	£63.6	<sup>*</sup> 66.®	<u></u>
Carbon Dioxide	Mean 🖉	Ø n.a.	12,7	@13.3 <sup>^</sup>	∛ 13.D <sup>∞</sup>	<i>\$</i> 3.2	Ű
(sum aerobic and anaerobic) <sup>3</sup>		~ °	D'	Y . O	ð		2 2
Volatile Organic Compounds	Mean	p.a.	ري n.d. بر	< <b>0</b> , 1	\$0.1	<sup>*</sup> × 0,1 ×	
(sum aerobic and anaerobic) <sup>3</sup>	4			ð	"0" ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		L°
Non-Extractable Residues <sup>3</sup>	Mean 🗞	7.4	35.8	s 31.4 🔊	28.7	<b>&amp;</b> 3.2	Q"
Total Recovery <sup>2</sup>	Mean	101.0	A01.5	109	105.4	103.2	Ϋ́
			y z	ð,		y O	-
le 7.1.2.1.4- 5 (continued)	° Ö °	Y V			ř S	<u>ģ</u>	
	~		~."	0 6		$\sim$	

## Table 7.1.2.1.4- 5 (continued)

le 7.1.2.1.4- 5 (continued)		Ŷ Ŷ				
Q .	<b>DAT</b>	420	<sup>3</sup> 152	20	300 y	394
Compound	DASF	" <sup>0"</sup> 90 🦂	122	<b>A80</b>	<sup>©</sup> 2700 <sup>°</sup>	364
NOA 413161	Mean	/ 22 <b>.B</b>	22.5	×22.8	220	18.3
NOA 41316	∅ Meap	25.8	‱\$3.1 ≪	18:4	<b>4</b> .3	11.1
Sum of Unid./ Diff. Residues 1	Mean	×48.4 C	¥ 24Ø	31.3	\$36.5	29.6
Total Extractable Residues 2 🖉	Mean 🔏	× 66.5×	6Ø9	A72.5	71.8	59.0
Carbon Ďioxide	Mean ~	1208	@13.1	12.9	13.7	14.4
(sum aerobie and anaerobic) 3	$\swarrow$ $\sim$					
Volatile Organie Compounds 🔬	Mean	×0.1	< 00 j	<b>≪ð</b> .1	< 0.1	< 0.1
(sum acrobic and anageobic) <sup>3</sup>	<b>V</b> 8	j O	L.	<i>a</i> ı		
Non-Extractable Residues	🔬 Mean 🏏	22 <sup>3</sup> .4	ĭ9.5 ≰	J 19.9	14.4	20.5
Total Recovery 2	Mean	J01.7~	102.5	105.3	99.9	93.9

n.d. not detected a.a.: not analysed, N/A. not applicable, DAT days after treatment, DASF: days after soil flooding Ň X, K)

Minor degradation products are summed up to sum of unidentified / diffuse residues, with no one component exceeding 145% Ale All components were < 5% AR if expressed as percentage of trifloxy grobin and considering the maximum formation of NOA 413161 and NOA 413163, and were therefore not identified

- 2 rounding errors as well as clean up and Difference to Material Balance Values due chromatographic Dosses,
- Values taken from Material Balance

### B. **MATERIAI**

Mean materia balance was 02.4% of applied radioactivity [% AR] (range from 94.1 to 109.1% AR). The complete material balances found at all sampling intervals demonstrated that there was no significant loss of radioactivity dissipated from the test systems or during sample processing.

# EXTRACTABLE AND NON-EXTRACTABLE RESIDUES

Extracta De residues decreased from 93.7% AR at study start (DAT-0) to approximately 40% AR from DASF-14 onwards. Non-extractable residues increased from 7.4% AR at DAT-0 to a maximum of 35.8% AR at DAT-30 and decreased to approximately 20% AR from DASF-60 onwards.



### D. VOLATILES

The maximum amount of carbon dioxide was approximately 13% AR 30 days after treatment DAT in the aerobic incubation phase and remained constant in the anaerobic incubation phase until study end (364 days after soil flooding (DASF)). Formation of volatile organic compounds was insignificant as demonstrated by values of  $\leq 0.1\%$  AR at all sampling intervals.

### E. **DEGRADATION OF PARENT COMPOUND**

The amounts of NOA 413161 and NOA 413163 decreased in the aerobic incubation phase from 46.1% AR each at DAT-0 to 22.6 and 27.9% AR at DAT-30, respectively. The amounts NOA 413161 and NOA 413163 decreased further in the anaerobic incubation phase to 18.3 and 11.1% AR, respectively. The total unidentified residues amounted to a maximum of 36.5% AR with no one component exceeding 14.6% AR at any sampling interval. All components were < 5% AR if expressed as percentage of trifloxystrobin and considering the maximum formation of NOA 413161 and NOA 413163 in aerobic soil, and were therefore not dentified.

calculated using The experimental  $DT_{50}$  and  $DT_{90}$  values for the anaerobic incubation single first order (SFO) kinetics (see Table 7.1.2.1 - 6).«

Table 7.1.2.1.4- 6:	Degradation kinetics of	NOA	413161	and	NOA	41,3263	<i>"</i> in	soil	under
	anaerobic conditions,	Ø	~~ ,	Ű,	Ô	, Or	Ő		



NOA 45961 and Noa 413163, major degradation products of frifloxystrobin, were slowly degraded in soil under anaerobic conditions in the dark in the laborator. The calculated half-lives were 976 and 206 days in the tested soil.

It is concluded that NOA 41316 163 will be slowly degraded under anaerobic conditions in the environment. Ĩ

The results are included in the summary of the degradation rates of trifloxystrobin and its major

The results are included in the summary of the degradation rates of the degradation products in soil in the aboratory given in section CA 7.1.2.1.



# Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.1.4 /04; ; ; 2013 。
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin and its Metabolite under
	Anaerobic Soil Conditions in Laboratory According to FOCUS Kinetics Using
	KinGUI 2 Tool
Report No:	EnSa-13-0732
Document No:	M-468176-01-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>
GLP:	No S A A A
Justification:	New data / guideline requirement:
	Kinetic analysis of the degradation of trifloxystrobin and its major degradation
	product CGA 321113 for modelling purpose Q

## **Executive Summary**

A kinetic analysis of soil residue data from the anaeropic son degradation study M-035427-01-1 (Baseline Dossier, KCA 7.1.2.1.3 /01 and KCA 7.1.2.1.4 /01) was performed with the software KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> to derive half-lives for triboxystrobin and its degradation product CGA 321113 as well as formation fractions for CGA 321143, which are suitable for modelling purpose. Only the results for CGA 321113 are described here.

The single first order kinetic model, was used for modelling purpose to describe the degradation of CGA 321113 in soil North Corolina under maerobic conditions in the dark in the laboratory at 25 °C and a test concentration of  $159 \ \mu g$  (based on soil/water combinations).

The half-life of CGA 321113 mas > 1000 da

The formation fraction of CGA 30113 was 1.000

Methods are summarized under &CA 7 .2.1. 202 of the Supplemental Dossier.

The single first order (SPO) kinetic model was used for modelling purpose to describe the degradation of CGA 321113 in SON North Cacolina. Table  $0.2.10^{2}$  7 summarizes the results of the kinetic analysis.

Table 7, 12.1.4-7: Kinetic parameters for the degradation of CGA 321113 in soil under anacrobic conditions for modelling purpose according to FOCUS

Soil Soil Kinetic Model <sup>1</sup> DT <sub>50</sub> Chi <sup>2</sup> Error t-test Visual	 $\vee$	× ./Y	- Ni				
	Soil N	ſ FP	Kinetic Model <sup>1</sup>	DT <sub>50</sub>	Chi <sup>2</sup> Error	t-test	Visual
Assessmen 🖉 🖉 🖉 🖉 🕹 🕺	£, 4 <sup>\</sup>	Û		[days]	[%]		Assessment <sup>2</sup>
North Carolina $51.000$ $2SFO$ > 1000 1.2 4.60 x 10 <sup>-3</sup> +	North Carolina	§1.000	<b>©</b> SFO	> 1000	1.2	4.60 x 10 <sup>-3</sup>	+

FF: formation fraction <sup>1</sup> SFO: mgle first order <sup>2</sup> visual assessment: + goo Bayer CropScience

Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

### **III. CONCLUSIONS**

The calculated half-life for modelling purpose for the degradation of CGA 321113 in soil inder anaerobic conditions in the dark in the laboratory was > 100 days in the tested soil. The formation fraction of CGA 321113 was 1.000.

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section CA 7.1.2.4

Report:	KCA 7.1.2.1.4 /05;
Title:	Kinetic Evaluation of the Degradation of Triflox strobul Metabolites
	NOA 413161 and NOA 413163 under Anserobic Soil Conditions in Paboratory
	According to FOCUS Kingtons Using the Kington 2 Tool
Report No:	EnSa-13-0734
Document No:	M-468178-01-1 5 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Guidelines:	- FOCUS kinetics $(2006)$
GLP:	No Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q
Justification:	New data / guidedine requirement:
	Kinetic analysis of the degradation of the major degradation products
	NOA 41316@and NOA 419163 for modeling purpose & &

## **Executive Summary**

A kinetic analysis of soil residue data from the macrofic soil degradation study M-123509-01-1 (Supplemental Dossier, KCA7.1.2  $\pm$  4/03) was performed with the software KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> to derive half fixes for the triffoxystrobin degradation products NOA 413161 and NOA 413162 which are surable for modelling purpose

Single first order was the most appropriate kinetic model for modelling purpose for the degradation of NOA 413161 and NOA 413163 in soft and the laboratory at 20 °G and a test concentration of each  $33 \mu g/kg$ .

The half-lives were \$76.4 days to NOA A13167 and \$6.1 days for NOA 413163.

Soil residue data from the anacrobic soil degradation study M-123509-01-1 (Supplemental Dossier, KCA 7.12.1.4/03) were used. In this study, the degradation of NOA 413161 and NOA 413163 was studied in soil soil study for 364 days, following an aerobic inclusion phase of 30 days, at 20 °C and a test concentration of each 33  $\mu$ g/kg.

The kinetic analysis was performed seconding to FOCUS kinetics  $(2006)^{1}$  using the software KinGUI 2 with four different kinetic models: single first order, first order multi compartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DATO was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessement of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, t-test significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters.







II. RESULTS

Single first order (SFO) was the most appropriate kinetic model for modelling purpose so degradation of NOA 413161 and NOA 413163 in soil **Table** 7.1.2.1 Table 7.1.2.1.4-9 are summarizing the results of the kinetic analysis.

Kinetic parameters for the degradation of NOA 413161 in soil ander Table 7.1.2.1.4-8: anaerobic conditions for modelling purpose according to FQCUSA

_				¥.	£0	<u> </u>
	Soil	Kinetic Model <sup>1</sup>	DT50	Chi <sup>2</sup> Error	) 🛛 t-test 🗸	<sup>™</sup> Visuat 6
			[dax\$	[%]		Assessment <sup>2</sup>
		SFO	2706.4	4,0	4.88 x 0 <sup>-3</sup>	
		,			Y W S	
1	SFO: single first order	\$				$\sim$

<sup>2</sup> visual assessment: + = good, o = moderate

Kinetic parameters for the degradation of NOA 413163 in, soil ander Table 7.1.2.1.4-9: anaerobic conditions for modelling purpose according to FOCUS O

_							S O
	Soil	Kinețį	Model	DT <sub>50</sub>	Chi <sup>2</sup> Frror	titest ~	Visual
		<i>a</i> ,	<u> </u>				Assessment
			SFÔy "	20691	√y 1.6 ØY	≥.45 x 10 <sup>-8</sup>	+
1	SFO: single first order	~ (	Υ <sup>Δ</sup>		° <sup>∧</sup>		
2	visual assessment: $+ = \frac{1}{2}$	good <sup>C</sup>					

The calculated half lives for modelling purpose for the degradation of NOA 413161 and NOA 413163 in soil under and robic conditions in the dark in the laboratory were 976.4 days for NOA 413161 and 206.1 days for NOA \$131630n the lested soil. , (0 , K, ') Õ

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil in the laboratory given in section C. 7.1.2.1.

the laboratory given in section



## CA 7.1.2.2 Field studies

The dissipation and degradation of trifloxystrobin and its major photodegradation product CGA 357261 after soil incorporation under field conditions were studied at six sites in Germany, United Kingdom, France, Spain and Italy using unlabelled trifloxystrobin and CGA 357261 formulated as WG 50 to fulfil the EFSA requirements to obtain DegT<sub>50</sub> values in soil for modelling purpose (EFSA kinetics (2010) <sup>3</sup>). The kinetic models and DT<sub>50</sub> values used for modelling purpose (normalised to 20 °C and field capacity) and best-fit evaluation as well as formation fractions for major degradation products are summarized in Table 7.1.2.2- 2 to Table 7.1.2.2- 11.

# Table 7.1.2.2-1: Overall summary of DegTo values and formation fraction for degradation of trifloxystrobin and its major degradation products in soils for modelling purpose (normalised to 20 °C and field capacity)

		Ŭ Ø	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
	Deg T 50 1~	Formation	Fraction <sup>2</sup>	0. 10	ŕ
Compound 🗸	. ∕fdays}∕`		ys] 🍾	Å V	
trifloxystrobin@EE)	V 1.69		A 👸 🖉	, A	0
CGA 357261 (ŽE)	<b>10,4</b> 4 ×	$\int \sqrt{N} = \sqrt{N/2}$	A N	S. Q	)
CGA 3214Q3 (EE)	لم 48.1 م	<u>م</u> ي آن		$\delta$ $\sim$	
CGA 373466 (ZE)	© 22.4 S	A.8.	53 🏷 🔬	) 	
NOA, \$13161 (ZE)	, 39.3	× _00.1	45	Ŭ,	
NOA 413163 (EE)	A9.3 U	r <sup>%</sup> 0.3		Ô	
∘CGA 357276 (₽)	£ 51.7 £	~ 040	68 🔊	L <sup>a</sup>	
ŇOA,≇09480,(Z)	510	0.0	28 🎽 👸	2	
NA: nov applicable	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\gamma 0'$			
<sup>1</sup> geometric mean	N 5				
$^{2}$ and the tree mean $^{1}$	$\sim$		~~		
		∧ ⊮			

Table 7.1.2.2 : Over all summary of DegT<sub>50</sub> values for degradation of trifloxystrobin in soils for modelling purpose (normalised to 20 °C and field capacity)

Soil	ິ ູ 🖓 Téxture _ \ ຼິິ	Kannex Point /	Kinetic	DegT <sub>50</sub> <sup>2</sup>
(Country)		🗶 Reference No	Model <sup>1</sup>	[days]
	₄ lo@m (0-100 cm) 0	KCA, 7.1.2.2.1 /18	DFOP	1.13
(Germany)				
	Candy to am (0-79 cm)	KCA 7.1.2.2.1 /18	SFO	1.66
(United Kingdom)	sandy clay loam (75-100com)	<u>ò</u>		
	silt Poam () 100 pm)	KCA 7.1.2.2.1 /18	SFO	1.69
(Northern France)				
	silt løgm (0-30 cm)	KCA 7.1.2.2.1 /18	SFO	2.73
(Southern France)	Silty clay loam (30-10) em)			
	Joam (@ 50 cm)	KCA 7.1.2.2.1 /18	SFO	1.10
(Spain)	saney clay Joam (50-100 cm)			
	Silty clay loam 0-50 cm),	KCA 7.1.2.2.1 /18	SFO	2.49
(Laty)	silty clay (50-75 cm)			
	clay loam (75-100 cm)			
	N N N		geomean	1.69

<sup>1</sup> SPO: single first order, DFOP: double first order in parallel

<sup>2</sup> for DEOP: DT<sub>50</sub> was not calculated from the slow k-rate, DT<sub>50</sub> is based on fit of the decline curve

### Overall summary of DT<sub>50</sub> and DT<sub>90</sub> values for degradation of Table 7.1.2.2- 3: trifloxystrobin in soils (best-fit) Q ð

						S
Soil	Texture	Annex Point /	Kinetic 渗	» DT <sub>50</sub>	<b>D</b> T 90	0*
(Country)	(USDA)	<b>Reference No</b>	Model	[days]	(days)	
	loam (0-100 cm)	KCA 7.1.2.2.1 /15	DFOP	2.4	35.6	
(Germany)				. O <sup>V</sup>		Ô,
	sandy loam (0-75 cm)	KCA 7:1.2.2.1 /15	<b>SFO</b>	6,7	_°∕≫Ž2.1 "©	
(United Kingdom)	sandy clay loam (75-100 cm)	N.	Į U	Č A		l s
	silt Loam (0-100 cm)	KCA 7.1.2.2.1 /15	🖗 SFO	× 6.0 Å	2000	, Ô <sup>v</sup>
(Northern France)			ſ	° ×		×
	silt loam (0-30 cm)	CA 7.1.2.2.1 /15	SFO O	67	22.3	
	silty clay loam (30-100 cm) 🖉					
(Southern France)	<b>K</b>	\$ \$ \$	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Å. N	≪J <sup>™</sup>	
	loam (0-50 cm)	KCA 7.4,2.2.1	<b>€Ø</b> MC ⟨	× 1,8	<u>م</u> 10.4 ،	
(Spain)	sandy clay loam (50-100 cm)	V Q		0"		
	silty clay loam (0-50 cm),	KCA 7.1.2,01/15	FQMC	≪3.3	1407	
(Italy)	silty clay (50-78 cm)		Å,		Ő	
	clay loam (755800 cm)		Û,		ě.	

<sup>1</sup> SFO: single first order, FOMC: first order multi compartment, DFOP: double first order in parallel ð

Overall summary of DegTs values for degradation of CGA 357261 in soils Table 7.1.2.2- 4: for modelling purpose (normalised to 20 C and field capacity)

Soil	🔊 🖌 Texture 🔊 🚽 Annex Po	mt / Kimetic	DegT <sub>50</sub> <sup>2</sup>
(Country)	🔬 💭 (USDA) Õ 📯 . Reference	No N	[days]
	<sup>©</sup> loam (0-100, cm)	2.1 🗗 🦓 DFOP	0.09
(Germany)		r a,	
	🔪 sandy loam (0-75 cm) 👌 KCA 7.1.20	1/19 SFO	0.61
(United Kingtom)	Sandy clay loam (7,5% 00 cm)	Ŵ	
ð Å	🖌 🖉 🖉 🖉 🖉 🖉 🖉 🖉 🖉 🖉	2.1@19 HS	0.12
(Northern France)		*	
	رُبْ 🖓 🕺 🖓 🖓 🖓 🖓 🖓 🖓 🖓 🖓	2.1 /19 SFO	1.35
(Southern France) 🐆	© silty@lay loam (30 100 cm ) ~ ~ ~		
~Q	4 logm (0-50 cm) 4 KCA #1.2.2	2.1 /19 SFO	0.95
(Spain)	sandy say loand (50-100 cm)		
	siltoclay loam (0-20 cm) S KCA 7.1.2.2	2.1 /19 SFO	0.88
(Italyo C	Silty clay (50 s cm)		
{	Sclay bam (75 00 cm)		
1 Con	o o u v v	geomean	0.44

<sup>1</sup> SFO: single first order, DFOP. double first order in parallel, HS: hockey stick



ð

### Table 7.1.2.2- 5: Overall summary of DT<sub>50</sub> and DT<sub>90</sub> values for degradation of CGA 357261 in soils (best-fit) Ø

						S
Soil	Texture	Annex Point /	Kinetic 渗	» DT <sub>50</sub>	<b>D</b> T 90	0°
(Country)	(USDA)	<b>Reference No</b>	Model	[days]	L (days)	
	loam (0-100 cm)	KCA 7.1.2.2.1 /16	DFOP	0.9	7.5	
(Germany)				, Ô <sup>y</sup>		Ô,
	sandy loam (0-75 cm)	KCA 7.3.2.2.1 /16	<b>D</b> FOP	246	×9.0 ×	
(United Kingdom)	sandy clay loam (75-100 cm)	<b>V</b>	<u></u>	Ô R		L
	silt Loam (0-100 cm)	KCA 7.1.2.2.1 /16Č	🎙 FOMC	2.2	1405	,0″
(Northern France)		4 <sup>0</sup>	۰. ۱			$\sum_{i}$
	silt loam (0-30 cm)	KCA 7.1.2.2.1 /16	<b>DFOP</b>	352	13.0	
(Southern France)	silty clay loam (30-100 cm) <sup>&amp;</sup>			×		
	loam (0-50 cm)	KCA 7.1,2,2.1/16	FOMC	<sup>™</sup> 1.6 <sup>™</sup>	6.8	
(Spain)	sandy clay loam (50-100 cm)		200		A	
	silty clay loam (0-50 cm), 🔩	KCA 7.1.2.2.1 16	FOMC	0.8	₩ 4.80 <sup>°</sup>	
(Italy)	silty clay (50-75(cm)					
	clay loam (75-100 cm)		L.V		Ő	

<sup>1</sup> FOMC: first order multi compartmen DFOR double first offer in parallel

### Overall summary of DegT<sub>50</sub> values and formation fractions for degradation Table 7.1.2.2- 6: of CGA 321113 in soils for modelling purpose (normalised to 20 °C and field expacity) field capacity) Ş L Ô

			Y ANY S	4 1	
Soil	💙 🛛 🖉 🖉	🔰 🕺 🖉 🎢 🎢 🎢 🎢 🎢 🎢 🎢 🎢 🎢 🎢 🎢 🎢 🎢	Formation	🖉 Kinetic	DegT50
(Country)	K AND O	Reference No/	<b>Fraction</b>	Model <sup>1</sup>	[days]
	loam (0,000 cm)	KCA 9.1.2.2.1 /18	0.686	SFO	52.4
(Germany)			Ø		
ê,	sandy koam (0-75 cm)	KCA 7.1 2.2.1 / 10	<b>\$</b> \$30	SFO	24.7
(United Kingdom)	andy clay loam (75-1000cm)		~		
	sittLoam (0-100 cm) 🔩	KCAS7.1.2.29 /18	Ø 0.556	SFO	53.0
(Northern Prance)			*		
	silt am (0 S0 cm)	KCA 7,1,2.2.1,48	0.688	SFO	95.8
«»	silty chay loam (30-100 cm)				
(Southern France)					
Į į	🚽 loan (0-50 cm) 🗸	KCA 7.1 2.2.1 /18	0.488	SFO	23.7
(Spain) <sub>Q</sub>	sandy clay loam (50-100 cm)	ô ô			
Ş.	🗘 silty lay laam (0-50 cm),	KCA 7.1.2.2.1 /18	1.000	SFO	79.8
(Italy)	Sity clag (50-7 هم معند) کې				
O* '	©clay loann (75-000 cm)				
^		^♀´ arithmetic mean	0.707	geomean	48.1
"					
<sup>1</sup> SFO? single first of	der a so a	× ¥			
<sup>1</sup> SFO? single first of	der Frank og for	A A			
<sup>1</sup> SFO? single first of	Per 5 , or 6 , o	4			
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<sup>1</sup> SEO single first of	der fri de	7			
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<sup>1</sup> SEO! single first of	$ \begin{array}{c} \operatorname{der} & \begin{array}{c} & \end{array}{} & \begin{array}{c} \end{array}{} \\ \end{array}{} & \begin{array}{c} \end{array}{} \\ \end{array}{} & \begin{array}{c} \end{array}{} & \begin{array}{c} \end{array}{} \\ \end{array}{} & \begin{array}{c} \end{array}{} \end{array}{} & \begin{array}{c} \end{array}{} \\ \end{array}{} \end{array}{} \begin{array}{c} \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \\ \end{array}{} \\ \end{array}{} \end{array}{} \\ \end{array}{} \\ \end{array}{} \\ \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \\ \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\$ \\ \end{array}{} \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \end{array}{} \\ \end{array}{} \end{array}{} \end{array}{} \\ \\{} \end{array}{} \end{array}{} \\{} \end{array}{} \end{array}{} \\{} \end{array}{} \end{array}{} \\{} \end{array}{} \end{array}{} \\{} \end{array}{} \\{} \end{array}{} \end{array}{} \\{} \end{array}{} \\{} \end{array}{} \\{} \end{array}{} \\{} \end{array}{} {} \\{} \end{array}{} \\{} \end{array}{} \end{array}{} \\{} \end{array}{} \\{} \\{} \end{array}{} \\{} \end{array}{} \\{} \end{array}{} {} \\{} \end{array}{} \\{} \end{array}{} {} \\{} \end{array}{} \\{} \end{array}{} {} \\{} \end{array}{} \\{} \end{array}{} \\{} \end{array}{} {} \\{} {} \\{} \\{} \end{array}{} {} {} \\{} {} \\{} \end{array}{}{} {}{}{}{}{}				
<sup>1</sup> SEO! single first of	$\begin{array}{cccccccccccccccccccccccccccccccccccc$				
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<sup>1</sup> SEO single first of	Per Gring Quint				
<sup>1</sup> SEO single first of	Per day in the second s				
<sup>1</sup> SEO single first of	Per Gring Gr				

## Overall summary of DegT<sub>50</sub> values and formation fractions for degradation Table 7.1.2.2-7: of CGA 373466 in soils for modelling purpose (normalised to 20 °C and field capacity)

			$\sim$	,		0
Soil	Texture	Annex Point /	Formation	Kinetic 🗸	DegT	
(Country)	(USDA)	<b>Reference No</b>	Fraction	Model <sup>1</sup>	[days]	
	loam (0-100 cm)	KCA 7.1.2.2.1 /19	0:640	SFO	6.86	Č,
(Germany)		(ČA)	, ,	4. N ~		
	sandy loam (0-75 cm)	KCA 🔭 .2.2.1 /19	<b>1.000</b>	SFO NO	× 8,5	L.
(United Kingdom)	sandy clay loam (75-100 cm)	de la	∑¥		, C	$0^{\nu}$
	silt Loam (0-100 cm)	KCA 7.1.2.2.1 /18	0,618	SFÔ≶	ر 29.1 گ	X
(Northern France)				Å .		
	silt loam (0-30 cm)	KCA 7.1.2.2 1/19	1.000	<u></u> ∖SFO √	91:0	
(Southern France)	silty clay loam (30-100 cm)				Ś	
	loam (0-50 cm)	KCA 7.1.2.2.1 /49	× <b>0</b> .860 Ø	SEO	ء 14.5	
(Spain)	sandy clay loam (50-100 cm)	o v Q	4 <i>Q</i>	Oʻ k	p' úy	
	silty clay loam (0-50 cm),	KCA 7.1.2, Dt /19 (	1.000	SFQ	56.1	
(Italy)	silty clay (50-78 cm)		s í		Ő	
	clay loam (75 100 cm)			l Q <sup>®</sup> /	8	
		💙 arithmetic mean	0.853	geomean	22.4	
<sup>1</sup> SEO: single first or	der 🌾 🗞 Ø			<u> </u>		

O: single first order

Overall summary of DegF<sub>50</sub> values and formation fractions for degradation of NOA 413161 in soils for modelling purpose (normalised to 20 °C and field capacity) Table 7.1.2.2- 8: 

			K, N		
Soil	Texture O	Annex Point /	Formation	Kinetic	DegT50
(Country)		Reference No 🔬	Fraction	Model <sup>1</sup>	[days]
	loam (0-100 cm)	KCA 7.1 2.2.1 / 8	<b>20</b> .071	SFO	66.1
(Germany)					
	sandy loam (0-75 cm)	KCA\$7.1.2.2.1 /18	0.263	SFO	30.7
(United Kingdom)	sandy clay toam (75-100 cm)				
	silt I am (0-\$00 cm)	€CA 7(1).2.2,1@8	- 2	SFO	- 2
(Northern France)		Y 4 AY			
	silt loan (0-30 cm)	KQA 7.1,2.2.1 /18	0.078	SFO	26.0
(Southern France)	sitty clay fram (30-100, cm)				
	_O <sup>™</sup> loam (0-50 cm) O″ 、	OKCA 701.2.2.1 /18	0.259	SFO	34.9
(Spain)	sandy@lay loan (50-100 cm)				
	silty clay pam (0=50 cm)	KCA 7.1.2.2.1 /18	0.055	SFO	50.8
(taly)	silty Qay (50-75 cm)	No.			
	🛇 clay loam (75-100 cm)	9			
		arithmetic mean	0.145	geomean	39.3
<sup>1</sup> SFO: single first ord	ler a a				
<sup>2</sup> value excluded from	n the calcoration of arithmetic o	r geometric mean due	to unreliable s	statistical par	ameters
	F & D				
A R					
S S A	Å S <sup>y</sup>				
	Ý <sub>A</sub> V				
	AS .				
¢0 <sup>°</sup>					

## Table 7.1.2.2-9: Overall summary of DegT<sub>50</sub> values and formation fractions for degradation of NOA 413163 in soils for modelling purpose (normalised to 20 °C and field capacity)

			$\sim$	1		9
Soil	Texture	Annex Point /	Formation	Kinetic 🗸	DegT	
(Country)	(USDA)	<b>Reference No</b>	Fraction	Model <sup>1</sup>	[days]	
	loam (0-100 cm)	KCA 7.1.2.2.1 /19		SĘŴ	33.0	2 N
(Germany)		Ò	Ś			'
	sandy loam (0-75 cm)	KCA 🕅 .2.2.1 /19	0.457	SFO S	87.4	Ľ
(United Kingdom)	sandy clay loam (75-100 cm)	L C	S <sup>≪</sup>		S .	, <b>O</b> ″
	silt Loam (0-100 cm)	KCA 7.1.2.2.1 /18	0,498	₽ SFÔ <sup>♥</sup>	رم 29.9 <u>م</u>	,¥
(Northern France)				e		
	silt loam (0-30 cm)	ØKCA 7.1.2.2 ∛19 №	0.185	SFO	365	
(Southern France)	silty clay loam (30-100 cm				≪U <sup>*</sup>	
	loam (0-50 cm)	KCA 7.1.2.2.1 /10	~ <b>Q</b> ?332 ©	SEO	ء 25.2 م	
(Spain)	sandy clay loam (50-100 cm)	v v		O'	d' é	
	silty clay loam (0-50 cm),	× KCA, 7.1.2.2 /19	Ď 0,1Ø″	🔊 SFO 🛸	28,7	
(Italy)	silty clay (50-7		, s í		Ő	
	clay loam $(75,100 \text{ cm})^{\vee}$			Ŭ,		
	A O	🗡 arithmetic mean	°° 0.31∕7°	geomean	39.3	
<sup>1</sup> SFO: single first or	der 👋 🧔 🖉					

<sup>2</sup> value excluded from the calculation of arithmetic mean due to the reliable statistical parameters

Table 7.1.2.2- 10:	Overall summary	f Degl 5	o values an	d formation	n fractions for	r degradation
	of & GA 357276 m	soils fo	r modellin	ig purpose	normalised	to 20 °C and
	field capacity)	Õ õ		× «.	, <b>(</b> )	

	~		Ó Á		
Soil & Texture &	~ .	Annex Pount /	Formation	Kinetic	DegT <sub>50</sub>
(Country) (Country)	y .	Reference No	Fraction	Model <sup>1</sup>	[days]
loam (0-100 cm) 0	/	≪ <b>K</b> CA ₹1.2.2.1\$18	<sup>**</sup> 0.072	SFO	36.5
(Germany)	~		$\mathbb{Q}$		
sandy leam (0-75 cm)	ď	KCA 7.1.22.1 /18	0.098	SFO	80.2
(United Kingdom) sandy classioam (5-100 cr	m)				
silt oam (0-100 cm)	0	_КСА 7.1.2.2 ҈4√18	0.062	SFO	36.1
(Northern France) (Northern France)	K				
⇒ silt loam (0-30 cm) ≪	S S	KCA 7.1 2:2.1 /18	- 2	SFO	_ 2
(Southern France) Stry classioam (30-100 cm	'n)				
boam (0-30 cm)	0 F.	УКСА 7.1.2.2.1 /18	0.077	SFO	45.5
(Spain) sand clay Qam (50 100 cm	a)	, O			
s toty class loam (\$450 cm)	¥,	×KCA 7.1.2.2.1 /18	0.032	SFO	76.5
(Italy) silty clay (50-75 cm)	~	Q"			
∠	$\sim$				
	$\mathbb{O}^{\prime}$	arithmetic mean	0.068	geomean	51.7
<sup>1</sup> SFO: single first order $\sqrt{2}$	/				
<sup>2</sup> value excluded from the calculation of arithmet	tic of	r geometric mean due	to unreliable s	tatistical par	ameters
í "Öř					
$\cup$					

### Overall summary of DegT<sub>50</sub> values and formation fractions for degradation Table 7.1.2.2-11: of NOA 409480 in soils for modelling purpose (normalised to 20 °C and field capacity)

			$\sim$	1		
Soil	Texture	Annex Point /	Formation	Kinetic 🗸	DegT	
(Country)	(USDA)	<b>Reference No</b>	Fraction	Model <sup>1</sup>	[days]	
	loam (0-100 cm)	KCA 7.1.2.2.1 /19	0:006	SĘŴ	97.3	Ô,
(Germany)		Ĉ	Ś			
	sandy loam (0-75 cm)	KCA 🕅 .2.2.1 /19	0.041	SFO S	95.5	Ľ
(United Kingdom)	sandy clay loam (75-100 cm)		)×		S.	,0″
	silt Loam (0-100 cm)	KCA 7.1.2.2.1 /16	0,025	Ĵ SFO <sup>™</sup>	ۍ \$4.7 ¢	×,
(Northern France)				. 0 ~		
	silt loam (0-30 cm)	<sup>©</sup> KCA 7.1.2.2∂ <sup>y</sup> /19 ှ	∀ - <del>%</del>	∕SFQ ≪	1 <b>A</b> C7	
(Southern France)	silty clay loam (30-100 cm)				$\sim$	
	loam (0-50 cm)	KCA 7. C2.2.1 /09	<b>3</b> .035 <sup>0</sup>	SFO	چ}18.1 (_°	
(Spain)	sandy clay loam (50-100 cm)		1 5			
	silty clay loam (0-50 cm),	KCA7.1.2,2.1/19	0:035	SFQ	<b>29</b> .7	
(Italy)	silty clay (50-5° cm)		N Q	r s	$\bigcirc$	
	clay loam (750100 cm)				6	
		arithmetic mean	0.028	geomean	51.7	
1 SEO: single first or	dor v Q					-

<sup>1</sup> SFO: single first order <sup>2</sup> value excluded from the calculation of writhmetic mean due to unreliable statistical parameters

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# CA 7.1.2.2.1 Soil dissignation studies

**CA 7.1.2.2.1 Soil dissipation studies** The dissipation and degradation of trifloxystrobin of soil under field conditions were evaluated during the Annex I inclusion using wilabeled trifloxystrobin formulated as WG 50 as well as [<sup>14</sup>C-TP]trifloxystrobin formulated as EC 250, and were accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following studies are included in the Baseline Dossier:

Ø

Annex Point / Reference No	Author(s) N R	Year	<b>Document</b> No
KCA 7 2.2.1 /01		1997	M-033482-01-1
KCA 7:1.2.2.1 /02		1997	M-033486-01-1
KCA 7.1.2.2.1 /05		1997	M-033490-01-1
KCA 7.1.2.2.1 Ø4		1997	M-033493-01-1
KCA 7.1.2 2 / /05 2 2		1997	M-033496-01-1
KCA 7.1.2.2.1 /06		1997	M-033502-01-1
KCA 7 0.2.2.1 /07		1998	M-033504-01-1
KCA 7.1.2.2.1 /08 S		1998	M-033514-01-1
KCA 7.1.2.2.1 /09	A. M.	1999	M-051252-01-1
KCA 7.1.2.2. 10		1999	M-051419-01-1
KCA 7.1.2. 81 /11 *		1999	M-051248-01-1
KCA 7.1 2.1 / 2 0 KCA 7.1		1997	M-033523-02-1
KCA 7 9.2.2.1013		1998	M-033520-01-1
KCA 9.1.2. 2 /14 /14		2001	M-064112-01-1



Three additional studies have been performed for trifloxystrobin and its major photodegradation product CGA 357261 and are submitted within this Supplemental Dossier for the trifloxystrobin renewal of approval because the existing field dissipation studies do not fulfil the EFSA requirements to obtain DegT<sub>50</sub> values in soil for modelling purpose (EFSA (2010) <sup>3</sup>). Furthermore, updated kinetic evaluations of the degradation behaviours of trifloxystrobin and its major degradation products in coll under field conditions have been performed according to FOCUS kinetics (2006) <sup>1</sup> to derive kinetic parameters suitable for modelling purpose and environmental risk assessment. Adjumnary of degradation rates of trifloxystrobin and its major degradation products in soil under field conditions is given in section CA 7.1.2.2.

		4	Ŵ,	· .	, ° ° , 0'
Report:	KCA 7.1.2.2.1 /15;	О;		; 201 <b>3</b> ; ame	nded 2013-09-
	02		ð "Ý		
Title:	Amendment No. 1 to Deter	mination of the	Residues	n Trifloxystr	obin in/on Soil
	after Spraying of Trifloxy	strohin WG 30	inothe Fie	d in Germa	ny, the United
	Kingdom, France, Spain an	nd Itsaly 🔊 🤌	A	Ő .	
Report No:	11-2710				
Document No:	M-462061-02-1		*		
Guidelines:	- EFSA Guidance for Five	aluating Laborat	ory and F	ield Dissipa	tion Studies to
	obtain DegTs Values of	Plant Protection	Products in	Son C	×~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
	- Commissi@n Directive 95	Ø36/ECSamepØin	g Council	Directive 91/	414/EEC
	- SETAC Procedures for	Assessing the E	nytronmen	tal Fate and	Ecotoxicity of
	Pesticides	N V		ŝ, ŝ	
	- BBA guideline, part IV, 4	19 4 N	v Kr		
	- ECPA Guidance Docum	ent on Field Soil	Dissipation	n Studios	
GLP:	Yes of a g	S D	0. %	L.Y	
Justification:	New data / guideline fequir	rement: 🔊 🔍		<i>a</i> n	
Č	Degradation of trifloxystro	bin in soil und	er fæld cø	ditions to f	ulfil the EFSA
~0	requirements to obtain D	egT <sub>50</sub> values in	soil for	modelling p	ourpose (EFSA
O*	kipetics (2010) 3)		õ <u>j</u> e		
FxecutizeSumm	nary & & &		Š		
		<sup>o</sup> v <sup>w</sup>	$\sim$		
Soil dissination	at triflox strolar was stud	ied after pre-en	nergence a	nnlication c	of trifloxystrobin
WG 50 on bare	soil plats under field condu	tions for un to	733  days a	t the six sit	tes
(Germany)	APnitedOK ingdon	(n)	rthern Fra	nce)	
(Southern France		de Mitaly)	Additional	lly kinetic d	ata for a possible
evaluation of th	e formation fractions of the	ke trifleyystrobi	n degrada	tion product	ts $CGA$ 321113
NOA $41a^{61}$ and	1 CGA 357270 were determine	$\sim$ $\sim$	in degrada	tion produc	IS COR 521115,
A nominal study	application rate of 0 125 I m	whectare corre	sponding to	nominal 18	75 g per hectare
trifloxystrohin w	upplied Trifloxystropin	WG 50 was imm	ediately in	corporated i	nto the soil after
spraving			iculatory in	corporated 1	nto the son alter
Trifloxystropin i	Sranidle degraded in Soil t	o CGA 321113	by ester c	leavage The	erefore the total
amounts of trifl&	vstrobin an CGA 321113 (	expressed as trif	loxystrohin	equivalents	) were calculated
for total residues	at study start (DAT-0) Sign	ificant amounts	of NOA 41	3161 were d	etected at
at PAT	-Oand were additionally inc	cluded in the cal	culation of	the total re	sidues at DAT-0
(everessed as tri	floxystrobin equivalents) T	he total residue	s detected	at DAT-0 x	vere 174 g/ha at

, 140 g/ha at , 167 g/ha at , 114 g/ha at

201 g/ha at and 165 g/ha at and 165 g/ha at a plication rate, respectively.

The amount of trifloxystrobin (total residues) decreased from DAT-0 to study end (DAT-733) from 174 to 0.49 g/ha at , from DAT-0 to DAT-708 from 140 to 0.39 g/ha at from DAT-0 to DAT-680 from 167 to 0.44 g/ha at , from DAT-0 to DAT-727 from 14 to , from DAT-0 to DAT-686 from 201 to  $0.10^{\circ}$ /ha at 0.17 g/ha at and from DAT-0 to DAT-661 from 165 to 0.33 g/ha at Residues of trifloxystrobin were primarily detected in the top 0-10 cm of soil, except low residues detected down to a depth of 20-30 cm. Dissipation and degradation of trifloxystrobin was accompanied by the formation of its degradati products CGA 321113, NOA 413161 and CGA 359276. CGA 321113 amounted to maxima (trifloxystrobin equivalents) of 77.4 to 157 what between DAT-8 and DAT-59 in the entire soil profiles. The major part of the residues was detected in the top 0-20 cm soil layer. Residues above the LOQ were detected down to a depth of 40-50 cm. residues between LOD and LOQ were detected down to a depth of 90400 cm NOA 413161 amounted to maxima (triflor strobit equivalents) of 1.15 to 145 g/habetween DAT-90 and DAT-360 in the entire soil profiles. The major part of the residues was detected in the top 0-20 cm soil layer. Residues above the LQQ were detected down to a depth of 50-60 cm, except of , where low residues were detected down to a depth of 90-100 cm. and CGA 357276 amounted to maxima (triffoxystrobin equivalents) of 1.12 to 2.49 gha between DAT-28 and DAT-360 in the entire soil profiles. The major part of the residues was detected in the top 0-20 cm soil layer and no residues were detected below a depth of 30-40 cm. O The experimental data dould be described by a single first order Enetic model for by a first order multi compartment kinetic model for and and by a double first order in parallel kinetic model for . The half-life of and trifloxystrobin under field conditions was 2.4, 6.7, 6.0, 6,7, 1.8, and 3.3 days at site and respectively. The corresponding DT value was 35, 22,1, 20.0, 22.3, 10,4 and 4.7 days, respectively. **D**METHODS

A. MATERIALS

## 1. Test Item

triflexystrobin formulated as W@50 (vettable granulate, 50% w/w trifloxystrobin) Certificate of Analysis: FAR 01568-00 Batch ID: DFL 091509 Specification No: 102000007798-02 2. Test Sites

Six sites were selected (see table 7.1.2.2.1-1), which are typical for the ecoregions of Southern and Northern Europe. The sites were neither subjected to erosion, flooding nor run-off. The test plots had no significant slope and were largely free of stones. A field soil dissipation trial consisted of a treated and an untreated plot at each test site. The control plots were located at least 5 meters away from the treated plots. The selected sites have not been treated with chemicals which could influence the dissipation behaviour of trifloxystrobin or which could interfere with the analysis of the individual residues in soil.





Table 7.1.2.2.1- 1:	Location.	site descri	ption and	climatic	data of	f test sites
		,				

S:4- ID			
Site ID	(Germany)	(United Kingdom	) (Northern ISance)
Site Designation	Germany,	, Unit Kingdom,	, Frence,
Geographic Location		C L	
City			
Country	Germany	United Kingdom	France
Ecoregion	Northern Europe	Northern Egrope	Northern Europe
GPS Coordinates			
Plot Size [m <sup>2</sup> ]	225 🐇	× 320°	360 × 360
Distance from weather station	in 20 km distance fro	om at trial location (if	in 5 km distance
used for climatic measurements	frial plot	500 m distance	from trial plot
Meteorological conditions	Overally Yes 🔬	ت Sveralk;Yes, but 20	110 Overall: Yes, but
compared to long-term average		was@frier.amd 201	25° vonter and spring
Within normal levels (Yes/No)		wetter C	2013 Were drier
Soil 0.20 am			
Soli $0-50$ cm		Sandrida In	
$\begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix} = \begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix} = \begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix} = \begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix}$		sandy boam	silt loam
[cm] 30-73 cm 3		Sandy Ioam	
/3-100 cm	ioam se	sandy clay loam	Silt Ioam
Site ID     O			
	(Southern France)	S (Spain) ♥	(Italy)
Site Designation	France,	Parcela 54	, Italy,
Geographic Location		0° ×	
City Q			
Country of co	, by France by	Spain	Italy
Ecoregion	Southern Europe	Southern Europe	Southern Europe
GPS Coordinates			
Plot Size [m <sup>2</sup> ]	× Q96 ~	300	720
Distance from weather station	In 7 km distance from	at trial location (in	in 10 km distance from
used for climatic measurement	rial pot	< 500 m distance)	trial plot
Meteorological conditions	Överalt Yes, but	Overall: Yes	Overall: Yes, but winter
vithin normal large (Variation)	$\sim$ 201 k was drier		and spring 2013 were
(1 com not and 1 covers (1 com of )			very wet
Soil Q-30 cm	silt loam	loam	silty clay loam
Senth 30-50 cm	silty clay loam	loam	silty clay loam
50-75 cm	silty clay loam	sandy clay loam	silty clay
75-100 cm	silty clay loam	sandy clay loam	clay loam
, 5 100 Ulli		Sunay Ouy Iouin	ciuy iouiii

GPS: global positioning system






#### B. STUDY DESIGN

#### 1. **Experimental Conditions**

Trifloxystrobin WG 50 is a granule formulation containing 50% w/w trifloxystrobin. The test item was applied once on bare soil plots using Knapsack sprayers with a nominal application rate 0.3750 kg/ha in 300 L water/ha, corresponding to 0.1875 kg trifloxystrobin/ha.

Prior to spraying the test item onto the soil, the plots were prepared to have a fine crumb structure and a fine seedbed. Grass was sown after spraying of the test item at **and** 

and before spraying of the test item at and the incorporation of the test item into the soil and the sowing of gess were performed simultareous The test item was incorporated into the soil up of a depth of approximately & to 10cm immediately a°rotary harrow with foll at after application using a curry comb at , a hay bob harrow at and a gray bob harrow with roll at and

ata were recorded during the field irrigation, and sunsh Air temperature, precipitation including

soil dissipation trial at all sites.

Soil dissipation of trifloxystrobin was studied for up to

#### 2. Sampling

Soil cores were taken to adepth of 10 cm using a soil piercer (Ø 50 mm) before application from the untreated control plots (10 to 20 soil cores) and immediately after application and incorporation of the test item into the soil from the treated plots (40 soll cores, DAT d'samples). All subsequent samplings were performed using a "Wacker frammer" (Ø 48 to 50 mm). At each sampling interval 20 soil cores from the treated posts were taken. The sampling spots were distributed candomly over the plots to obtain representative samples.

In all treated plots of the trials the soil cores were taken to a maximum depth of 100 cm on the following occasions: 0 (2 samplings post-incorporation, each 0-10 cm depth), 2-4, 6-8, 13-15, 28 (each 0-30 cm depth), 56-62, 83-96, (each 0-50 cm depth), and 118-030, 170-182, 356-371, 535-545 and 661-733 (each 0-100 cm depth) days after treatment (DAT) From the control plots, samples were taken on the following occasions: Orays before application, 356-371 and 661-733 days after treatment.

In addition, samples for soil characterisation (10 to 20 soil cores, 0-100 cm depth) were taken before application from the treated plots, except of for which the soil characterisation sample was taken at DAT-99 from the treated plot of a parallel study due to a time conflict.

The soil cores were stored dark immediately after sampling and were deep-frozen within 24 hours (DAT-0 samples within 6 hours). The frozen soil cores were cut into 10 cm segments and each horizon (laboratory samples) was multed separately in a hammer mill and carefully homogenized. An aliquot of each laboratory sample (analytical samples) was used for analysis. Soil cores and samples were stored in the dark at  $\leq -18$  °C.

and



#### 3. **Analytical Procedures**

The analytical method 01327/M001 (M-464872-01-1, Supplemental Dossier, KCA 4.1.2 /24) @vas developed for the determination of trifloxystrobin and its degradation products CGA 357261, CGA 321113, CGA 373466, NOA 413161, NOA 413163, CGA 357276 and N@A 409480 in Soil Soil samples of 20 g were extracted three times at ambient temperature using shaker and once by microwave-accelerated extraction at 70 °C using acetonitrile/water 4/1 (v/v). After each extraction step, extract and soil were separated by centrifugation (> 500 x g) and decantation. The soil extracts? were combined, internal stable-labelled standards added and an aliquot of the combined soil extract was analysed by reversed phase HPLC-MS/MS in multiple reaction monitoring piede. The method was validated using three different soils. The limit of detection and whit of quantitation were 0,03 and  $0.1 \,\mu g/kg$  for each analyte, respectively.

During analysis of the dissipation samples of the current story, concurrent receivery samples were prepared freshly by fortification of control samples with test item trifloxystrobid and reference items CGA 321113, NOA 413161 and CGA 357276 at levels of 9.1 and 1 µg/bg and processed in parallel to the dissipation samples. The mean recoveries were 195% (RSD & 2%) for trifloxystrobin, 193% (RSD 9.9%) for CGA 321113, 89% (\$SD (3.4%) for NGA 413 61 and 93% (RSD 10.8%) for CGA 357276.

The degradation kinetics of the teg item was determined according to FOCUS kinetics (2006) <sup>1</sup> using the software KinGUI 2 with three different kinets models: single first order, first order multi compartment and double first order in parallel. Model input datasets were the residuad amounts found in each replicate test system at each Gampling interval. The initial total recovery at DAT-0 (2 samplings after incorporation) was included in the parameter optimozation procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The best-fit kinetic model was selected on the basis of the chi2 scaled-error croterion and on the basis of a visual assessment of the goodness of the stis. Der and DT90 values were calculated from the resulting kinetic parameters.

A. DAT	Č,
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~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	õ			$\sim$	Z,	×	DA	Т						
Compound	Mean <sup>1</sup>	0 <sup>2,3</sup>	$O^{2,3}$	<b>3</b>	6	<b>A</b> 4	28	56	91	124	182	368	543	733
trifloxystoobin	Mean	158	<sup>¢</sup> 99.1@	87.6	₹38.1×	40.3	25.5	7.46	3.10	2.15	1.11	1.35	0.49	0.49
CGA 321113	Mean	70.3	45,1	49.8	7, <b>1</b> ,0°	79.7	84.7	98.5	78.2	45.1	27.3	21.2	7.51	7.24
NQA 413161	Mean	<b>EOD</b>	≰eod	<b>€</b> OD	≪©ÖD	<lod< td=""><td>0.04</td><td>0.66</td><td>2.09</td><td>4.23</td><td>3.55</td><td>1.00</td><td>1.01</td><td>0.27</td></lod<>	0.04	0.66	2.09	4.23	3.55	1.00	1.01	0.27
CGA 357276	Mean	0.07¢	(0.02)	ð.08	9.13	0.20	0.56	1.27	1.95	2.29	1.26	1.51	0.61	0.73

Residues of triffoxystrobin in soil at Table 7.1.2.2.1- 2: values (sum of 9-100 cm) expressed as g/ha

(Germany), mean

DAT: days after freatment, values in (brackets) are given as 1/2 LOD according to FOCUS kinetics (2006) 1

trifloxystrepin equivalent sum of 0-100@m

<sup>2</sup> DAT-0 single values (rifloxystrobin): 156, 160 g/ha (mean 158 g/ha); 116, 86.1, 95.3, 99.2 g/ha (mean

99.2 g/ha); ov grall mean 119@/ha = 63% of nominal application rate of 187.5 g/ha
<sup>3</sup> DACO single values (total residues (trifloxystrobin equivalents) = trifloxystrobin + CGA 321113): 224, 23% g/ha, @hean 31 g/ha), 169, 127, 142, 146 g/ha (mean 146 g/ha); overall mean 174 g/ha = 93% of cominal application rate of 187.5 g/ha

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(United Kingdom),

#### Table 7.1.2.2.1- 3: Residues of trifloxystrobin in soil at mean values (sum of 0-100 cm) expressed as g/ha

D

													* `	×	1020
							]	DAT		ŀ	~		Ő	,	0
Compound	Mean <sup>1</sup>	0 <sup>2,3</sup>	0 <sup>2,3</sup>	4	8	15	28	62	91	1 <b>30</b> C	174	371	545	708	
trifloxystrobin	Mean	99.4	108	87.6	76.4	15.9	9.6	3.71	3.40	2.12	1.63	1.1	0.45	@.39	
CGA 321113	Mean	38.3	32.6	37.2	66.2	84.4	97.2	58.7	61.3	A)5.4	22.6	8.0°	2.7	1.90	Q.
NOA 413161	Mean	<lod< td=""><td>(0.02)</td><td>0.20</td><td>0.28</td><td>1.83</td><td><b>\$</b>\$95</td><td>7.74</td><td>11.8</td><td>13.7</td><td>14.5</td><td>(5.84</td><td>1.34</td><td>0.50</td><td></td></lod<>	(0.02)	0.20	0.28	1.83	<b>\$</b> \$95	7.74	11.8	13.7	14.5	(5.84	1.34	0.50	
CGA 357276	Mean	(0.02)	0.06	0.09	0.20	0.98	<b>¥</b> .81	2.12	2019	2.08	1.98	1.36	<b>@</b> .61	<b>0,5</b> 7	Å

DAT: days after treatment, values in (brackets) are given as 1/2 LOD according to FOCUS kinetics 2006

1 trifloxystrobin equivalents, sum of 0-100 cm

DAT-0 single values (trifloxystrobin): 103, 69.1, 903, 122 g/ha (mean 09.3 g/ha); 98.9, 2 118 🍘 ha (m 🗞 án 108 g/ha); overall mean 102 g/ha = 55% of nominal application rate of 187.5 g/ha

DAT-0 single values (total residues (trifloxystrobin equivalents) = 4rifloxystrobin CGA 32111,3): 140, 91.1, 153, 172 g/ha (mean 139 g/ha); 128, 156 g/ha (mean 140 g/ha); o@rall mean 140 g/ha 275% of nominal application rate of 187.5 g/ha

#### Residues of trifloxystrobinkin soft/at France, mean Table 7.1.2.2.1- 4: orthern values (sum of 0-100 cm) expressed as g/ha

Compound	Mean <sup>1</sup>	0 <sup>2</sup>	0 2, 3	ري ۲ 3 م	) 7	<b>A</b>	€   -\$¥8	AT S	/ ^(   90	) 119 <sup>°</sup>	0 181 (	356	540	680
trifloxystrobin	Mean	125	148	8208	90.6	31.4	<b>⊳</b> 5.36	1.15	183	1.2	0.74	0.64	0.32	0.44
CGA 321113	Mean 👌	<b>P</b> 0.7	<b>H8.1</b>	<b>\$</b> 3.5	20.6	68.7	61,6	77.4	¢0.8¢	<b>©</b> \$8.7	\$5.4	21.7	3.56	3.07
NOA 413161	Mean	(0.02)	≽LOD	(0.03)	<b>5</b> 0.13 a	Ø.54	1031	3687	5.85	4.15	A1.6	4.16	7.51	0.77
CGA 357276	Mean	<løď< td=""><td>(0.02)</td><td>(0.03)</td><td>0.12</td><td>0.24</td><td>Ø.38</td><td><b>Ø</b>62</td><td>0,96</td><td>1,18</td><td>1.11</td><td>1.24</td><td>0.74</td><td>0.67</td></løď<>	(0.02)	(0.03)	0.12	0.24	Ø.38	<b>Ø</b> 62	0,96	1,18	1.11	1.24	0.74	0.67

DAT: days after treatment, values in brackets) are given as 2 LOIP according to FOCUS kinetics (2006)<sup>1</sup>

- <sup>1</sup> trifloxystrobin equivalents, sum of 0-100 cm
- Ň DAT-0 single value (trifloxystrobar): 120 131 g/ha (mean 126 g/ha); 161, 196 g/ha (mean 179 g/ha); 2 overall mean 152 gara = 84% of nominal application rate of 187.  $\mathfrak{Dg}/ha_{\mathbb{Z}}$
- <sup>3</sup> DAT-0 single values (total residues (trifloxystrobin equivalents) = trifloxystrobin + CGA 321113): 131, 142 g/ha/ (mean 137 g/ha); 478, 216 g/ha (mean 197 g/ha); overall mean 167 g/ha = 89% of nominal application rate of 1 2.5 g/ha?

Residues of trifloxystrobin in soil at Table 7.1.2.2.1-(Southern France, mean values (sum of 0-100 cm) expressed as g/ha

~0	Û	õ	_` <sup>°</sup> ¥											
1		ð «	08	R	ß	Ő	]	DAT						
Comported	Mean	0 2, 3	<sup>y</sup> 0 <sup>2,3</sup>	<b>J</b> '3	`∼∕7 .	<u>43</u>	28	62	83	118	180	361	543	727
trifloxystrobin	Mean	111	104	93.5	61.3	21.6	3.53	0.99	0.99	0.51	0.44	0.28	0.39	0.17
CGA/321113	Møan	. 10 🞝	6008	20.5	46.0	78.5	56.5	51.7	67.2	45.5	35.7	15.6	11.3	7.28
NOA 413161	Mean (	ĔLO₽	(0.02)	0.08	Ø.13	0.34	0.54	0.77	0.88	1.17	0.91	0.95	0.28	0.29
CGA 357276	🖉 Mean	<løø< td=""><td>(0.02)</td><td>0.15</td><td>0.23</td><td>0.66</td><td>1.12</td><td>0.74</td><td>0.96</td><td>0.55</td><td>0.64</td><td>0.61</td><td>0.53</td><td>0.47</td></løø<>	(0.02)	0.15	0.23	0.66	1.12	0.74	0.96	0.55	0.64	0.61	0.53	0.47

DAT: days after treatment, values in (brackers) are given as 1/2 LOD according to FOCUS kinetics (2006) 1

<sup>1</sup> trifloxystrobin equivalents, sun of 0-100 cm

<sup>2</sup> DAT Single Values (triflog strobin): 110, 112 g/ha (mean 111 g/ha); 98.0, 110 g/ha (mean 104 g/ha); overall mean 108 g/ha = 57% of nominal application rate of 187.5 g/ha <sup>3</sup> DAT-0 single values (total residues (trifloxystrobin equivalents) = trifloxystrobin + CGA 321113): 117,

 $\mathcal{I}$  8 g/ha, (mean 118 g/ha); 104, 116 g/ha (mean 110 g/ha); overall mean 114 g/ha = 61% of nominal application rate of 187.5 g/ha

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Table 7.1.2.2.1- 6:Residues of trifloxystrobin in soil at(Spain), mean values(sum of 0-100 cm) expressed as g/haImage: Comparison of the second second

														×	1020
								DAT			$\gg$		Ő	)	0
Compound	Mean <sup>1</sup>	0 <sup>2,3</sup>	0 <sup>2,3</sup>	2	8	14	28	62	90	119.	×170	366	540	686	
trifloxystrobin	Mean	176	150	91.0	37.0	5.95	2.18	0.67	0.40	0.35	(0.03)	0.27	0.10	0/10	
CGA 321113	Mean	35.3	38.0	46.7	106	57.7	64.3	32.8	7.48	<b>4</b> .97	2.71	Į.Ø	1.09	0.42	Ô,
NOA 413161	Mean	(0.02)	14.1	(0.03)	1.51	2.85	7.90	0.43	11.1	9.49	3.54	L.59	Q.76	0.49	e e
CGA 357276	Mean	(0.02)	0.05	(0.03)	0.47	0.61	<b>¥</b> .31	0.09	0,53	0.42	(0.03)	0.24	<b>@</b> .21	0,18	L.

DAT: days after treatment, values in (brackets) are given as 1/2 LOD according to FOCUS kinetics 2006

<sup>1</sup> trifloxystrobin equivalents, sum of 0-100 cm

<sup>2</sup> DAT-0 single values (trifloxystrobin): 193, 159 pha (mean 176 g/ha) 2150, 150 g/ha (mean 150 g/ha); overall mean 163 g/ha = 87% of nominal application rate of 187. 2 g/ha

<sup>3</sup> DAT-0 single values (total residues (triflox) strobin equivalents) = trifloxy strobin + CGA 321113 + NOA 413161): 231, 194 g/ha (mean 213 g/ha); 195, 186 g/Ha (mean 1910/ha); overall brean 201 g/ha = 107% of nominal application rate of 187.5/g/ha

# Table 7.1.2.2.1- 7: Residues of triffoxystrobin in soil at the soil at 100 cm) expressed as g/ha (Italy), mean values (sum of 0-100 cm) expressed as g/ha

Compound	Mean <sup>1</sup>	0 <sup>2</sup>	0 <sup>2, 3</sup> ≈	× 73	7	<b>1</b> <b>1</b> <b>1</b> <b>3</b>	28	DAT 4	¥ 90	122	0 180	360	535	661
trifloxystrobin	Mean	163	136	83.Ô	52.2	/15.2	3.83	1:04	<b>Q.</b> 82	1,07	0.54	0.75	0.39	0.33
CGA 321113	Mean 💡	<b>P</b> 3.9	M.9	66.8	83.7	157	132	∿112☆	<b>9</b> 3.8	¢28	721	58.7	27.4	20.6
NOA 413161	Mean	<lod< td=""><td>(0.02)</td><td>0.07</td><td><b>3</b>.12</td><td><b>A</b>46</td><td>081</td><td>1.87</td><td>2.21</td><td>2.76</td><td>2.02</td><td>3.38</td><td>1.81</td><td>1.32</td></lod<>	(0.02)	0.07	<b>3</b> .12	<b>A</b> 46	081	1.87	2.21	2.76	2.02	3.38	1.81	1.32
CGA 357276	Mean	0.65	0.04	0.12	0.19	0.56	0.83	0 <b>Q\$</b> 2	0,94	1.29	0.99	1.94	1.22	1.03

DAT: days after treatment, values in brackets) are given as 2 LOD according to FOCUS kinetics (2006) 1

<sup>1</sup> trifloxystrobin equivalents, sum of 0-100 cm

Q

- <sup>2</sup> DAT-0 single value (trifloxystrobit): 1597 168 g/ha (mean 164 g/ha); 138, 135 g/ha (mean 137 g/ha); overall mean 150 g/ra = 80% of nominal application rate of 187. Dg/ha
- <sup>3</sup> DAT-0 single values (total residues (total resides (total residues (total residues (total residues (total

# B. RESIDUES

Trifloxystrobin is rapidly begraded in soil to SGA 321113 by ester cleavage. Therefore, the total amounts of trifloxystrobin and CGA 321013 (expressed as trifloxystrobin equivalents) were calculated for total residues at study start DAT-0. Significant amounts of NOA 413161 were detected at Spain) at DAT-0, and were additionally included in the calculation of the total residues at

DAT (expressed as trifloxystrobin equivalents). The total residues detected at DAT-0 were 174 g/ha at (Germany), 140 g/ha at (United Kingdom), 167 g/ha at (Northern France), 114 g/ha at (Southern France), 201 g/ha at (Southern France), 201 g/ha at (Spain) and 105 g/ha at (Italy), corresponding to 93, 75, 89, 61, 107 and 88% of the nominal application rate, respectively.

The arrown of triflexystroom (total residues) decreased from DAT-0 to study end (DAT-733) from 174 to 0.49 g/ha at the DAT-0 to DAT-708 from 140 to 0.39 g/ha at the DAT-0 to DAT-680 from 167 to 0.44 g/ha at the DAT-0 to DAT-727 from 114 to 0.17 g/ha at the DAT-0 to DAT-0 to DAT-686 from 201 to 0.10 g/ha at the DAT-0 to DAT-661 from 165 to 0.33 g/ha at the DAT-0.

and



Residues of trifloxystrobin were primarily detected in the top 0-10 cm of soil, except for some very low residues detected down to a depth of 20-30 cm.

Dissipation and degradation of trifloxystrobin was accompanied by the formation of its degradation products CGA 321113, NOA 413161 and CGA 357276.

CGA 321113 amounted to maxima (trifloxystrobin equivalents) of 77.4 to 157 g/ha between DAT-89 and DAT-59 in the entire soil profiles. The major part of the residues was detected in the tap 0-20 cm soil layer. Residues above the limit of quantitation (LOQ) were detected down to a depth of 40-50 cm. At **EXAMPLE**, residues between limit of detection (LOD) and LOQ were detected down to a depth of 90-100 cm.

NOA 413161 amounted to maxima (trifloxystrobin equivalents) of 1.17 to 14.5 g/ha between DAP-90 and DAT-360 in the entire soil profiles. The major part of the residues was detected in the top 0-20 cm soil layer. Residues above the LOQ were detected down to a depth of 50-60 cm except of and and the way were detected down to a depth of 90-100 cm.

CGA 357276 amounted to maxima (tofloxystrobin equivalents) of 1.12 to 2.49 that between DAT-28 and DAT-360 in the entire soil profiles. The major part of the residues was detected to the top 0-20 cm soil layer and no residues were detected below a depth of 30-40 cm.

# C. KINETIC ANALYSIS

The degradation of trifloxystrobin followed single first order (SFO) kinetics for and first order multicompartment@FOMC) kinetics for

, and double first order in parallel (DFOP) kinetics for according to the lowest chi<sup>2</sup> error values are visual assessments. Table 7.1.2,  $3^{4}$ - 8 summarizes the best-fit results of the DT<sub>50</sub> and DT<sub>90</sub> calculations.

 Table 7.1.2.2.1-8: Best fit degradation kinetics of telfloxystrobin in soils under field

 conditions according to FOCUS

			17	$\cap$		
		Best Fit	DT 50	DT 90	Chi <sup>2</sup> Error	Visual
	Sitte Sitte	Kinetic Model <sup>1</sup>	[days]	[days]	[%]	Assessment <sup>2</sup>
	(Germany)	DKOP	20	35.6	12.6	+
	(Unit Kingtom)	J OSFO O	Ø <b>6</b> .7	22.1	17.9	+
	(Northern France)	SFQ SFQ	<b>→</b> 6.0	20.0	22.6	+
M.	(Southern)	SFØ SFØ	6.7	22.3	12.9	+
st n	(Spain)	FOME	1.8	10.4	11.2	+
$\sim$	(Italy)	- <sup>Q</sup> FO	3.3	14.7	9.3	+

<sup>1</sup> SFO: single first order, FOMCC first order multi compartment, DFOP: double first order in parallel <sup>2</sup> visual assessment: +, \vec{book} good

# **MI.** CONCLUSIONS

Triflox strober was rapidly degraded in soil under field conditions in the ecoregions Northern and Southern Europe. The calculated best-fit half-lives were between 1.8 and 6.7 days at the tested sites. The major degradation products CGA 321113, NOA 413161 and CGA 357276 were formed and declined towards study end.

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil under field conditions given in section CA 7.1.2.2.

Report:	KCA 7.1.2.2.1 /16; 0; ; 2013 ;
Title:	Determination of the Residues of CGA 357261 in/on Soil after Spraying of
	CGA 357261 WG 50 in the Field in Germany, the United Kingdom, France,
	Spain and Italy
Report No:	
Document No:	M-465701-01-1
Guidelines:	- EFSA Guidance for Evaluating Laboratory and Field Dissipation Studies to k
	obtain DegT <sub>50</sub> Values of Plant Protection Products in Soil &
	- Commission Directive 95/36/PC amending Council Directive 9/2414/BEC
	- SETAC Procedures for Assessing the Environmental Fate and Ecotoxicity of
	Pesticides
	- BBA guideline, part IV, 4-1 2 0 0 0 0 0 0 0 0
	- ECPA Guidance Document on Field Soil Dissipation Studies
GLP:	Yes if it is it is it is
Justification:	New data / guideline requirement
	Degradation of major photodegradation product CGA 357261 in Soil under field
	conditions to fulfil the EFSA requirements to obtain DegT <sub>50</sub> values in soil for
	modelling putpose (DFSA kinetics (2010))

## **Executive Summary**

Soil dissipation of CGA 357261, a major photodegradation product of triflow strobin, was studied after pre-emergence application of CGA 257261 WG 50 on bare soil plots under field conditions for up to 733 days at the six sites for the formation (Germany), for the formation (Spain) and (Northern France), for the formation fractions of the (Italy). Additionally, kinetic data for a possible evaluation of the formation fractions of the trifloxystrobin photodegradation products CGA 373466, NOA 413163 and NOA 409480, which are derived from CGA 357261, were determined.

A nominal study application rate of 0.125 E per hectare, corresponding to nominal 187.5 g per hectare CGA 357261, was applied. CGA 357261 W@ 50 was immediately incorporated into the soil after spraying.

CGA 357261 is rapidly degraded in soil to CGA 373466 by ester cleavage as well as to a small extent further to NOA 413163 and NOA 409480. Therefore, the total amounts of CGA 357261 and its degradation products. expressed as CGA 57261 equivalents) were calculated for total residues at study start (DAT-0). The total residues detected at DAT-0 were 209 g/ha at the start of the total residues at 169 g/ha at the start of the total residues detected at DAT-0 were 209 g/ha at the start of the total and 179 g/ha at the start of the total start of the total at the start of the total at the start of the total at the start of the total start of the total at the start of the total start of the total

The amount of CA 350261 (total residues) decreased from DAT-0 to study end (DAT-733) from 209 to 0.13 what at the provide of the DAT-0 to DAT-708 from 114 g/ha to < LOD at the provide of the DAT-0 to DAT-708 from 122 to 0.14 g/ha at the DAT-0 to DAT-727 from 122 to 0.16 g/ha at the DAT-0 to DAT-657 from 179 to 0.16 g/ha at the DAT-640 onwards at the DAT-0 to DAT-657 from 179 to 0.16 g/ha at the DAT-0.

Residues of CGA 357261 were primarily detected in the top 0-10 cm of soil, except for some very low residues detected down to a depth of 20-30 cm.

**BAYER** Bayer CropScience Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Dissipation and degradation of CGA 357261 was accompanied by the formation of its degradation products CGA 373466, NOA 413163 and NOA 409480.

CGA 373466 amounted to maxima (CGA 357261 equivalents) of 88.5 to 245 g/ha between DA 20 and DAT-15 in the entire soil profiles. The major part of the residues was detected in the top 0-30 cm soil layer. Residues above the LOQ were detected down to a depth of 30-40 cm at the top 0-30 cm

and and , and down to a depth of 90-100 cm at and .

NOA 413163 amounted to maxima (CGA 357261 equivalents) @ 6.0 to 52.6 what between @AT-22 and DAT-180 in the entire soil profiles. Residue above the LOQ were detected down to a depth of 50-60 cm, except of **Except of The entire and Except of The e** 

NOA 409480 amounted to maxima (CGA 35726) equivalents) of 0.54 to 1.51 g/ha between DAV-14 and DAT-119 in the entire soil profiles. The major part of the residnes was detected in the top 0.10 cm soil layer and no residues were detected below a depth of 20-30 cm.

The experimental data could be described by a first order multi compartment kinetic model for and and and and by a double first order in parallel kinetic model for and and and a state of the half-life of CGA 357261, under field conditions was 0.9,

MATERIALS AND METHODS

# A. MATERIALS

1. Test Item CGA 257261 formulated as 80 G 50 (wettable gramilate, \$1% w/0 CGA 357261) Certificate of Analysis: FAR 01571-60 Batch ID: 2001-002271 Specification No. 192000025869

# 2. Test Sites

Six sites were selected (see Table 7.17.2.1-57), which are typical for the ecoregions of Southern and Northern Europe. The sites were neither subjected to erosion, flooding nor run-off. The test plots had no significant slope and were largely free of stones. A field soil dissipation trial consisted of a treated and an untreated plot at each test site. The control plots were located at least 5 meters away from the treated plots. The selected sites have not been treated with chemicals which could influence the dissipation behaviour of triat oxystrobin or which could interfere with the analysis of the individual residues in soil.

Table 7.1.2.2.1- 9:	Location.	site descri	ption and	climatic	data o	f test	sites
							~~~~~~

Site ID       (Germany)       (United Kingdom)       (Northern France)         Site Designation       Germany,       Kingdom,       Prance,       Prance,         Geographic Location       Germany,       United Kingdom,       Prance,       Prance,         Country       Germany,       United Kingdom,       Prance,       Prance,         PS Coordinates       United Kingdom,       Withern Europe       Northern Europe,       Northern Europe,         Post Size [m <sup>2</sup> ]       225       320       3667         Distance from weather station       in 20 knd/starber from       at trial location for       in 5 knfb/distarber         Sold conditions       Overafler Ses,       Overafler Ses,       00 Addistarber       Cooperation of the set of				
Site Designation       Germany,       Germany,       Kingdom,       Proc.         Georgraphic Location       City       Germany,       United Kingdom,       France,         Country       Germany,       United Kingdom,       France,       Northern Europe,         JPS Coordinates       Joint Size [m <sup>3</sup> ]       225       3200       3601         Joint Size [m <sup>3</sup> ]       225       3200       in 5 ktr3listage         Joint Size [m <sup>3</sup> ]       225       3200       in 5 ktr3listage         Joint Size [m <sup>3</sup> ]       225       3200       in 5 ktr3listage         Joint Size [m <sup>3</sup> ]       225       3200       in 5 ktr3listage         Joint Size [m <sup>3</sup> ]       225       3200       in 5 ktr3listage         Joint Size [m <sup>3</sup> ]       201 kyres drier       Southern Franke,       werder         Joint Size [m <sup>3</sup> ]       320       werder       Southern Franke,       werder         Soil 0.30 cm       Joan       Joan       Saud, Joan       sattly loan       silt loam         Soil 0.30 cm       Franke,       Joan       Saud, Joan       saud, Joan       saud, Joan         Joint 1.22.1.9 (contrined)       Franke,       Saud, Joan       saud, Joan       saud, Joan       saud, Joan         Joan	Site ID	(Germany)	(United Kingdom	1) 🔊 (Northern Fance)
Germany,       Kingdom,       Compared by the second secon	Site Designation	(000-000-5)	Uni	ted Exance
Geographic Location       City       Germany       United Kingdom       France         Country       Northern Europe       Northern Europe       Northern Europe       Northern Europe         Plot Size [m <sup>2</sup> ]       22       320       360       360         Distance from weather station       in 20 knaftstance from       gt trial location (model)       in 50 knaftstance         Get or elimatic measurements       in 20 knaftstance       Overaft Yes       Overaft Yes       Overaft Yes         Soila Or 30 cm       Overaft Yes       Overaft Yes       Overaft Yes       Overaft Yes       Overaft Yes         Soila O-30 cm       Jeam       Jeam       Sondy Coam       Sitt Ioam       Sitt Ioam         Soila O-30 cm       Jeam       Jeam       Sondy Coam       Sitt Ioam       Sitt Ioam         Soila O-30 cm       Jeam       Jeam       Sondy Coam       Sitt Ioam       Sitt Ioam         Soila O-30 cm       Jeam       Jeam       Sondy Coam       Sitt Ioam       Sitt Ioam         Soila C-12.2.1- 9 (contrined)       Jeam       Sondy Coam       Sitt Ioam       Southern Europe       Southern Europe         France       Spain       Italy       Jarcela 54       Jarcela 54       Jarcela 54       Jarcela 54         <		Germany.	Kingdom.	, i i tance,
Geographic Location       Germany       United Kingdom       Branco         Country       Germany       United Kingdom       Branco         SPS Coordinates       Distance from worthern Europe       Northern Europe       Northern Europe         Plot Size [m²]       225       3200       3600         Distance from weather station       in 20 kin distance from       at trial location (m)       in 5 km-distance         Solitance from weather station       in 20 kin distance from       at trial location (m)       in 5 km-distance         Solitance from weather station       Overall Yes       Overall Yes       Overall Yes       Overall Yes         Outstance from weather station       Overall Yes       Overall Yes       Overall Yes       Overall Yes         Soil       0-30 cm       Jeam       Soild Joam       sill Joam       sill Joam         Soil       0-30 cm       Jeam       Soild Joam       sill Joam       sill Joam         soil       0-30 cm       Jeam       Soild Joam       sill Joam       sill Joam         feetural Class (USDA)       France       Soild Joam       sill Joam       sill Joam         feetural Location       France       Southern Europe       Southern Europe       Southern Europe         regraphic Location		containing,		
City Country Ecoregion Northern Europe Sisto condinates Plot Size [m <sup>2</sup> ] Secoregion Northern Europe Secoregion Northern Secore Secoregion Northern Secore Secoregion Northern Secore Secoregion Northern Europe Secoregion Northern Europe Northern Europe Secoregion Northern Europe Northern Europe N	Geographic Location			
Country       Germany       United Kingdom       France         Ecoregion       Northern Europe       Northern Europe       Northern Europe         Plot Size [m²]       225       3200       3661         Plot Size [m²]       225       3200       3661         Distance from weather station seed for climatic measurements       in 20 kpt distance from trial plot       strial plot       from trial plot         Meteorological conditions compared to long-term average within normal levels (YesNo)       Overall. Yes, but weather and 2012       Overall. Yes, but weather and spring 2013 Stree drier         Soil       0-30 cm       loam       sandy clam       silt loam         Soil       0-30 cm       loam       sandy clam       silt loam         Soil       0-30 cm       loam       sandy clam       silt loam         [em]       30-50 cm       loam       sandy clam       silt loam         [m]       50-75 cm       loam       sandy clam       silt loam         [em]       Southern France       Spain       Italy         [recorgion       France       Spain       Italy         [recorgion       Southern Europe       Southern Europe       Southern Europe         [recorgion       Southern Europe       Southern Europe	City			
Ecoregion       Northern Europy       Northern Europy       Northern Europy         JPS Coordinates       225       320       364         Jot Size [m <sup>2</sup> ]       225       320       364         Distance from weather station ised for climatic measurements       in 20 kpt.distance from deteorological conditions       at trial location (m crop trial plot       in 5 kmBitstage from trial plot         Weterorological conditions       Overaft Yes       Overaft Yes       Overaft Yes         Soil       0-30 cm       Joan       Soil to am       Soil to am         Ectural Class (USDA)       Joan       Soil to am       Soil to am       Soil to am         Soil       0-30 cm       Joan       Soil to am       Soil to am       Soil to am         [cm]       50-75 cm       Joan       Joan       Soil to am       Soil to am         [corregion       France       Southern France       Spain       Italy         ite ID       Southern Europe       Southern Europe       Southern Europe       Southern Europe         ite Optional       France       Spain       Italy         icegraphic Location       In 7 km distarter from       at trial location (in       in 10 km distance from         ite Designation       In 7 km distarter from       at trial	Country	Germany	United Kingdom	France <sup>O</sup>
GPS Coordinates       225       330       3647         Plot Size [m <sup>-1</sup> ]       225       330       in 5 km distance         Distance from weather station used for climatic measurements       in 20 km distance from trial por versite versite vers	Ecoregion	Northern Europe	Northern Forope	Northern Europe
Plot Size [m²]       225       320       360         Distance from weather station ised for climatic measurements       in 20 km distancer from trial plot       et rrial location (n) strial plot       in 5 km distancer from trial plot         Overalt Ves, but ompared to long-term average within normal levels (Yes/No)       Overalt Ves, weather and spring       Overalt Ves, weather and spring         Soil       0.30 cm       Jeam       Soilt Oam       Silt loam         Joen 75 cm       Joan       sandy Joan       silt loam         75-100 cm       loam       sandy Joan       silt loam         able 7.1.2.2.1- 9 continued)       France       Spain       Italy         ite ID       Southern France       Spain       Italy         Country       France       Spain       Italy         France       Spain       Italy         Southern France       Spain       Italy         Overalt Ves, but tecoregion       Southern France       Spain         ite ID       Southern France       Spain         ite ID       Southern France       Spain         ite ID       Southern Europe       Southern Europe         Southern France       Spain       Italy         ite Designation       Italy       Spain	GPS Coordinates			
Int size (m)       in 20 km distance from       at Frial legition (a)       in 50 km distance         ised for climatic measurements       in 20 km distance from       at Frial legition (a)       in 5 km distance         Meteorological conditions       Overall Yes       Overall Yes, bil 2011       Overall Yes, bil 2011         Soil       0-30 cm       Depth       Soil dom       silt loam         Soil       0-30 cm       Deam       sandy loam       silt loam         Soil       0-30 cm       Deam       sandy loam       silt loam         [cm]       50-75 cm       loam       sandy loam       silt loam         75-100 cm       loam       sandy loam       silt loam       silt loam         able 7.1.2.2.1- 9 continued)       France       (Spain)       (Italy)         ite ID       (Southern France)       (Spain)       Italy         icographic Location       France       Spain       Italy         icographic Location       in 7 km distance from       string load       southern Europe         PS Coordinates       Southern Europe       Southern Europe       Southern Europe         PS Coordinates       Spain       Italy       Southern Europe         PS Coordinates       Southern Fuspe       Southern Europe	Plot Size [m <sup>2</sup> ]	225 %		
Jonance 1001 Weather Multi Vestion (m 2 kind)       an indeption (m 2 kind)       for the indeption (m 2 kind)         Stead for climatic measurements       Trial point       Ston Ardinisaree       for the indeption (m 2 kind)         Meteorological conditions       Overally Yes       Overally Yes, end 2011       Overally Yes, end 2011         Stoil       0-30 cm       Jeam       Standy Jeam       Still loam         Soil       0-30 cm       Jeam       Standy Jeam       Still loam         Soil       0-30 cm       Jeam       Standy Jeam       Still loam         Soil       0-30 cm       Jeam       Standy Jeam       Still loam         (cm]       50-75 cm       Joan       Jeam       Standy Jeam       Still loam         able 7.1.2.2.1- 9 (continued)       Fratee       Spain       Italy       Italy         ite ID       (Southern France)       (Spain)       (Italy)       Italy         ite Designation       Fratee       Spain       Italy       Italy         ite Designation       Fratee       Spain       Italy       Southern Europe         Southern Europe       Southern Europe       Southern Europe       Southern Europe         PS Coeffinates       Southern Europe       Southern Europe       Southern Europe </td <td>Distance from weather station</td> <td>in 20 km distanter fr</td> <td>et trial location (#</td> <td>in 5 lasting</td>	Distance from weather station	in 20 km distanter fr	et trial location (#	in 5 lasting
Meteorological conditions compared to long-term average within normal levels (Yes/No)     Overaft Y es (Yes/No)     Overaft Yes, but yes (Yes/No)       Soil     0-30 cm     leam     sardy leam     sardy leam     silt loam       Depth     30-50 cm     leam     sardy leam     sardy leam     silt loam       To com     leam     Sardy leam     sardy leam     silt loam     silt loam       To com     leam     leam     sardy leam     silt loam     silt loam       To com     leam     sardy leam     sardy leam     silt loam       To com     leam     leam     sardy leam     silt loam       To com     leam     sardy leam     sardy leam       able 7.1.2.2.1- 9 (continued)     france     grant     laam       ite ID     (Southern France)     (Spain)     (Italy)       ite Designation     France     Spain     laay       City     Southern Europe     Southern Europe     Southern Europe       iPS Coodinates     Southern Europe     Southern Europe     Southern Europe       iPS Coodinates     Overal P es, but     Overal P es, but     Overal P es	used for climatic measurements	trial plot	500 and distance	from trial mot
compared to long-term average vithin normal levels (Yes/No)       westerier and 2012       winter and spring 2013 were driver         Soil       0-30 cm       leam       sardy leam       silt loam         Depth       30-50 cm       leam       sardy leam       silt loam         [cm]       50-75 cm       leam       sardy leam       silt loam         [cm]       50-75 cm       leam       sardy leam       silt loam         [able 7.1.2.2.1- 9 (continued)       (Southern France)       (Spain)       (Italy)         ite ID       (Southern France)       (Spain)       (Italy)         ite Designation       France       Spain       Italy         icographic Location       France       Spain       Italy         City       Southern Europe       Southern Europe       Southern Europe         iPS Coordinates       Southern Europe       Southern Europe       Southern Europe         iofor climate meastrement       Overall Yes, but       Overall Yes, but       Overall Yes, but         off or climate meastrement       Southern       Overall Yes, but       Overall Yes, but         off or climate meastrement       Southern       Overall Yes, but       Overall Yes, but         optimic fore off off off off off off off off off of	Meteorological conditions	QOverally Yes	ØveralkyYes, but 20	011 Overall: Yes, but
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[cm]       30-75 cm       ioam,       sandy clay loam,       silt loam         75-100 cm       loam       sandy clay loam,       silt loam         able 7.1.2.2.1- 9 (continued)       (Southern France)       (Spain)       (Italy)         ite ID       (Southern France)       (Spain)       (Italy)         ite Designation       France,       Designation       Italy,         iceographic Location       France,       Spain,       Italy         City       France,       Spain       Italy         Country       France,       Southern Europe       Southern Europe         PS Coeffinates       Southern Europe       Southern Europe       Southern Europe         information measurement       Trial filot       <500 m distance)	Depth 30-50 cm	of Stoam of	sandy toam	silt loam
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able 7.1.2.2.1-9 continued)       Southern France       Spain       Italy         ite ID       Southern France       Spain       Italy,         ite Designation       France,       Parcela 54         ieographic Location       France,       Spain       Italy         city       France,       Spain       Italy         country       France,       Spain       Italy         country       Southern Europe       Southern Europe       Southern Europe         PS Coordinates       Southern Europe       Southern Europe       Southern Europe         istance from weather station       in 7 km distarbe from at trial location (in trial plot       in 10 km distance from trial plot         deteorological conditions       Overall?Yes, but       Overall: Yes       Overall: Yes, but winter and spring 2013 were very wet         catural Class USDAY       silt loam       loam       silty clay loam       silty clay loam         50-75 cm       silty clay loam       sandy clay loam       silty clay loam       sandy clay loam	/3-100 cha	y Q loam	sandy clay loam	siit ioam
ite ID       (Southern France)       (Spain)       (Italy)         ite Designation       France,       Spain,       Italy,         ite Designation       France,       Parcela 54       Italy,         ite Ocation       France,       Spain,       Italy,         ite Ocation       France,       Spain,       Italy,         City       France,       Spain,       Italy,         Country       Southern Europe       Southern Europe       Southern Europe         Southern Europe       Southern Europe       Southern Europe       Southern Europe         istance from weather station       in 7 km distance from       at trial location (in       in 10 km distance from         sed for climatio measarement       Overall Yes, but       Overall: Yes       Overall: Yes, but         onpared to long torm average       Voerall Yes, but       Overall: Yes       Overall: Yes, but winter         and spring 2013 were       very wet       very wet       very wet         extural Class USDA)       Soit       silty clay loam       silty clay loam         50-75 cm       silty clay loam       sandy clay loam       silty clay loam         75-100 cm       silty clay loam       sandy clay loam       silty clay loam	Fable 7.1.2.2.1- 9 (continued)			¥
ite Designation France, France, Spain, DParcela 54 Geographic Location City Country France, Spain Ecoregion Southern Europe Southern Europe Southern Europe Southern Europe Southern Europe Southern Europe Southern Europe Southern Europe Southern Europe Southern Europe PS Coordinates 2006 300 720 Distance from weather station in 7 kea distance from at trial location (in sed for climatic measurement for trial plot Meteorological conditions Overall Yes, but ompared to long term average ithin normal lecels (Yes No) South Southern Silty clay loam South South Southern Silty clay loam South South Southern Silty clay loam South South	Site ID	(Southern France)	S (Spain)	(Italy)
France,       Parcela 54         ieographic Location       France,         City       France,         Country       France,         Ecoregion       Southern Europe         Southern Europe       Southern Europe         PS Coordinates       Southern Europe         Poistance from weather station       in 7 km distarce from         at trial location (in sed for climatic measurements)       in 7 km distarce from         Overall Yes, but       Overall Yes, but         Overall Yes, but       Overall Yes, but         ompared to long form average       2011 was drier         extural Class OSDAN       silt loam         Soit       6-30 cm         Soit       50-75 cm         silty clay loam       sandy clay loam         silty clay loam       sandy clay loam         silty clay loam       sandy clay loam	Site Designation		, Spain,	, Italy,
ieographic Location       image       image<		France,	Parcela 54	
City       Spain       Italy         Country       Southern Europe       Southern Europe       Southern Europe         GPS Coordinates       Southern Europe       Southern Europe       Southern Europe         GPS Coordinates       Southern Europe       Southern Europe       Southern Europe         Intervention       Southern Europe       Southern Europe       Southern Europe         Stance from weather station       In 7 km distance from trial plot       at trial location (in < 500 m distance)	Geographic Location			
Country       France       Spain       Italy         Ecoregion       Southern Europe       Southern Europe       Southern Europe         BPS Coordinates       Southern Europe       Southern Europe       Southern Europe         Iof Size [m <sup>2</sup> ]       296       300       720         Distance from weather station sed for climate measurement       in 7 km distance from station sed for climate measurement       in 7 km distance from sed for climate measurement       Overall/Yes, but       Overall: Yes         Atteorological conditions       Overall/Yes, but       Overall: Yes       Overall: Yes, but winter and spring 2013 were very wet         extural Class (JSDA)       silt loam       loam       silty clay loam         50-75 cm       silty clay loam       sandy clay loam       silty clay loam         75-100 cm       silty clay loam       sandy clay loam       sandy clay loam	City City			
Ecoregion       Southern Europe       Southern Europe       Southern Europe         BPS Coordinates       Southern Europe       Southern Europe       Southern Europe         BPS Coordinates       Southern Europe       Southern Europe       Southern Europe         Dotstance from weather station       in 7 km distance from       at trial location (in       in 10 km distance from         sed for climatic measurement       Virial plot       Overall Yes, but       Overall: Yes       Overall: Yes, but winter         Acteorological conditions       Overall Yes, but       Overall: Yes       Overall: Yes, but winter       and spring 2013 were         very wet       2011 was drier       silt loam       loam       silty clay loam         South       30-50 cm       silty clay loam       silty clay loam       silty clay loam         50-75 cm       silty clay loam       sandy clay loam       silty clay loam         75-100 cm       silty clay loam       sandy clay loam       silty clay loam	Country . O CO	* Erance Sa	Spain	Italy
GPS Coordinates       296       300       720         Distance from weather station sed for climate measurements       in 7 km distance from sed for climate measurements       in 7 km distance from sed for climate measurements       in 7 km distance from sed for climate measurements       in 10 km distance from sed for climate measurements         Meteorological conditions       Overall/Yes, but 2011 was drier       Overall/Yes       Overall/Yes         Meteorological conditions       Overall/Yes, but 2011 was drier       Overall/Yes       Overall/Yes         Soft       0-30 cm       silt loam       loam       silty clay loam         Soft       0-30 cm       silty clay loam       sandy clay loam       silty clay loam         50-75 cm       silty clay loam       sandy clay loam       silty clay loam       silty clay loam         75-100 cm       silty clay loam       sandy clay loam       clay loam       clay loam	Ecoregion	Southern Europe	Southern Europe	Southern Europe
Iof Size [m <sup>2</sup> ]       296       300       720         Distance from weather station       in 7 km distance from sed for climatic measurement       in 7 km distance from trial plot       at trial location (in < 500 m distance)	GPS Coordinates			1
lot Size [m <sup>2</sup> ]       296       300       720         Distance from weather station sed for climatic measurement       in 7 km distance from strial plot       at trial location (in sed for climatic measurement       in 10 km distance from trial plot         Meteorological conditions       Overall/Yes, but       Overall/Yes, but       Overall/Yes       Overall/Yes         Meteorological conditions       Overall/Yes, but       Overall/Yes       Overall/Yes       Overall/Yes         in normal levels (Yes/No)       Soft       0-30 cm       silt loam       loam       silty clay loam         Soft       0-30 cm       silty clay loam       sandy clay loam       silty clay loam       silty clay loam         50-75 cm       silty clay loam       sandy clay loam       sandy clay loam       silty clay loam				
Distance from weather stationin 7 km distance from sed for climatic measurementin 7 km distance from   trial plotat trial location (in      Overall/Yes, butin 10 km distance from trial plotActeorological conditionsOverall/Yes, but Overall/Yes, butOverall/Yes Overall/YesOverall: YesOutrall (Ves, but ompared to long-term average vithin normal levels (Yes/No)Overall/Yes, but 2011 was drierOverall: YesSoft0-30 cfdSilt loam silty clay loamloam silty clay loamsilty clay loam silty clay loamSoft50-75 cm T5-100 cmsilty clay loam silty clay loamsandy clay loam sandy clay loamsilty clay loam sandy clay loam	Plot Size [m <sup>2</sup> ]	N Q96 N	300	720
sed for climate measurement       Itial plot       < 500 m distance)       trial plot         Meteorological conditions       Overal@Yes, but       Overal@Yes, but       Overal@Yes, but       Overal@Yes, but         ompared to long term average       2011 was drier       and spring 2013 were       and spring 2013 were         vithin normal le@ls (Yes/No)       itil loam       loam       silty clay loam         Soft       0-30 cfo       silt loam       loam       silty clay loam         Depth       30-50 cm       silty clay loam       sandy clay loam       silty clay loam         50-75 cm       silty clay loam       sandy clay loam       silty clay loam	Distance from weather station	, in 7 kon distance from	at trial location (in	in 10 km distance from
Acteorological conditions       Overall/Yes, but 2011 was drier       Overall/Yes       Overall: Yes       Overall: Yes, but winter and spring 2013 were very wet         Vithin netmal levels (Yes/No)       Verall/Yes, but       Overall: Yes       Overall: Yes       Overall: Yes         Vithin netmal levels (Yes/No)       Verall/Yes, but       Image: Verall overall overalleveral overall overall overall overallevera	used for climatic measurement	🔊 trial prot	< 500 m distance)	trial plot
ompared to long term average     2011 Was drier     and spring 2013 were very wet       vithin normal levels (Yes/No)     isilt loam     loam     silty clay loam       Soft     0-30 cfor     isilty clay loam     loam     silty clay loam       Depth     30-50 cm     silty clay loam     loam     silty clay loam       50-75 cm     silty clay loam     sandy clay loam     silty clay loam       75-100 cm     silty clay loam     sandy clay loam     clay loam	Meteorological conditions	Overal@Yes, but	Overall: Yes	Overall: Yes, but winter
Soft     General reverse (res/NO)     Very wet       Soft     9-30 cm     silt loam     loam     silty clay loam       Depth     30-50 cm     silty clay loam     loam     silty clay loam       50-75 cm     silty clay loam     sandy clay loam     silty clay loam       75-100 cm     silty clay loam     sandy clay loam     clay loam	compared the long-term average	201 I <sup>s</sup> was drier		and spring 2013 were
Soft9-30 cmsilt loamloamsilty clay loamDepth30-50 cmsilty clay loamloamsilty clay loam50-75 cmsilty clay loamsandy clay loamsilty clay loam75-100 cmsilty clay loamsandy clay loamclay loam	Textural Class (1, es/100)	y		very wet
Depth     30-50 cm     silty clay loam     loam     silty clay loam       50-75 cm     silty clay loam     sandy clay loam     silty clay loam       75-100 cm     silty clay loam     sandy clay loam     slay loam	Soft soft Soft	silt loam	loam	silty clay loam
Image: Solution of the second state of the second	Denth @ 30-50 cm	silty clay loam	loam	silty clay loam
75-100 cm silty clay loam sandy clay loam clay loam	50-75 cm	silty clay loam	sandy clay loam	silty clay
i o too oni o inty olay ioani o anity olay ioani o iay ioani	75-100 cm	silty clay loam	sandy clay loam	clay loam

GPS: global positioning system







#### B. **STUDY DESIGN**

#### **Experimental Conditions** 1.

CGA 357261 WG 50 is a granule formulation containing 51% w/w CGA 357261. The test juin was applied once on bare soil plots using Knapsack sprayers with a nominal application rate 0.3750 kg/ha in 300 L water/ha, corresponding to 0.1875 kg CGA 357261/ha.

Prior to spraying the test item onto the soil, the plots were prepared to have a fine crumb structure and a fine seedbed. Grass was sown after spraying of the test item at and and before spraying of the test item at and Š∕At

the incorporation of the test item into the soil and the sowing of gess were performed simultareous The test item was incorporated into the soil up of a depth of approximately & to 10cm immediately after application using a curry comb at a rotary harrow with roll a rand , a hay bob harrow at and a hay bob har ow with roll at and

sunshine data weife recepted dirring the field aßd Air temperature, precipitation including irrigation, soil dissipation trial at all sites.

Soil dissipation of trifloxystrobin was studied for up to 733 do

#### 2. Sampling

Soil cores were taken to a depth of 10 cm using a soil piercer ( $\emptyset$  50 mm) before application from the untreated control plots (10 to 20 soil cores) and immediately after application and incorporation of the test item into the soil from the reate oplots (40 soff cores, DAT o samples). Al Subsequent samplings were performed using a "Wacker Hammer" (Ø 48 to 50 mm). At each sampling interval 18 to 20 soil cores from the treated plots were distributed randomly over the plots to obtain representative samples,

In all treated plots of the trials, the soil cores were taken to a maximum depth of 100 cm on the following occasions: 0 (2 samplings post-incorporation, each 0-100cm depth), 2-4, 6-8, 13-15, 27-28 (each 0,50° cm depth), \$6-62, \$3-91, \$each 0.50 cm depth), and 18-130, 173-182, 356-371, 532-546 and 657-733 (each 04,00 cm depth) days after treatment (DAT) From the control plots, samples were taken on the following occasions: 0 days before opplication, 356-371 and 661-733 days after treatment.

The soil cores were store Odark immediately offer sampling and were deep-frozen within 24 hours (DAT-0 samples within 7 hours) The Hozen soil cores were cut into 10 cm segments and each horizon (laboratory samples) was milled separately in a harmer mill and carefully homogenized. An aliquot of each laboratory sample (analytical samples) was used for analysis. Soil cores and samples were stored in the dark at  $\leq -18$  °C

#### Analytical Procedures 3.

The analytical method 01\$27/M001 (10-464872-01-1, Supplemental Dossier, KCA 4.1.2/24) was developed for the determination of trifloxystrobin and its degradation products CGA 357261, CGA 32, 113, CA 373466, DOA 413161, NOA 413163, CGA 357276 and NOA 409480 in soil. Soil samples of 20 g were extracted three times at ambient temperature using a shaker and once by microwave accelerated extraction at 70 °C using acetonitrile/water 4/1 (v/v). After each extraction step, extract and soil were separated by centrifugation (> 500 x g) and decantation. The soil extracts were combined, internal stable-labelled standards added and an aliquot of the combined soil extract was analysed by reversed phase HPLC-MS/MS in multiple reaction monitoring mode. The method

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was validated using three different soils. The limit of detection (LOD) and limit of quantitation (LOQ) were 0.03 and 0.1  $\mu$ g/kg for each analyte, respectively.

During analysis of the dissipation samples of the current study, concurrent recovery samples were prepared freshly by fortification of control samples with test item CGA 357261 and reference items CGA 373466, NOA 413163 and NOA 409480 at levels of 0.1 and 1 µg/kg and processed in parallel to the dissipation samples. The mean recoveries were 102% (RSD 9.2%) for CGA 357261, 192% (RSD 11.0%) for CGA 373466, 79% (RSD 19.7%) for NOA 413163 and 98% (RSD 10.4%) NOA 409480.

The degradation kinetics of the test item was determined according & FOCUS kinetics (2006) Stising the software KinGUI 2 with three different kingfe models: single first order, first order multicompartment and double first order in parallel. Model input datasets were the desidual amounts found in each replicate test system at each sampling interval The mitial total recovery at DAT-0 (2 samplings after incorporation) was included in the parameter, optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The best fit kingtic model was selected on the basis of the chi<sup>2</sup> scaled error criterion and on the basis of a visual assessment of the goodness of the fits. DF50 and DT90 values were calculated from the resulting kinetic parameters.

#### DATA A.

Table 7.1.2.2.1-10: Residues of CGA 357261 in soil at (Germany), mean values (sum of \$100 cm) expressed as g/ha X L,

	1.V	"0"	$\sim$	<i></i>		st i	, (		3 <sup>v</sup>	al .				
	Ű	d .		Å.	Ž	ð	ДA	T.	J _	. &				
Compound	Mean <sup>1</sup>	$0^{2,3}$	$\sqrt{0}^{2,3}$	≪°3	<b>⊳</b> 6	<b>1</b> 4	<b>28</b>	56	21	124	182	368	543	733
CGA 357261	Mean	58.0	47. 🌾	42.6	25.8	8.23	3.37	<b>Ø</b> .66	<b>6.4</b> 3	0.33	0.22	0.27	0.15	0.13
CGA 37346	Mean	J95	126	129	5400	80.8	40.5	19.6	15.5	12.2	6.6	3.72	1.20	1.35
NOA 413 263	Mean	0.05	<b>@</b> .06	Â.35	<b>20.</b> 34	1003	1,05	2,5	4.41	8.97	6.96	1.79	0.73	0.47
NOA 409480	Mean	0.49	0.38	0.37	0.28	0.51	<b>0</b> .42	<b>%</b> Å4	0.42	0.47	0.32	0.31	0.13	0.14
		0n	*	0	s ()								-	

DAT: days after treatment

<sup>1</sup> CGA 357261 equivalents, sum of 0-100 cm

<sup>2</sup> DAT-0 single alues (GA 367261) 3.7, 62.2 g/ha (mean 38.0 g/ha); 44.8, 49.4 g/ha (mean 47.1 g/ha); overall mean 52.5 g/ha= 28% of nominal application rate of 87.5 g/ha

DAT-0 single values (total residues (CGA 357261 equivalents) = CGA 357261 + degradation products): 233, 247 g/ha (mean 240 g/ha);  $0^{93}$ , 169 g/ha mean  $b^{99}$  g/ha); overall mean 209 g/ha = 112% of nominal



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#### Table 7.1.2.2.1-11:Residues of CGA 357261 in soil at values (sum of 0-100 cm) expressed as g/ha

(United Kingdom), mean

													°/	V.	, and the second	
								DAT		4	$\gg$					
Compound	Mean <sup>1</sup>	0 <sup>2,3</sup>	0 <sup>2,3</sup>	4	8	15	28	62	91	1 <b>30</b> C	174	371	545	708)		
CGA 357261	Mean	37.5	41.0	39.0	15.4	2.87	1.23	0.53	0.42	0.28	0.28	0.31	0.12	(0,03)		
CGA 373466	Mean	72.8	70.3	72.9	86.5	88.5	54.9	21.6	15.4	<b>4</b> 0.6	9.80	5. <b>O</b>	2.08	¥1.17	Ô,	
NOA 413163	Mean	0.23	0.19	0.83	2.95	14.8	<b>\$2</b> ,6	28.7	32.3	37.6	31.5	48.0	8.56	4.5		
NOA 409480	Mean	0.10	0.11	0.19	0.30	1.47	<b>F</b> .61	1.19	0.99	0.82	0.98	0.95	<b>Q</b> .37	Q.24	Ś	

DAT: days after treatment, values in (brackets) are given as 1/2 LOD according to FOCUS kinetics 2006

<sup>1</sup> CGA 357261 equivalents, sum of 0-100 cm

<sup>2</sup> DAT-0 single values (CGA 357261): 37.8, 37.2 g/ha (mean 37.5 g/ha); @2.0, 40.9 g/ha@mean@41.0 g/@a); overall mean 39.0 g/ha = 21% of nominal application rate of 187 g/ha/

DAT-0 single values (total residues (CGA 357261 equivalents) = CGA 357261 +3 Degradation products): 109, 117 g/ha (mean 113 g/ha); 113, 115 g/ha (mean 114 g/ha); ox frall mean 114 g/ha = 61% of nominal application rate of 187.5 g/ha

#### Brances mean values Table 7.1.2.2.1-12: Residues of CGA 35%261 in soil at rthern (sum of 0-100 cm) expressed as g/ha D

Compound	Mean <sup>1</sup>	0 <sup>2</sup>	0 2, 3	ري عرم	) 7	<b>A</b>	€   ^\$∕8	AT S	, ^ 90	) 119 <sup>0</sup>	0 181 (	356	540	680
CGA 357261	Mean	122	101	52Q	62	16.6	¥1.17	Ø.72	<b>Ø</b> Å2	0.41	0.37	0.43	0.13	0.19
CGA 373466	Mean 👌	\$7.7	52.5	<b>G</b> 0.1	467	96.4	37.4	89.4	¢\$1.7	¢1.5	<b>¥</b> 8.5	6.23	1.54	1.38
NOA 413163	Mean	0.06	0.06	0.30	<b>5</b> 0.44 .	Ø.15	235	18.2	15.7	23.6	22.6	16.4	1.80	0.88
NOA 409480	Mean	0.07	0.06	0.03	0.13	0.51 (	Ø.33	<b>@</b> 47	0,64	0,84	0.83	0.70	0.22	0.23

DAT: days after treatment 🔍

- <sup>1</sup> CGA 357261 equivalents, sum of 0-100 cm
- 20 27 <sup>2</sup> DAT-0 single value (CGA 35726): 1210/124 g/ha (mean 1230/ha); 104, 98.5 g/ha (mean 101 g/ha); overall mean 112 gara = 60% of nominal application rate of 187.  $\mathfrak{Dg}/ha_{\mathbb{Z}}$
- <sup>3</sup> DAT-0 single values (total residues (CGA 358261 equivalents) = CGA 357261 + degradation products): 184, 180 g/ha (mean 183 g/ha); 158, 954 g/ha (mean 156 g/ba); overall mean 169 g/ha = 90% of nominal application rate of 1 2.5 g/ha?

#### Residues of CGA 357201 in soil at Table 7.1.2.2.1-(Southern France), mean values (sum of 0-100 cm) expressed as g/ha (1) i

<u> </u>	Û	õ		$\sim$	. N									
.1		ð a	08	R	ß	Ő	]	DAT						
Comported	Mean	0 <sup>2,3</sup>	<sup>2</sup> 0 <sup>2,3</sup>	53	`∼∕7	<u>43</u>	28	62	83	118	180	361	543	727
CGA 397261	Mean	102	86.3	62 L	31.3	012.0	1.50	0.38	0.48	0.24	0.20	0.28	0.10	0.11
CGA/373466	Møan	Z¥.9 .	<b>207</b> .1	6 <b>9</b> .7	50.7	143	76.2	41.9	124	108	88.3	30.2	16.1	8.60
NOA 413163	Mean (	) 0.06¢	0.06	0.82	Ø.84	1.82	2.14	3.47	3.28	5.21	6.00	3.97	1.66	1.24
NOA 409480	<sup>™</sup> Mean <sub>\</sub>	0.05	0.05	0.35	0.45	1.23	1.37	0.59	0.87	0.58	0.72	0.70	0.34	0.25

DAT: days after treatment

<sup>1</sup> CGA 35₡261 equivalent sum of 0-100 cm

<sup>2</sup> DAT Single Values (CGA 357261): 93.8, 111 g/ha (mean 102 g/ha); 88.6, 83.9 g/ha (mean 86.3 g/ha); overall mean 94.0 gAa = 50% of nominal application rate of 187.5 g/ha

<sup>3</sup> DAT-0 single values (total residues (CGA 357261 equivalents) = CGA 357261 + degradation products): 22, 13, g/ha (mean 190 g/ha); 115, 114 g/ha (mean 115 g/ha); overall mean 122 g/ha = 65% of nominal application rate of 187.5 g/ha

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Table 7.1.2.2.1-	-14: Re	sidues	of C	CGA 3	57261	in s	oil at				(Spa	in), 1	nean v	values	1
	(su	m of (	)-100	cm) e	xpress	sed as	g/ha								
								DAT		4	>		Ő		0
Compound	Mean <sup>1</sup>	0 <sup>2,3</sup>	0 <sup>2,3</sup>	2	8	14	28	62	90	119	173	370	540	686)	
CGA 357261	Mean	55.8	69.4	65.5	12.4	1.37	0.99	0.41	0.17	0.14	).12 (	0.03)	<lod <<="" td=""><td>\$<b>₽</b>ŎD</td><td></td></lod>	\$ <b>₽</b> ŎD	
CGA 373466	Mean	72.2	97.4	86.9	139	37.2	64.3	25.5	5.32	<b>2<del>.</del>40 4</b>	4.25	0.7ू3©	0.45	ð.38 🔬	Ô,
NOA 413163	Mean	0.13	0.13	0.90	7.07	6.62	1833	24.7	12.7	9.27 1	0.4	3:80	123	1.0\$	
NOA 409480	Mean	0.07	0.09	0.18	0.61	0.66	<b>¥</b> .24	1.47	0,01	0.52 0	).35	9.19	£98	Q.]3	
DAT: days after	treatment,	values	in (bra	ckets)	are giv	ven as	½ LOI	) acco	ding to	o FOC	US∰	netic	(2006)	€× «	, O'
<sup>1</sup> CGA 357261	equivalent	s, sum	of 0-10	00 cm		A		Ŕ	) 1 17a	° ,	5	L	° °	¢.	1
<sup>2</sup> DAT-0 single	values (C	CGA 35	7261)	50.2,	61.4	Ana (n	nean 5	5:8 <b>,</b> g/h	ia); 🔊	.3, 69.	g/h	a@mea	in@9.5	g/ka);	
overall mean (	63.0 g/ha =	= 33% c	of nom	inal ap	plicati	on rate	of 187	₿g/h	a S	J.O	ð			S	
<sup>3</sup> DAT-0 single	values (t	otal res	sidues	(CGA	35726	1 egui	valent	š) = G	GA 35	7261 -	+ deg	radati	on prod	lucts):	
118, 143 g/ha	(mean  13)	l g/ha)	; 174,	167 g/	ha (m	eanv 17	l guna)	); over	all me	ăn 151	g/ha	0809		mural	
application rat	te of 18/.5	g/na		Ś	% ¥	1 ~		ð Í	A	. Ô	Ł	9	<i>₽</i> ¢	Q .	
Table 7 1 2 2 1	15. Ro	eiduos	of C	a a	50281	in C	il 🏤	~ ·	Р <sub>П†а</sub> ј	ha m	â	vəkîte		`	_
Table 7.1.2.2.1-	- 13. KC 10	l cm)	evnre	ised a	¢⁄σ/hs					y), m		v area	s (sumi	01 0-	
	10	o emy		sscu A	9 6/ Hq	^` ∧	×Q	Ň	ð	õ		Ş.,	K,		
				2.Q	- Carl			DAT	Ş	2	<u> </u>		¥		
Compound	Mean <sup>1</sup>	0 <sup>2</sup>	0 <sup>2,3</sup>	3	7	10Å	27	58	90	118	<b>P1</b> 76	5 360	532	657	
CGA 357261	Mean	135	102	29.Ô	13.9	2.37	0.84	Ø#43	0:32	0.34	0.3	0.25	5 0.17	0.13	
CGA 373466	Mean 💊	<b>6</b> 4.0	<b>9</b> .5	12ð	215	194	109	\ 118.	88.2	d24	56	7 32.0	5 17.2	9.80	
NOA 413163	Mean	″0.37	,0.36	0.60	<b>\$</b> .58	2015	3	4.06	5.79	<sup>4</sup> 7.89 (	¥.60	5 4.19	9 1.89	1.09	
NOA 409480	Mean	0.49	0.00	0.26	0.45	0.65	0298	1ØŽ	1.03	1.29	1.24	4 1.07	0.74	0.41	
DAT: days after	treatment	L.	6	Ś	\$.		) _ (	U	ſ	1 0					
<sup>1</sup> CGA 357261	equivalent	ခါ, sum္ရွ	¢۴0-1	00 cm	$\sim$			) (	× ×	Ç,					
<sup>2</sup> DAT-0 single	values (	CGA 3	5726	). 138,	∂∛31 g	y/ha (r	nean 1	35	1a); 10	6, 97.	9 g/ha	a (mea	an 102	g/ha);	
overall mean	118 g/bra =	63%0	f nomi	nal app	blicati	n rate	of 187	. 🔊 🖉 /ha		50 (1					
<sup>3</sup> DAT-0 songle	values (to	otal res		(CGA	35 26	l equit	valents	S) = C	GA 35	/261 -	+ deg	radati	on prod	lucts):	
211, 192/g/na	(mean  a)	2 g/020	; 103. K	1048 g/	na (m	ean 15	o gena)	(); over	an me	an 1/9	g/na	= 93%	% 01 no	minai	
		g/na/	\$	S	¥`_%	¥ 4		Ň							
<b>B. RESIDUE</b>	S.S A	~~	Ŝ		. T	Ô	× ``								
				$\tilde{\mathcal{C}}$	s N	£	- Q								
CGA 357261	rapid d	egtade	d in,∕s	oil to	ČGA	<b>9</b> 7346	6 by e	ester c	leavag	ge as v	vell a	is to a	small	extent	t
further to NOA	413163	and 1	JQÁ 4	10,994,8(	). <b>T</b> he	erefore	, the	total	amou	nts of	f CG	A 357	7261 a	nd its	5
degradation pro	ducts (ex	pressé	a as	ĢĞĂ.	35726	1 æqu	ivalen	ts) we	ere ca	lculate	ed fo	r tota	l resid	ues at	ũ
study start (DA	T-0). The	totáRa	esidu	es dept	seted a	ŧ DA	T-0 w	ere 20	9 g/ha	a at			(Gern	nany),	,

114 g/ha atWinter Kingdom), 169 g/ha at(Northern France), 122 g/ha at(Southern France), 151 g/ho at(Spain) and 179 g/ha at(Italy), corresponding to 112 51, 90 55, 80 and 95% of the nominal application rate, respectively.

The amount of CGA 357261 (total residues) decreased from DAT-0 to study end (DAT-733) from 209 to 0.13 g/a at 500 m DAT-0 to DAT-708 from 114 g/ha to < LOD (limit of detection) at 500 m DAT-0 to DAT-680 from 169 to 0.14 g/ha at 500 m DAT-0 to DAT-727 from 122 to 0.06 g/ha at 500 m DAT-0 to DAT-657 from 151 g/ha at DAT-0 to < LOD from DAT-540 onwards at 500 m DAT-0 to DAT-657 from 179 to 0.16 g/ha at 500 m DAT-640 m DAT-0 to DAT-657 from 179 to 0.16 g/ha at 500 m DAT-640 m DAT-640 m DAT-657 from 179 to 0.16 g/ha at 500 m DAT-640 m DAT-640 m DAT-657 from 179 to 0.16 g/ha at 500 m DAT-640 m DAT-640 m DAT-657 from 179 to 0.16 g/ha at 500 m DAT-640 m DAT-640 m DAT-640 m DAT-657 from 179 to 0.16 g/ha at 500 m DAT-640 m DAT

Residues of CGA 357261 were primarily detected in the top 0-10 cm of soil, except for some very low residues detected down to a depth of 20-30 cm.

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Dissipation and degradation of CGA 357261 was accompanied by the formation of its degradation products CGA 373466, NOA 413163 and NOA 409480.

CGA 373466 amounted to maxima (CGA 357261 equivalents) of 88.5 to 245 g/ha between DA 20 and DAT-15 in the entire soil profiles. The major part of the residues was detected in the top 0-30 cm soil layer. Residues above the limit of quantitation (LOQ) were detected down to a depth of 30 40 cm<sup>2</sup> at the solution and the solution of the residues above to a depth of 90-100 cm at the solution.

NOA 413163 amounted to maxima (CGA 357261 equivalents)  $\oplus$  6.0 to 52.6 what between  $\oplus$  AT-28 and DAT-180 in the entire soil profiles. Residues above the bOQ were detected down to a depth of 50-60 cm, except of **Equivalents**, where residues above the COQ were detected down to a depth of 90-100 cm.

NOA 409480 amounted to maxima (CGA-357261 equivalents) of 0,51 to 1,61 g/ba between DAT-14 and DAT-119 in the entire soil profiles. The major part of the residers was detected in the top 010 cm soil layer and no residues were detected below a depth of 20-30 cm.

## C. KINETIC ANALYSIS

and

The degradation of CGA 357261 followed first order multi compartment (FOMC) kinetics for and , Oand double first order in parallel kinetics for

and assessments. Table 7. (2.2.1) b summarizes the best-fit results of the  $DT_{50}$  and  $DT_{90}$  calculations.

 Table 7.1.2.2.1- 16:
 Best-fit degradation kinetics of CGA 357261 in the solutions according to FOCUS

			~ <i>Q</i>		
Site 2	Best Fit Kinetic Model	DT 50	DCD90 DCD90	Chi <sup>2</sup> Error [%]	Visual Assessment <sup>2</sup>
(@erman@)	DFOL O	×0.9 ×	<b>0</b> 7.5	2.4	+
(United Kingdom)	<b>ODFOR</b>	لاً 2.6 🖇	9.0	2.2	+
(Northern France)	√ FQMC	23	17.5	26.9	+
Southern France		\$ <sup>.2</sup>	13.0	1.1	+
(Span) ~	FOME	1.6	6.8	3.0	+
(Italg)	🖉 FOMC 💭	0.8	4.8	4.7	+

<sup>1</sup> FOMC? first order multi compartment, DFOP? doub@ first order in parallel

CGA 357267, a major photodegradation product of trifloxystrobin, was rapidly degraded in soil under field conditions in the coregions Northern and Southern Europe. The calculated best-fit half-lives were between 0.6 and 3.2 days at the tested sites. The major trifloxystrobin photodegradation products CGA 373466, NOA 413163 and NOA 409480, which are derived from CGA 357261, were formed and declined towards study end.

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil under field conditions given in section CA 7.1.2.2.







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Report:	KCA 7.1.2.2.1 /17; ; 2013; amended 2013-10-25	
Title:	Amendment No. 01 to Report No. MR-13/108 – Determination of the storage	ð
	stability of the trifloxystrobin and the metabolites CGA 279202 ZE- isogree,	S
	CGA 321113, CGA 373466, BCS-AB39385, BCS-CR7487, NOA 41310 and	0
	NOA 413163 in soil – Phase Report for an Interval of 0 to 18 and 21 Months	
Report No:	MR-13/108	~
Document No:	M-467625-02-1	Q 1
Guidelines:	- Regulation (EC) No 1107/2009 👸 🔬 🖉	, ()
	- European Commission DGA 7032/ 1/95 rev. 5, Appendix H	Ś
	- US EPA OCSPP Test Guideline No. 860.1380	
GLP:	Yes A Q of C Q	Ĭ
Justification:	New data / guideline requirement: $\sqrt{2}$	
	Storage Stability of trifloxystrobin and its major degradation products	
	CGA 357261, CGA 321, 1/3, GGA 32, 3466, NOA 413161, NOA 413163,	
	CGA 357276 and NOA 409480 11 soil 0 0 0 0 0 40 2 2	

### **Executive Summary**

The storage stabilities of trifloxystrobin and its degradation products CGA 357267, CGA 321113, CGA 373466, NOA 413161, NOA 413163, GGA 35276 and NOA 409480 in soil were studied (sandy Toam) between -18 and -25 °C for up to 636 days using soils (silt loam) and (clay loam). Soils and were used for trifloxystrobin, CGA 357261, CGA 321113, CGA 373466, CG& 357276 and NOA 499480, whereas soils were used for NOA 493161 and NOA 413763. and

soil were used for prifloxystrobin and each Fortification concentrations of nominal 30 µg per degradation product.

On average, por than 70% of the fortified amount of triflow strokin and its degradation products CGA 357261, CG& 321143, GGA 373466 NOA 413169, NOA 413163, CGA 357276 and NOA 409480 were recovered from the stored samples at each sampling interval.

The mean recovered amounts after 636 days of storage were 98 and 95% for trifloxystrobin, 101 and 100% for CGA 355261, 91 and 89% for CGA 21110, 94 and 89% for CGA 373466, 95 and 96% for CGA 357276, and 101 and 99% for NOA 409489. After 557 days of storage the mean recovered amounts were @8 and @9% for NOA 413160 and 99 and 85% for NOA 413163.

The results demonstrate that residues of triflexystrobin, CGA 357261, CGA 321113, CGA 373466, CGA 35 276 and No 409480 in soil are considered to be stable for at least 636 days and that

CGA 355276 and NOX 409480 in soil are considered to be stable for at least 636 days and that residues of NOA 413161 and NOX 41363 in soil are considered to be stable for at least 557 days under frozen conditions.

**Bayer CropScience** Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

I. **MATERIALS AND METHODS** 





#### 2 **Test Soils**

				<u>,</u>	
Three soils were used (see Table	e 7.1.2.2.1- 17) rep	presenting different	geographical	origin and different	ð
soil properties. Two different s	soils were used fo	r each test item. So	oils	and	Ĭ
were used for trifloxystrobi	n, CGA 357261,	CGA 321113, CO	GA 373466,	CGA 357296 and	
NOA 409480, whereas soils	and	wei	re used for	NOA 413161 and	
NOA 413163.			4		

# Table 7.1.2.2.1-17: Physico-chemical properties of test soils

7.1.2.2.1-17: P	hysico-chemical prop	erties of test soi	ls 5		
-	· · ·	<b>V</b>			
Parameter			<b>Results</b> / Units	<u> </u>	ð y
Soil Designation		1772		ку с	
Geographic Loca	tion (Country)	Germany	Germany	Germany	
Textural Class (U	JSDA)	sandy loam	sift loam	clay loam	st f
Sand [:	50 $\mu$ m – 2 mm]	×J0.7%	0 <sup>7</sup> 4.389	0° 34% A	a °
Silt [2	2 μm – 50 μm]	× 18:3%	<sup>™</sup> 7 <u>6</u> .3%	38% 🖉	<u></u>
Clay [·	< 2 µm]	× 12,0% ~	A19.4%~	31%	
pH (soil/CaCl <sub>2</sub> )		6.8	6.TC	E D .	J
pH (soil/water)	L O'	ັ≫ັ 7.4 <sup>⊷</sup> ັ		\$7.4 <sub>4</sub>	
Organic Carbon		6 13% &	Q.9%	€ 5.0%	
Organic Matter <sup>1</sup>		<b>3</b> .1% 0	0 <sup>9</sup> 1.6% <sup>0</sup>	8.6%	
Cation Exchange	Capacity [meq/100 st	9.8		<b>20</b> .6	
Water Holding C	apacity 5	Ø Ø		<u>Å</u>	
maximum [g H	$_2$ $\mathcal{O}$ $\mathcal{A}$ d 100 g soil $\mathcal{D}$ $\mathcal{W}$ ]	¥ \$7.9 \$	<sup>39.5</sup>	79.1	
<sup>1</sup> % organic ma	tter = % organie carbon x	1.723			
DW: dry weight		Ĵ Ĵ "	° v		
USDA. Ungla	tat Data montat A ania		al an		

# B.

#### Experimental Conditions 1.

The test system for consisted of polypropylene Corning<sup>®</sup> centrifuge tubes (volume 50 mD). For preparation of the test systems, 20 g of the soils were weighed into each tube.

Fortification concentrations of nominal 50 µg per kg soil were used for each test item. The test items were applied to the respective test systems in 200 µL sectonitrile.

Ň After application, the test systems were stored at 2-18 °C in a deep-freezer for up to 636 days. This storage stability study is orgoing and will be continued for up to 28 months (820 days).

#### Sampling @ 2.

Samples were processed and analysed 0, 84, 267 and 636 days after treatment (DAT) for trifloxystropm, CGA 357261, CGA 324013, CGA 373466, CGA 357276 and NOA 409480, as well as 0, 190, 286 and 557 days after the atment for NOA 413161 and NOA 413163.

At each sampling interval (except DAT-0), four fortified and six control samples were removed from the deep-freezer and allowed to reach ambient temperature. Four of the control samples were fortified with the dest items at the same concentrations as the storage stability samples (50 µg per kg soil) to determine the concurrent recoveries. The samples were processed in parallel to the fortified and control samples of the respective sampling interval.



#### 3. Analytical Procedures

The analytical method 01327/M001 (M-464872-01-1, Supplemental Dossier, KCA 4.1.2 /24) was developed for the determination of trifloxystrobin and its degradation products CGA 357261, CGA 321113, CGA 373466, NOA 413161, NOA 413163, CGA 357276 and NOA 409480 in soil. Soil samples of 20 g were extracted three times at ambient temperature using a shaker and once by microwave-accelerated extraction at 70 °C using acetonitrile/water 4/1 (v/v). After each extraction step, extract and soil were separated by centrifugation (> 500 x g) and decantation. The soil extract were combined, internal stable-labelled standards added and an aliquot of the combined soil extract was analysed by reversed phase HPLC-MS/MS in multiple reaction monitoring mode. The method was validated using three different soils. The limit of detection (LOD) and limit of quantitation (200) were 0.03 and 0.1 µg/kg for each analyte, respectively.

Trifloxystrobin (*EE*) and its *E/Z* isomer CGA 357261 (*ZE*) are rapidly degraded in solv to CGA 321113 (*EE*) and its *E/Z* isomer CGA 373466 (*ZE*), respectively, by ester cleavage. The degradation observed from day 0 to day 84 is presumably caused by the time needed for the application procedure, deep-freezing and thawing of the samples prior to extraction. Therefore the total amounts of trifloxystrobin and its degradation product CGA 324113 (expressed as trifloxystrobin equivalents) as well as CGA 357261 and its degradation product CGA 324113 (expressed as trifloxystrobin equivalents) were eaculated for recoveries of trifloxystrobin and CGA 357261, respectively.

During analysis of the storage stability and control samples of the current study, concurrent recovery samples were prepared freshly by fortification of control samples with the test items trifloxystrobin and its degradation products CGA 357261, CGA 321(113, CGA 373466, NGA 413161, NOA 413163, CGA 357276 and NOA 409480 at a level of 50 µg for kg oil and processed in parallel to the storage stability and control samples. The mean recoveries were 103 and 100% (RSDs 6.3 and 7.0%) for trifloxystrobin, 96% (RSDs 10.0 and 14.4%) for CGA 357264, 100 and 95% (RSDs 7.1 and 6.0%) for CGA 321113, 99 and 95% (RSDs 7.6 and 7.1%) for CGA 373466, 90 and 78% (RSDs 11.8 and 14.3%) for NOA 413163, 92 and 78% (RSDs 11.8 and 12.7%) for NOA 413163, 99 and 97% (RSDs 9.4 and 10.4%) for CGA 357276, and 99 and 97% (RSDs 5.2 and 10.4%) for NOA 409480.





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#### **II. RESULTS AND DISCUSSION**

### A. DATA

Table 7.1.2.2.1- 18:	Recovered amounts of trifloxystrobin in	soil exj	pressed	as	perce	ntage G	ðf
	nominal applied amount	1	A State		S.	29	Ô

		r						ý s		. 10
Soil	DAT					Recov	eries 🦼	× .×	, ~?	S a
			Single	Values		Mean	RSD	Normalised	o DAT-0 <sup>1</sup> 🖉	
			[9	6]	L	[%]	[%)	× %		40 <sup>4</sup>
	0	88	94	90	80	90	×3.2	° 100	N A	, ev
	84	87	89	94	<b>6</b>	91 🔊	4.3 °			ŵ
	267	104	112	111	<sup>∜</sup> 98 ू	• 106°	6.0	_© ⊗ <b>}</b> 18		8
	365	91	104	1	98	×	<b>40</b> .6	D 2 112	. 1	0
	636	104	106	<u>م</u> 101 گ	Ø07	Ø104 A	Q 2.3			
			Š	Överal	Mean	× 980	88	- ? ` ?		2
	0	89	Ø		94	٦ ۲	x Z.5	× © 100	Ç O	
	84	94	<sup>©</sup> 89	<b>9</b> 90	i~ <b>)</b> 94	≪ <sup>3</sup> 92 ∽	2.7			
	267	103	102	10%	1020	· 10	39	Ö114	. 🌱	
	365	<b>4</b>	°~87	81	90)	, OT	<b>\$</b> 8.8	0 ° 10¢	₩.	
	636	<sup>ل</sup> 96 🖗	, 99 (	100	<b>€</b> 102	<sub>⊘</sub> 99 √	2.6			
	S.	4	2007	Overat	l Mean	<u>9</u> 5 \	2.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
				- A -	(// n	6¥	<i>n</i>			

DAT: days after treatment  $\sqrt[6]{}$   $\sqrt[$ 

Table 7.1.2.2.1-19: Recovered amounts of CGX 357261 in soil pspressed as percentage of

	0	<u> </u>	4	<u>`</u> ^		<u>y</u>		
~ Soil	DAT	4Ú	A	ď	"0"	Recov	er <b>iðs</b>	
	Û,	G.	Single	Values	Å.	Mean	RSD	Normalised to DAT-0 <sup>1</sup>
K~y <sup>v</sup>	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		<u> </u>	(a) v	$\overset{\circ}{\sim}$ .	<b>~</b> [%] `~	[%]	[%]
	₽ 0 %	93	97, <sup>O</sup>	95	94	95	1.7	100
Q Q	8 <sup>4</sup> ,	<b>40</b> 4	<b>10</b> 0	_¥1⁄7	109	197	6.8	113
Ŵ	<u>َ</u> 267 کُ	ی 103 ا	Û84	0 <sup>9</sup> 6 、	<b>Q</b> 05	®97	9.7	102
	<sup>0</sup> 365	103	120	950	860	° 101	14.3	107
<i>A</i>	636	<u>1004</u>	¢04	100	, 126	104	2.4	109
				<b>Over</b> all	Ølean	101	8.8	-
Kj ×		94	98	920	90	93	3.9	100
	84	Al M2	@03	A96	95	104	7.0	112
Á A	A 267	97∢	88	102	112	100	9.7	107
	365	147	88	105	96	102	11.9	109
	636	<u>څ</u> 93	107	106	98	101	6.8	108
		Ň		Overall	Mean	100	8.3	-

DAT: days after reatment Normalised recovery = (mean recovery / mean recovery at DAT-0) x 100%

#### Table 7.1.2.2.1-20: Recovered amounts of CGA 321113 in soil expressed as percentage of Q nominal applied amount ð

										S
Soil	DAT					Recov	eries	~	Ő	. "0"
			Single	Values		Mean	RSD	Normalised to I	AT-0 <sup>1</sup>	Ì
			[%	6]		[%]	[%]	<u> </u>		N°
	0	95	95	99	100	97	2.7	100 Ĉ		<u></u>
	84	86	82	84	87	Č\$\$5	2.6	82,7		Š.
	267	88	92	87	88	<b>*</b> 89	2.50	\$1	S 4	
	365	86	80	86	83	84	,₹ <sup>,</sup> 4 <sup>×</sup>	86 4		×°
	636	91	90	98		95	<sup>Q</sup> 4.9 g	° 5 97	Ŭ.	Å
			(	Overal	Mean	91 🖓	5:8			Ø V
	0	96	99	84	90 <sup>©</sup>	22	Ž.3	× × 100		
	84	79	77	<sub>1</sub> 88	×81	81	6.1	× × ×	, and a second s	Ś
	267	99	80 🛒	/ <sup>%</sup> 91	88	> 90~	8.8	<u></u> 0 <sup>54</sup> 40 <sup>97</sup>		
	365	92	× S	\$5%	93 <sup>©</sup>	-2Ĵ	<b>@</b> .3	N 6 98 0		
	636	94	091	84	\$5	\$91 ×	کې 5.5 ک		Į,	
		Ŕ		Överal	l Mean	, 89, °	70		× Y	
DAT: days after	treatment	$\mathcal{O}_{\mathcal{O}}$	\$1	<i>n</i>	Q	a,	Ž			•

<sup>1</sup> Normalised recovery = (mean recovery threan recovery at DAT x 100%

Table 7.1.2.2.1-21: Recovered amounts of CGA 373460 in soil expressed as percentage of nominal applied amount

	a <sup>y</sup>		ý (1	// A	V .			~
Soil	DAT		- A	· · ·	^_	<sup>y</sup> Recov	eries	Ø.
Ň		L'	Single	Values	Ň	Mean	<b>BSD</b>	Normalised to DAT-0
<u> </u>			$\propto$ 12	67 ·	L.Y	<u>_</u> [%] {	× [%] ``	۲ <u>۷</u>
	\$`0 K	106	106	106 🖉	2 108 L	≥ 106Õ	0, <b>Ø</b>	100
~~~?	- 84,	Ð	20	90°″	83"0"	<b>90</b>	<b>1</b> 6.4	85
Ê9"	\$67	85	\$02	<b>9</b> 6	ð 8	× 90 (	⊃ <sup>¥</sup> 11.9	85
~ * *	<sup>()</sup> 365	° 91≪	91 Ô	* 99 <u>*</u>	¥ 92 🎉	93 <u>(</u> )	4.1	88
	636	Ø	\$9×	890	94 <sup>0</sup>	Ð	3.3	84
~~ @,		Š.	ê (	Ìverall	<b>M</b> ean	<b>\$9</b> 4	8.8	-
	0 0		106	102	98⊗	, 102	3.8	100
A	84		83	~89°		88	6.6	86
j.	≈267	₽82 <sub>≈</sub>	82	×80	ð¥8	81	2.4	79
× ×	365	230	88	86	<b>9</b> 1	90	3.5	88
× ×	636	®2	_92 <sup>♥</sup>	Ľ,	88	89	5.6	87
A S	A &		Ş (	Rerall	Mean	89	8.6	-
DAT: days after	treatment		Q					
<sup>1</sup> Normalised re	cover = (r	nean re	coverv	/ mean	recove	v at DAT	-0) x 100	%
		Õ	ee erj			.j 2111	0)11100	
	AS	Y						
	J.							
, Ox								
U								

Table 7.1.2.2.1- 22:	Recovered amounts of NOA 413161 in soil expressed as per-	centage of	
	nominal applied amount	R D	,

Soil	DAT					Recov	eries	
			Single Values			Mean	RSD	Normalised to DAT-0 <sup>1</sup>
			[%	6]		[%]	[%]	<u> </u>
	0	111	107	106	111	109	2.6	95 0 2 2
	190	76	89	91	-	Č\$\$5	9.5	
	286	79	80	79	94	\$ 83	8.20	
	557	98	118	110	118	111	,8 <sup>,3</sup> <sup>°</sup>	
			(	Overall	Mean	98	₹ <b>5.2</b> (	
	0	95	95	84 🐇	Ø93	92	5:2	
	190	69	81	84	7 <b>0</b>	76	10.0	83 7 83
	286	59	89	<sub>م</sub> 79	×96	81	0 <sup>7</sup> 19.9 (	
	557	120	104	/ <sup>*</sup> 97_`	¥117	> 110	9, <b>9</b>	× ° × 119
				Overall	Mean	-89	<b>8.3</b>	
DAT: days after	treatment		Õ¥	×"	, Ç	AS I	r s	

Table 7.1.2.2.1-23: Recovered amounts of NOA 413463 in soil expressed as percentage of nominal applied amounts

		0	- Ô	Ŕ	Å.		L.V	
Soil	DAŤ	A	Ra	ľ,	~Ű <sup>×</sup>	Recov	eries	
		Ş <sup>×</sup> ,	Single	Values	Ő	∫°Mean (	RSD	Normalised to DAT-0 <sup>1</sup>
	Û,	Ś	y I	<b>[6</b> ]	ÿ	<b>`[%]</b>	[%])	* [%]
	· . 6	1406	90×	1/06	<b>95</b> 0	99	Å.7	<b>2</b> 100
	20	701	\$\$7	Ń	400	<u>96</u>	© 6.6 ≪	ັ້ 97
ð	\$286 <sub>4</sub>	<sup>©</sup> 59	71 🖇	104 6	ວັ90 <u>(</u>	81 0	24.6	82
, Q	557	2 <u>9</u>	85	105	- 0	9 <del>4</del> ,	<b>10</b> .8	95
ja j	Õ			Overall	l Mean	<b>393</b>	14.4	-
J	$\bigcirc 0 \bigcirc 0$	‴79‰	1 75 Ĉ	81	¥ 99 🌾	83	12.6	100
	190	Ø	ZÍ	800°	75 <sup>0</sup>	¥	14.2	99
an a	A\$6	\$80	<del>6</del> 6ئ	<u>م</u> م	86	81	13.4	97
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	0 5570	85	100	92	95	, 93	6.7	112
A A			A.S.	Overall	l Mean	85	12.1	-
	0 190 886 0 557 0	79% 99 5780 85 7	75 24 66 100	81 800 91 92 Overall	<ul> <li>✓ 99 (k)</li> <li>75<sup>©</sup></li> <li>56</li> <li>✓ 95 ₀</li> <li>Mean</li> </ul>	83 83 82 81 93 85	12.6 14.2 13.4 6.7 <b>12.1</b>	100 99 97 112 -

DATE days after treatment Normalised recovery = mean recovery mean recovery at DAT-0) x 100%

Table 7.1.2.2.1- 24:	Recovered amounts of CGA 357276 in soil expressed as per	centage of	
	nominal applied amount	N D	ŕ

Soil	DAT					Recov	eries	
			Single	Values		Mean	RSD	Normalised to DAT-0 <sup>1</sup>
			[%	6]		[%]	[%]	<u> </u>
	0	92	86	81	92	88	6.0	
	84	81	90	107	93	<b>E</b> \$93	11.5 🔬	
	267	117	111	83	105	\$104	14.8	498 ° 4
	365	92	96	107	82	94	k1.0"	×107 Q 54 W
Γ	636	93	95	103	88 8	95	<i>₹</i> 6.6 ¢	
			(	Overal	Mean	95 🖓	11.0	
	0	84	92	83∜	93	&8)°	6.2	
	84	94	90	<sub>1</sub> 88	¥Ø2	Ø4 4	6.8	
	267	86	116	108	¥92∝	> 10 l	13:8	. Õ <sup>¥</sup> √114 . Š
	365	104	28	ŁÔ¥	8.7°	-28	, Ø.9	× 112 0
	636	106	Q01	<b>\$99</b> 9 ·	<b>9</b> 4	2100 L	O 5.0 S	
		Ŵ		Överall	Mean	, 96 <sup>°</sup>	9 <b>0</b>	$\sim$ $\sim$ $\sim$ $\sim$
DAT: days after tr	aatmant	0.	4		C		Ň	

DAT: days after treatment <sup>1</sup> Normalised recovery = (mean recovery onean recovery at DAT<sup>4</sup>) x 100% Table 7.1.2.2.1- 25: Recovered amounts of NOA 409480 in soil expressed nominal applied amount as percentage of

	à.		y G		y :		Ó	A i
Soil	DAT	, Ô	4 S		•0	<sup>y</sup> Recov	eries	
Ň		L'Y	Şinğle	Values	<sup>°</sup>	Mean	<b>Å</b> SD ∕	Normalised to DAT-0 <sup>1</sup>
	LÕ`	, , , , , , , , , , , , , , , , , , ,	<u>~ [2</u>	st l	s de la companya de l	<u>_</u> [%] _	§ <sup>®</sup> [%] <sup>×</sup>	[%]
	$\overset{\sim}{\gg} 0 \overset{\sim}{\swarrow}$	104	104 ~	¢ 91 و	) 99 L	≥ 100Õ	6, D	100
~~?	- 84,	28	23	108	1070	101	<b>16</b> .8	102
Ê9"	<b>26</b> 7	<b>1</b> 05	\$00	100	ð¥9	£106 (	⊃ <sup>≫</sup> 8.5	107
~ *	مُنَّي365 رُ¢	`´10 <u>%</u>	96	×100 ×	¥ 97 🌾	101	5.9	101
l l l l l l l l l l l l l l l l l l l	636	Ø	103	250	91 <sup>0</sup>	Ľ	5.4	96
-4 M 11	R' é	5	ê (	Ìverall	Nean	<b>A</b> 101	6.8	-
	0 0	94	99	َ <sup>بَ</sup> 89	୭ 97 ֎	<sub>°</sub> 94	5.0	100
	84	106	24	100	₽₽ <sup>©</sup>	99	5.3	106
	°× <b>2</b> 67	<sup>©</sup> ∕101 <sub>∞</sub>	125	<u>۾</u> 99	ð <sup>704</sup>	107	11.2	114
	J 365	900	1190	105	<b>9</b> 8	103	11.9	110
y a s	636	Ôĺ	87	<u>1</u> 06	87	93	9.7	99
L.	A' &		$\mathbb{S}$ (	Rerall	Mean	99	10.0	-
DAT: days after	treatment		, d					
<sup>1</sup> Normalised re	covery = (n	ncan re	covery	/ mean	recover	y at DAT	-0) x 100	%
	1 ~	<b>0</b>						
	F. S	7						
E Z '								
$\bigcirc$								



### **B. RESIDUES**

On average, more than 70% of the fortified amount of trifloxystrobin and its degradation products CGA 357261, CGA 321113, CGA 373466, NOA 413161, NOA 413163, CGA 357276 and NOA 409480 were recovered from the stored samples at each sampling interval

The mean recovered amounts after 636 days of storage were 98 and 95% for trifloxystrobin, 101 and 100% for CGA 357261, 91 and 89% for CGA 321113, 94 and 89% for CGA 373466, 90 and 96% for CGA 357276, and 101 and 99% for NOA 409480. After 557 days of storage the mean recovered amounts were 98 and 89% for NOA 413161 and 93 and 85% for NOA 413163.

The results demonstrate that residues of trifloxystrobin, CGA 357261, CGA 321113, CGA 373462, CGA 357276 and NOA 409480 in soil are considered to be stable for at least 656 days and drat residues of NOA 413161 and NOA 413163 in soil are considered to be stable for at least 557 days under frozen conditions.

# CONCLUSION

Residues of trifloxystrobin and its degradation products CGA 357261 CGA 221113 CGA 973466, NOA 413161, NOA 413163, CGA 357276 and NOA 409480 if soil are stable for at least 557 days under frozen conditions.

			· , 0			
Report:	KCA 7.1.2.2.1 (1/8;	;		o≪• <i>≹</i> ?	<b>₽</b> 2013	
Title:	Kinetic Evaluation of	Dethe Degradatio	n of Trifle	oxystrobîn a	nd its Metabol	ites after
	Soil Incorporation	und European	ı, Đield 🌾	onditions	according to	FOCUS
	Kinetics Wing the K	KinGUI 2 Tool 🔉	υ <sup>γ</sup> Ο΄	or a	.''Y	
Report No:	EnSa-18-07220	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	, O		¢	
Document No:	∭~468499-Q121		S.	Î ș		
Guidelines:	- FOCUS kinetics (2	200@p <sup>1</sup> 🖉 .	s			
GLP: Or	No x		y õ	, O		
Justification:	New data / guideline	requirement: 🖉	Q .	õ		
× C	Kinetic analysis of	the degradation	of Trifloxy	strobin and	l its major deg	gradation
	products CGA 3211	13. NOA 413161	and CGA	357276 for	modelling pur	pose

## Executive Summary

A kinetic analysis of soil residue data from the field dissipation study M-462061-02-1 (Supplemental Dossier, KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FOCUS kinetics (2006) <sup>1</sup> KGA 7.1.2.2.1/15) was performed with the offtware KinGUI 2 according to FO

Single first order was the most appropriate kinetic model for modelling purpose for the degradation of trifloxystrobin at the sites and the si

# **Bayer CropScience** Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

The half-lives (geometric means) were 1.69 days for trifloxystrobin, 48.1 days for CGA 321113, 39.3 days for NOA 413163 and 51.7 days for CGA 357276.

The formation fractions (arithmetic means) were 0.707 for CGA 321113, 0.145 for NOA 413061 and 0.068 for CGA 357276.

Soil residue data from the field dissipation study M-462061-02-1 (Supplemental Dossie KCA 7.1.2.2.1 /15) were used. In this study, the degradation of trolloxystrobin was studied a sites.

(United Kingdom), (Germany), (Northern France), (Spain) and (Italy) order field conditions for up to (Southern France), 733 days with an application rate of 187.5 g/ha and normalise to 20°C and field opacity,

Ű Soil temperature and moisture were simulated with the FOCUS PEAR 4.4,4 model based on daily weather data (precipitation and irrigation, maximum and minimum, air remperature, humidity or vapour pressure, wind speed, global solar radiation) These values were used a mput values for the time-step normalisation process implemented in a Microsoft Excel<sup>®</sup> spreadsheet

m

The kinetic analysis was performed according to FOCUS kinetics (2006) 1 Wing the software KinGUI 2 with four different killetic models: Single first order, first order multi Sompartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessment of the goodness of the fits, chi<sup>2</sup> scaled-error criterion, t-test significance correlation malysis and standard deviation. The DT50 value was calculated from the resulting kinetic parameters. The degradation of degradation products was described with the single first order model. The resulting DT value from the double first order in parallel was not calestated from the slow k-rate as recommended by FOCUS. This procedure produces the worst case DT50 for the parent compound, which, however, does not describe the worst case scenario for the following degradation products. The DTS value taken for modelling is based on the





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#### П. RESULTS

Single first order (SFO) was the most appropriate kinetic model for modelling purpose for the (United Kingdom), degradation of trifloxystrobin at the sites (Northern Prance), (Southern France), (Spain) and (Italy), as welt as (Germany). The SFO kinetic model was used for double first order in parallel at site modelling purpose to describe the degradation of CGA 321113, NOA #13161 and CGA \$\$7276. Table 7.1.2.2.1- 26 to Table 7.1.2.2.1- 29 are summarizing the results of the kinetic analysis Ø i

#### Table 7.1.2.2.1-26: Kinetic parameters for the degradation of trifloxystrobit in sol under field conditions for modelling purpose according to FOCUS (normalised to 20 °C and field capacity 0

	6	<i>R</i> o <sup>°</sup>			$\sim \sim$
Site	Kinetic	D@T <sub>50</sub> <sup>2</sup>	Chi <sup>2</sup> Exror	🖉 t-test	Visual
	Model <sup>1</sup>	Hdays)	[80]		Assessment <sup>3</sup>
(Germany)	DFOP '	1,137	27.1 4	$k_{10}$ 2.4 x 10 <sup>-2</sup>	
(United Kingdom)	S₽®⁄	¥.66	165	$\sim < 2 \times 10^{-16}$	8
(Northern France)	SFO 2	√ <sup>™</sup> 1.69√ <sup>™</sup>	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	7 5x 10-7	₩ +
(Southern France)	©SFO ©	2 3	§ 9.0 0	2 x 1€ €	°~y +
(Spain) 🖉 🐁	SFO <sup>®</sup>	2.10	Ø 19 <b>0</b>	<sup>07</sup> .6 x 10 <sup>-14</sup> %	+
(Italy) V (	SFO .	2.49	A3.5 .	$6.7 \times 10^{-15}$	+
j j j j j j j j j j j j j j j j j j j	geomean	1,69			

<sup>1</sup> SFO: single first order, DFOP; double first order in parallel

for DFOP: DT50 was not calculated from the sow k-cite, DT50 is based on (it of the decline curve 2

3 visual assessment:  $\frac{1}{2}$  good, 0 = moderate

O) Kinetic parameters for degradation of CGA \$21113 in soil under field Table 7.1.2.2.1-27: conditions for modelling purpose according to FOCUS (normalised to 20 °C and field capacity) Ĩ

		0		~ '0'		
Site C	K)F	Kinetic	Deg 50	Chi <sup>2</sup> Error	t-test	Visual
	KI (	Model	[days]	× [%]		Assessment <sup>2</sup>
(Germany)	0.680	SFO	52.4	<b>■</b> 8.9	3.8 x 10 <sup>-10</sup>	+
(United Kingdom)	0.830	SFO S	24	9.5	5.8 x 10 <sup>-14</sup>	+
(Nothern Dance)	<u> 0,3</u> 56	©″SFQ© <sup>♥</sup>	59.0	16.8	1.2 x 10 <sup>-6</sup>	0
	√0.668 <sub>C</sub>	SEG	<b>\$95.8</b>	19.1	3.6 x 10 <sup>-8</sup>	0
(Southern France)			$\mathbb{Q}$			
(Spain) Q	0.488	SFO >	23.7	28.5	1.2 x 10 <sup>-5</sup>	0
(Italy)	<b>3</b> .000 (	SFQ	79.8	15.2	5.1 x 10 <sup>-7</sup>	+
arithmetic mean	¥ 0.70R	geomean	48.1			

FF: formation fraction

<sup>1</sup> SFO: single furst order <sup>2</sup> visual assessment: <sup>4</sup> good, o = moderate

## Table 7.1.2.2.1-28: Kinetic parameters for degradation of NOA 413161 in soil under field conditions for modelling purpose according to FOCUS (normalised to **20 °C and field capacity**)

					×		
Site	FF	Kinetic	DegT <sub>50</sub>	Chi <sup>2</sup> Error	_Qr∠test	<b>N</b> isual	
		Model <sup>1</sup>	[days]	[%]	<i>'0</i> '	Assessment <sup>2</sup>	
(Germany)	0.071	SFO	66.1 <sup>3</sup>	18.9 🎤	>> 6.9 x 10 <sup>-3</sup>	O' O 4	la l
(United Kingdom)	0.263	SFO	30.7	15.4 🏑	1.4 x 10 <sup>-7</sup>		, 
(Northern France)	0.284 4	SFO	3264	47,6	1.7 x 10 <sup>G</sup>	Q - L	Ś
	0.078	SFO	\$26.0	19.3	5.9 x 40-5		, O V
(Southern France)		A	0	Q <sup>y</sup> <sup>o</sup>		° Č "O	, <sup>e</sup>
(Spain)	0.259	SFQ	34.9	∼ 17.2°	6.4 x 1.00"	& + X	
(Italy)	0.055	SFO <sup>™</sup>	<u>م</u> 50.8 م	0 16.9	©7.3 x∂0 <sup>-5</sup>		
arithmetic mean	0.145	gomean	y 39.30			4	
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		4// 11			

FF: formation fraction

SFO: single first order

visual assessment: + = good, o = moderate, 2

estimate based on fit of the decline cure 3

value excluded from the calculation of arithmetic or geometric meandue statistical parameters

Table 7.1.2.2.1- 29:	Kinetic parameters f	or degradation	of &GA 3572760	on soil under field
	conditions for model	ling purpose ac	cording to FOC	US <i>inormalised</i> to
	20 °C and field capacit	ty) 🖓 💮 🥤		- 120

	) (h)	<u> </u>		\ <u>{</u> } ~{		
Site	FF	Kinetic Model	Deg Fri Idavs]	Chi <sup>2</sup> Error	trest	Visual Assessment <sup>2</sup>
					N. 196	
(Cermany)	0.072	SF@*	_≫6.5	, 20.¥	8.1 x 10 <sup>-6</sup>	0
(United Kingdom)	0.098	SEO .	980.2 K	\$.8	ℓ 1.0 x 10 <sup>-6</sup>	+
(Northern France)	0.062	SFO &	36.1	<b>7.9</b> √	1.8 x 10 <sup>-6</sup>	+
	0.922 4	SFQ SFQ	1974	24 <b>5</b>	4.3 x 10 <sup>-2</sup>	-
(Southern France)	e a		ñ.			
(Spain)	0.000	SFO 🔊	45.5	<b>19.7</b>	1.9 x 10 <sup>-3</sup>	0
(Italy)	0.032	SFQ <sup>O</sup>	76.5	23.2	1.9 x 10 <sup>-3</sup>	0
arthmetic mean	0.068	geomean	<b>51.7</b>			

FF: formation fraction

- <sup>1</sup> SFO: single first order
- <sup>2</sup> visual assessment: = good, o = moderate
- estimate based on fit of the decline curves
- value excluded from the calculation of drithmetic or geometric mean due to unreliable statistical parameters

The calculated mormalised (20 °C, and fight capacity) half-lives (geometric means) for modelling purpose for the degradation of willoxystrobin and its major degradation products CGA 321113, NOA 41316 and NOA 409480 in soil under field conditions were 1.69 days for trifloxystrobin, 48.1 days for CGA 321013, 3903 days for NOA 413161 and 51.7 days for CGA 357276 at the tested sites. The normalised 20 °C and field capacity) formation fractions (arithmetic means) were 0.707 for CGA \$21112, 0.145 For NOA 413161 and 0.068 for CGA 357276. Ô Â

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil under field conditions given in sections CA 7.1.2.2 and CA 7.1.2







# Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.2.2.1 /19; ; .; ; 2013
Title:	Kinetic Evaluation of the Degradation of Trifloxystrobin Metabolite CGA 357261
	and its Metabolites after Soil Incorporation under European Field Conditions
	according to FOCUS Kinetics Using the KinGUI 2 Tool
Report No:	EnSa-13-0723
Document No:	M-468500-01-1
Guidelines:	- FOCUS kinetics (2006) <sup>1</sup>
GLP:	No Di A A A A
Justification:	New data / guideline requirement:
	Kinetic analysis of the degradation of the major trifloxystrobit photodegradation
	products CGA 357261, CGA 373466, NOA 413163 and NOA 409480 for
	modelling purpose $\mathcal{O}^{\mathcal{O}^*}$ $\mathcal{O}^{\mathcal{O}^*}$ $\mathcal{O}^{\mathcal{O}^*}$

## **Executive Summary**

A kinetic analysis of soil residue data from the field discipation study M-467701-01-1 (Supplemental Dossier, KCA 7.1.2.2.1/16) was performed with the offware KinGVI 2 according to FOCUS kinetics (2006)<sup>1</sup> to derive normalised (20°C and field capacity) half-lives for the trifloxystrobin photodegradation products CGA 35/261, CGA 373466, NOA 413163 and NOA 409480 as well as normalised (20°C and field capacity) formation bactions for OGA 373466, NOA 413163 and NOA 409480, which are suitable for modelling purpose.

Single first order was the most appropriate kinetic model for modelling purpose for the degradation of CGA 357261 at the sites (United Kingdom), (United Kingdom), (Southern France), (Spain) and (Italy), double first order in parallel, at site

(Germany), as well as hockey stick at site **Constant** (Northern France) under field conditions with an application rate of \$87.5 g/ha and normalised to 20. Cand field capacity. The single first order kinetic model was used for modelling purpose to describe the degradation of CGA 373466, NOA 413163 and NOA 409480

The half lives (geometric means) wore 0.44 days for CGA 35 261, 22.4 days for CGA 373466, 39.3 days for NOA 410163 and 51.7 days for NOA 409480.

The formation fractions (arithmetic means) were 0.852 for CGA 373466, 0.317 for NOA 413163 and 0.028 for NOA 409480

# METHODS

Soil residue data from the field discipation study M-465701-01-1 (Supplemental Dossier, KCA,7,1.2.2.1/16), were used. In this study, the degradation of CGA 357261, a photodegradation product of trifloxystrobul, was studied at ortes for the degradation (Germany), for the degradation (United Kingdom), for the france (Construction (Southern France), for the degradation rate of 187.5 g/ha and for the degradation of 20 °C and field capacity (Construction).

Soil temperature and moisture were simulated with the FOCUS PEARL 4.4.4 model based on daily weather data (precipitation and irrigation, maximum and minimum air temperature, humidity or vapour pressure, wind speed, global solar radiation). These values were used as input values for the time-step normalisation process implemented in a Microsoft Excel<sup>®</sup> spreadsheet.



The kinetic analysis was performed according to FOCUS kinetics  $(2006)^{1}$  using the software KinGUI 2 with four different kinetic models: single first order, first order multi compartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model was selected on the basis of a detailed statistical analysis including visual assessement of the goodness of the first, chi scaled-error criterion, t-test significance, correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters. The degradation of degradation products was described with the single first order model. The resulting DT<sub>50</sub> values from the double first order in parallel and hockey stick model were not calculated from the Slow k-rates as recommended by FOCUS. These procedures produce the worst case DT<sub>50</sub> for the parent compound, which, however, does not describe the worst case scenario for the following degradation products. The DT<sub>50</sub> values taken for modelling are based on the iteratively calculated values from KinGUI 2000.

Single first order (SFO) was the nost appropriate kinctic model for modeling purpose for the degradation of CGA 357261 at the sites and the sites are (United Kingdom). (Southern France), (Spain) and (Italy), double first order in parallel (DFOP) at site (Germany) as well as heckey stick (MS) at site (Corthern France). The SFO kinetic model was used for modeling purpose to describe the degradation of CGA 373466, NOA 413163 and NOA 409480. Table 7.5.2.2.1030 to Pable 7.1.2.2.4 33 are summarizing the results of the kinetic analysis.

Table 7.1.2.2.1-30: Kinetic parameters for the degradation of CGA 357261 in soil under field combining purpose according to FOCUS (normalised to 20°C and field capacity)

		0	6'0' ×	U' 🏷	and a start of the		
	Site 🗸	Ra	Kinetie	Deg Tso <sup>2</sup>	Chi <sup>2</sup> Error	t-test	Visual
	? <u> </u>		Mode	[days]	© [%])		Assessment <sup>3</sup>
ì	(Germany)		DFQP	\$0.09	78	k <sub>1</sub> : 0.281	+
		\$ I	\$` `*			k <sub>2</sub> : 0.261	
	(United Kingdo	and the second sec	≈ SFO ≈	0.61	7.9	$< 2 \text{ x } 10^{-16}$	0
	(Northern France)		, Ĥ <b>R</b>	0.12	<sup>©°</sup> 17.5	k <sub>1</sub> : 0.470	0
		Ű ,	0 <sup>×</sup>	ð Ø		k <sub>2</sub> : 3.44 x 10 <sup>-3</sup>	
	South n Fr	ance)	SFO S	1.35	8.5	$< 2 \text{ x } 10^{-16}$	0
	(Spain)		₹ <sup>™</sup> SĘO?	<b>9</b> .95	6.0	5.78 x 10 <sup>-9</sup>	+
W.	(staly)	<u> </u>	ŞĘO	°∕≫0.88	24.9	1.95 x 10 <sup>-7</sup>	+
\$	A A	and the second s	gomean	0.44			

<sup>1</sup> SPO: single first order, pFOP: double first order in parallel, HS: hockey stick

<sup>2</sup> for DFOP and HS: DT<sub>50</sub> was not calcented from the slow k-rate, DT<sub>50</sub> is based on fit of the decline curve <sup>3</sup> visual assessment:  $\exists \Rightarrow good = moderate$ 

for DFOP and FS: D1<sub>50</sub> was not calculated visual assessment:  $A^{\pm}$  good  $\delta =$  moderate

Table 7.1.2.2.1-31: Kinetic parameters for degradation of CGA 373466 in soil under field conditions for modelling purpose according to FOCUS (normalised to **20 °C and field capacity**)

					×		
Site	FF	Kinetic	DegT <sub>50</sub>	Chi <sup>2</sup> Error	_Qr∠test	<b>N</b> isual	
		Model <sup>1</sup>	[days]	[%]	<i>"0</i> "	Assessment <sup>2</sup>	
(Germany)	0.640	SFO	6.86	36.5	≫2.09 x 10 <sup>-3</sup>	O O K	Ŷ,
(United Kingdom)	1.000	SFO	8.63	12.7 🔬	5.94 x 10 🐇	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	@_
(Northern France)	0.618	SFO	29.1	27,5	7.63 x 🕼	$\mathcal{Q}' + \mathcal{Q}$	Ś
	1.000	SFO	<i>§</i> 91.0	36.5	6.69 × 10 <sup>-5</sup>	Q 6 <sup>5</sup> %	, O V
(Southern France)		Ţ	0 •	Q" ~ °		° °° ,0	, Č
(Spain)	0.860	SFQ	14.5 <sup>3</sup>	∼ 9.40	4.80 x 100 <sup>°</sup>		
(Italy)	1.000	SFO	\$6.1	0° 20,A	ØI.84 x∂d <sup>-7</sup>		
arithmetic mean	0.853	g@mean@	ປ້ 22.4 <sup>(</sup> )				

FF: formation fraction

SFO: single first order

visual assessment: + = good, o = moderate 2

<sup>2</sup> visual assessment: + = good, o = moderate <sup>3</sup> estimate based on fit of the decline cuce **Table 7.1.2.2.1- 32:** Kinetic parameters for degradation of NOA 413-163 in soil- under field conditions for modelling purpose according to FOCUS (normalised to 20 °C and field capacity) (1)Ò

Š	× .		Ø		<u>~</u> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
Site 😪	, FF 炎	Kinetic	DegT <sub>50</sub>	∙ Chi <b>∛È</b> rror≪	t-test	Visual
/=		Model 1	/ [days]	[%]_ <sup></sup>	Š	Assessment <sup>2</sup>
(Germany)	0%039 4	SFOC	53,0 <sup>3</sup>	0 17.5 ≶	4.23 x 10 <sup>-3</sup>	+
(United Kingdom)	0.457	SFO <sup>®</sup>	×¥7.4 @	40.5	2.59 x 10 <sup>-2</sup>	+
(Northern France)	0.498	SF0 >	29.9	<b>26</b> .7	1.65 x 10 <sup>-3</sup>	+
	0.485	SFO SFO	36.5	<u></u> 20.6 <sup>€</sup>	1.18 x 10 <sup>-3</sup>	+
(Southern France)	0	V Q		9. Q		
(Spain)	0.332	, <b>S</b> FO	©25.2	21.0	3.47 x 10 <sup>-3</sup>	+
(Italy) Č	0,05	SFO SFO	28.9	20.3	9.47 x 10 <sup>-4</sup>	+
arithmetic mea	n <b>0.317</b>	Sgeomean	39.3	Ž		



Table 7.1.2.2.1-33: Kinetic parameters for degradation of NOA 409480 in soil under field conditions for modelling purpose according to FOCUS (normalised to 20 °C and field capacity)

					$\sim$		_
Site	FF	Kinetic	DegT <sub>50</sub>	Chi <sup>2</sup> Error	_Qr≤test	Nisual 🔊	
		Model <sup>1</sup>	[days]	[%]	<i>®</i>	Assessment <sup>2</sup>	
(Germany)	0.006	SFO	97.3	33.7 🎾	♦4.71 x 10 <sup>-3</sup>		Ŝ,
(United Kingdom)	0.041	SFO	95 🔊	14.9 🏑	4.37 x 10-3		
(Northern France)	0.025	SFO	34.7	23,0	1.87 x 崎	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Ś
	0.020 4	SFO	AJ11.1 <sup>3</sup>	$2\Omega^{0}$	1.25 x 10 <sup>-3</sup>	õ. t <sup>e</sup> s	O'
(Southern France)		J	U			y cy e	Ĩ
(Spain)	0.035	SFO	18.1	19.3°	3:921 x 100 <sup>™</sup>	& + X	
 (Italy)	0.035	S₽O	29.7	¢ 17,Y	∕₿.42 x 🖓 🖓 ⁻⁴		
arithmetic mean	0.028	gomean	y 51.70			4	
arithmetic mean	0.033 0.028	gomean	51.70				

FF: formation fraction

2

3

e calculated normalised to or The calculated normalised (20 ° (2, and ford capacity), half-lives (geometric means) for modelling purpose for the degradation of the major trifloxystrobin photodegradation products CGA 357261, CGA 373466, NOA 413163 and NOA 409480 in soil under field conditions were 0.44 days for CGA 357261, 22.4 days for GA 378466, 39.3 days for NOA 403163 and 51.9 days for NOA 409480 at the tested sites. The normalised (20 C and field capacity) formation fractions (arithmetic means) were 0.853 for CGA 373666, 0,317 for OA 413163 and 0,028 for NOA 409480.

The results are included in the summary of the degradation rates of trifloxystrobin and its major degradation products in soil under field conditions given in sections QA 7.1.2.2 and CA 7.1.2

# CA 7.1.2.2.2 Soil accumulation studies

No field accumplation studies have been performed for trifloxystrobin. Accumulation of trifloxystrobin and its degradation products CGA \$21113 and CGA 373466 was modelled from DT<sub>50</sub> values calculated in M-064112-01-1 (Baseline Dossier, KCA 7.1.2.2.1/14), evaluated during the Annex I inclusion and accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following study is included in the Baseline Dossier:

A

Annex Point / Reterence No . Author(s)	Year	<b>Document No</b>
KCA 7.1.2.2.2 /Q1	2001	M-065732-01-1
No additional studies are submitted within this Supplemental I approval.	Dossier for the trifle	oxystrobin renewal of

0



# CA 7.1.3 Adsorption and desorption in soil

## CA 7.1.3.1 Adsorption and desorption

The adsorption and desorption behaviours of trifloxystrobin and its major degradation products in soil were studied using two different radiolabel positions, [<sup>14</sup>C-GP] and [<sup>14</sup>C-TP]. The studies have been performed in a number of soils in batch equilibrium experiments. Adsorption and desorption isofterms, were calculated by linear regression analysis of the adsorption or desorption data according to the Freundlich equation. The calculated adsorption constants and correlation coefficients are listed in Table 7.1.3.1- 2 to Table 7.1.3.1- 10, an overall summary is given Table 7.1.3.1- 1.

# Table 7.1.3.1-1: Overall summary of adsorption constants Koccads) in Soils of trifloxystrobit and its major degradation products

		k G	ŝ	_%_ ×		) °~	K <sup>y</sup>
		O' W	Koc(ad	or do	r P	L.	4
	Compo	und 🖉 🦼	<u>©</u> [mIQ	ğ		0′ _(	ŗ' <sub>6</sub> ,4
	trifloxystrol	oim (PE) 🔨	<sup>ب</sup> ر کھر کے پ	7	O <sup>v</sup> ×		A ST
	CGA@572	§ÎX(ZE)√	<u>∘</u> ~∛487	,0' x	, ŝ		Ő
	C6¥321\$k	13 (EE)	~~ 12 <del>0</del>		<u>S</u>	Q' à	ň
	CGA 3734	66 ( <i>ZÊ</i> )	\$7.6		õ.	Š. V.	,
	CGA \$813	18(ØZZ) Ö	6.5		õ (		
~	NQA 4131	61 (ZE)	3.6	S.	) <sub>(</sub>	×	
Ŕ	🕺 🔊 🔊 🔊 🔊	63 ( <i>EE</i> )	<u> </u>		Ò	0	
Ô	CGA 372	276 @	8170	) 🖓 .		Q.	
Ý	NOA 4094	180°(Z)	\$235¢	5 2	y .Q	<i>y</i>	
	¢arithmetic me	an 🏷		1 <u>4</u> ,	~~)`		
Ũ			v V	ŎŶ	s,		

Table 7.1.3.1-2: Coverall summary of adsorption constants and correlation coefficients in soils of trifloxystrobin

	× v	Toxturo	n	Anna Daint D	<b>V</b> <sub>E</sub> (1)	1/n	Kacch
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	USDA	<b>N</b>	Reførence No	mL/g]	1/11	[mL/g]
		loamsand	√ 7.3 <sup>€</sup>	KGA 7.1.3 1/01	14.7	0.925	1837
2.1		sand 🔊	6,8%	KCA 7.1 3.1.1 /01	11.2	0.999	3745
	4	∂ <sup>S</sup> loam^́∕>	<i>.</i>	KCA 7.1.3.1.1 /01	40.6	0.939	2031
Þ	Ĩ,	🛇 silt logrm 🔗	~7.2 "	KC457.1.3.1.1 /01	126	0.978	2683
1	0° õ	humic soil	6.7 <sup>0</sup>	KCA 7.1.3.1.1 /01	325	0.976	1642
		loamy sand	50	CA 7.1.3.1.1 /02	23.3	0.942	2327
	là i	N W		arithmetic mean	90.1	0.960	2377

<sup>1</sup> Soil was tested with two different soil-to-solution ratios, the soil-to-solution ratio of 1/20 was excluded from the valuation during the Annex I inclusion (SANCO/4339/2000-Final, 7 April 2003)

Table 7.1.3.1- 37	• Overall summary	v of adsorption	constants and	correlation	coefficients	in
L	Soils of CGA 357					
_O'		701 71				

Soil Soil Soil Soil Soil Soil Soil Soil	Texture (USDA)	pН	Annex Point / Reference No	K <sub>F(ads)</sub> [mL/g]	1/n	K <sub>OC(ads)</sub> [mL/g]
2 P74 8 V	sandy loam	7.0	KCA 7.1.3.1.2 /05	2.78	1.034	479
185 Q 185	loam	6.9	KCA 7.1.3.1.2 /05	14.9	1.005	476
186	sandy loam	6.6	KCA 7.1.3.1.2 /05	3.17	0.962	389
C 187	sand	5.6	KCA 7.1.3.1.2 /05	4.61	0.980	567
188	clay loam	6.9	KCA 7.1.3.1.2 /05	12.8	0.990	526
			arithmetic mean	7.65	0.994	487

Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

# Table 7.1.3.1-4:Overall summary of adsorption constants and correlation coefficients in<br/>soils of CGA 321113

Soil	Texture (USDA)	рН	Annex Point / Reference No	K <sub>F(305)</sub> [mt] g]	1/n	KOC(ads)	õ
	loamy sand	7.3	KCA 7.1.3.1.2 /01	0.83	1.006	104	A
2.1	sand	6.8	KCA 7.1.3.1.2 /01	€ 0.58	1,108	Ø)94 🖌	Q 1
	loam	7.1	KCA 7.1.3.1.2 /01 🖧	2.33	Ø.993	×117 ×	, a
	silt loam	7.2	KCA 7.1.3.1.2 /06	3.96	0.94 <b>%</b>	¢ 84	Š
Illarsaz	humic soil	6.7	KCA 7.1.3.1.2 🖗 🕅	18.6 🔊	0.973	A ga g	$\mathcal{O}^{\cdot}$
	loamy sand	5.1 🖉	KCA 7.1.3.10/02	° 1.32	0.984	©۲32 ٍ و	Ĩ
		D	arithmetic mean	4.60	Q.001	b 1210 <sup>°</sup>	

# Table 7.1.3.1- 5: Overall summary of disorption constants and correlation coefficients in soils of CGA 373466

	station of the second s			Ô <sup>v</sup> 4	,	ž "Č
Soil	Texture	^%pÅ	Annex Point	KF(ads	1/1	Koc(ads)
	(USPA) (	\$~ j	Reference No	[mLg		[mL/g]
174	sandy loam	7.Ô	KCA 7.1.3, 1.2 /05	0. 175 .	<b>0.90</b> 2	30.1
185	- Goam 🔊	69	<b>%</b> CA 7,4.3.1.2,003	<u>0</u> 3.07 <u></u>	0.87%	97.7
186	Randy loam	<b>B</b> .6	KCA@.1.3.12703	O 0.540	06990	63.4
187	, sand 🔨	≥ 5.6 <sub>e</sub>	KCÂ 7.1.3.4.2 /03@	1.35	Ø.901	166
188	clay loam	6	KCA 7.1.3.1.2	×J.98 Ø	0.794	80.9
		A A	🎸 arithmetic mean	°∑1.42	0.894	87.6
		n n n n n n n n n n n n n n n n n n n		S AV		

# Table 7.1.3.1- 6: Overall summary of adsorption constants and correlation coefficients in soils of CGA 381318

C .	<u> </u>		V .		1		
Sol		Texture (USDA)	pH ,	Annex Foint / Reference No	K <sub>F(ads)</sub> [mL/g]	1/n	KoC(ads) [mL/g]
		sandy loam	<b>T</b> .1	KCA@1.3.1.2006	1.41	0.866	78.2
	, (	Sandy Toam	√ 5.9 <sup>¢</sup>	<sup>™</sup> KQA <sup>™</sup> 7.1.3 <sub>0</sub> .2 /06	1.13	0.892	75.5
	Š	silt loam	6,2%	KCA 7.K3.1.2/06	1.21	0.895	75.9
	4	@lay loam	<b>@</b> .1	QKCAZ,1.3.1.2/06	3.68	0.896	76.6
9. 1			× 5	arithmetic mean	1.86	0.887	76.5
Ø1 .(	) ^;	× 、♥ O	· . O	404			

# Table 7.1.3.1-7: Overall sommary of adsorption constants and correlation coefficients in soils of NOA 413161

×				· .~O				
k≪	Soil	Č,	<b>Texture</b>	) Hq	Annex Point /	KF(ads)	1/n	KOC(ads)
**		- P	ر) (USDA)	.0 <sup>%</sup>	<b>Reference</b> No	[mL/g]		[mL/g]
			loamy sand	5.1	KCA 7.1.3.1.2 /04	0.042 1	N/A <sup>1</sup>	4.2 <sup>1</sup>
		n an	Noam 🖉	5.3	KCA 7.1.3.1.2 /07	0.116	0.912	6.4
		Ő	sandy lõsm	6.2	KCA 7.1.3.1.2 /07	0.066	0.931	3.7
		4a_0	o ⊂silt loam	6.6	KCA 7.1.3.1.2 /07	0.049	0.885	2.0
N,			clay loam	7.3	KCA 7.1.3.1.2 /07	0.095	0.890	2.1
		O X			arithmetic mean	0.082	0.905	3.6

N/A: not applicable

<sup>1</sup> Study was terminated after preliminary tests, therefore the concentration dependency of the adsorption was not investigated and the K<sub>F(ads)</sub> and K<sub>OC(ads)</sub> values were not used for the calculation of the arithmetic mean.

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Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

# Table 7.1.3.1- 8:Overall summary of adsorption constants and correlation coefficients in<br/>soils of NOA 413163

Soil	Texture (USDA)	рН	Annex Point / Reference No	K <sub>F(abs)</sub> [md)/g]	1/n	Koc(ads)	/
	loam	5.3	KCA 7.1.3.1.2 /08	0.172	0.887	9:6	
	sandy loam	6.2	KCA 7.1.3.1.2 /08	<b>7</b> 0.115	0.920	<b>\$</b> .4	
4a	silt loam	6.6	KC 7.1.3.1.2 /08	0.118	¢.949	¥4.9 \$	Ø
	clay loam	7.3	KČA 7.1.3.1.2 /08	0.201	0.893	44	Y
			arithmetic mean	0.15h	<b>0.9</b> ₽	<u>.</u>	

 Table 7.1.3.1-9:
 Overall summary of adsorption constants and correlation coefficients in soils of CGA 357276

		0 🕺		The second secon	Ç Or	L	4
Soil	Texture 🔎	, pĦØ	Annex	Point /	Katerads)	Oĭ/n ₄	Koc
	(USDA)		Refere	ace Nø	₹ <sup>®</sup> Ωn <sup>™</sup> L/g <sub>k</sub>		
174	sandy loam	0.V 🔊	KCA 11.	3.1, <b>2</b> 09 s	(√48.5)	0,952	8345
185	logn	√ <sup>∞</sup> 6.9 √	KCA7.1.	3 <i>6</i> ,2/09,~	2007	<b>&amp;</b> 813	م 6587
186	sandy loam	6.6	KĈA 7.1	3.1.2 /09	65.1	0.962	9228
187	sand 🖗	<b>\$</b> 6	RCA 70	3.1.2009	079.4°	0.847	9756
188 🗳	clay loam	6.9	<b>КС</b> а 9.1.	3.1 2/09	160	0.813	6934
~	ý <u>v.</u> 8	× L	arithm	retic mean	<b>\$</b> 16	0.877	8170
		aľ	•0		N U	2	

Table 7.1.3.1-10: Overall summary of adsorption constants and correlation coefficients in

 <u> </u>		$\sim$		V		
Soil S	Texture (USDA)	~pH .	Annex Point/ Reference No	ØK <sub>F(ads)</sub> ∛ [mL/g]	1/n	KoC(ads) [mL/g]
	O sand loans	5.10	KOA 7.1 3 1.2 /10	41.7	0.847	2317
~	sándy loam	~5 <u>7</u> 9	CA 7.1.3.1.2410	37.6	0.865	2507
	silt loom	6.2	KCAC7.1.3.1 2/10	40.5	0.862	2530
	Clay loam	°7.j_O	KCA 7.1 3, 1.2 /10	99.4	0.879	2070
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Ŵ	👋 arithmetic mean	54.8	0.863	2356
~~ 4						

# CA 7.1.3.1, BAdsorption and desorption of the active substance

The adsorption and desorption behaviour of oiflox/strobin in soil in batch equilibrium experiments was evaluated during the Annox I inclusion using one radiolabel position, [<sup>14</sup>C-GP], and was accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following studies are included in the Baseline Dossier

Annex Point Reference No Author	Year Document No
KCA 7.1.3	1995 M-033549-03-1
KCA 7. \$3.1.1 \$2 & 2	2000 M-049477-01-1

No additional studies are submitted within this Supplemental Dossier for the trifloxystrobin renewal of approval. A summary of the adsorption and desorption behaviours of trifloxystrobin and its major degradation products in soil is given in section CA 7.1.3.1.

# CA 7.1.3.1.2 Adsorption and desorption of metabolites, breakdown and reaction



#### products

The adsorption and desorption behaviours of the major degradation products CGA 32113, CGA 373466 and NOA 413161 in soil in batch equilibrium experiments were evaluated during the Annex I inclusion using two radiolabel positions, [<sup>14</sup>C-GP] and [<sup>14</sup>C-TP], and were accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following studies are included in the Baseline Dossier:

		æ.		i.v		2
Annex Point / Reference No	Author(s)		Q	Year	Document No	
KCA 7.1.3.1.2 /01		Å,	, Ô <sup>%</sup>	1995	M-033569-02	Ő
KCA 7.1.3.1.2 /02		.1 <sup>0°</sup>		2000 🦿	M-051381-01-1 🦉	7
KCA 7.1.3.1.2 /03		;,	× . Ø	@1997Q*	M=036332-01-1	
KCA 7.1.3.1.2 /04				2000	M-046346-01-1	
		V Z		$\sim$		

Six additional studies have been performed for the major degradation products CGA 357261, CGA 381318, NOA 413161, NOA 413163, CGA 357276 and NOA 409480 and are submitted within this Supplemental Dossier for the trifloxystrobin renewal of approval using two adiotabel positions, [<sup>14</sup>C-GP] and [<sup>14</sup>C-TP]. A summary of the adsorption and desorption behaviours of trifloxystrobin and its major degradation products in set is given in section (A 7.1.1.)

Report:	KCA 7.1.3.1.2 (05; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	
Title:	Adsorption-Desorption of [planyl (B)-U-14C]-CGA-357261 in Soil	
Report No:	211-97	
Document No:	$M-036399-07-1$ $\beta$ $O$ $\delta$ $\delta$ $\delta$ $\delta$ $\delta$	
Guidelines:	- JS EPA Pesticide Agessment Guidelines, Subdicision IV, Section 16	3-1
GLP:	Sees to a star a	
Justification: 🏾 🌘	New data / guideline requirement? 5 2 2	
~	Adsorption and desorption of major photodegradation product CGA 35	7261
0		

Executive Summary 🔬

The adsorption / desorption / behaviour of  $[^{14}CTP]CGA 352261$ , a photodegradation product of trifloxystrobin, was studied in five soils in batch equilibrium experiments in the dark at  $25 \pm 1$  °C:

	~				
	Soil &	Source O	Texture (USDA)	pН	OC [%]
4	174	Madera, USA	sanay loam	7.0	0.6
Ď	185	Northwood, SA	🔬 🛴 💭 loam	6.9	3.1
	186	🗡 Louisberg, USA	_	6.6	0.8
L.	187&	Raleigh, USA	sand sand	5.6	0.8
¥	188	Northwood, USA	C clay loam	6.9	2.4
	_0				

The adsorption phase was carried out using sterilized soils with soil-to-solution ratios of 1/5 (soils 174, 186 and 187) and 1/10 (soils 185 and 188). CGA 357261 was applied at nominal concentrations of 0.5, 0.2, 0.075 and 0.025 mg/L in sterilized aqueous 0.01 M CaCl<sub>2</sub> solution. The desorption phase was performed by supplying pre-adsorbed soil samples with fresh sterilized aqueous 0.01 M CaCl<sub>2</sub> solution. Adsorption and desorption took place for 4 hours equilibration time each.

CGA 359261 was rapidly degraded to CGA 373466 by ester cleavage even in sterilized soil. Therefore, the mean parental mass balances after adsorption and desorption were only 82.7, 68.7, 71.4, 62.2 and 62.3% of applied radioactivity [% AR] for soil 174, 185, 186, 187 and 188, respectively.
Mean material balances were 91.0, 94.3, 92.2, 93.3 and 93.5% AR for soil 174, 185, 186, 187 and 188, respectively.

Adsorption and desorption isotherms were calculated using the Freundlich equation. Since significant degradation (> 10%) was observed even in the sterilized soils, the sorption values were calculated based on both the applied radioactivity and on the measured [14C-TP]CGA 357261 concentration. Based on the measured [14C-TP]CGA 357261 concentration, the calculated adsorption coefficients?  $K_{F(ads)}$  of the Freundlich adsorption isotherms ranged from 2.78 to 14.9 mL/g (means 7.65 mL/g) and the adsorption constants K<sub>OC(ads)</sub> (normalised to organic Carbon content) ranged from 389 to 567 mL/g (mean: 487 mL/g). The Freundlich exponents 1/n were in the range of 0.962 to \$034 (mean: 6994), indicating that the concentration of CGA 357261 did not affect the adsorption behaviour in the examined concentration range. The desorption Kales (mean: 1.3 ml/g) and the normalised Koakes (mean: 781 mL/g) values were higher (1.6 times higher) than those obtained for the adsorption please, indicating that CGA 357261 once adsorbed to soil is not readily desorbed

CGA 357261 can be classified as low to medium mobile for adsorption and low mobile for desorption using the McCall <sup>9</sup> classification for the strimation of the mobility in soil. I. MATERIALS AND METHODS A. MATERIALS AND METHODS A. MATERIALS AND METHODS A. MATERIALS AND METHODS A. MATERIALS A. MATERIA sterilized by gamma radiation for the adsorption desorption batch equilibrium experiments.



McCall P. J., Laskowski, B. A., Swarm, R. L., Bishburger, H. J.: "Measurement of Sorption Coefficients of Organic Chemicals and Their Use in Environmental Fate Analysis" in "Test Protocols for Environmental Fate and Movement of Toxicants"; A.O.A.C. Symposium proceedings, 94th annual meeting, Washington, BC, 1980.

<b>D</b>					
Parameter			Results / Unit		
Soil Designation	174	185	186	⊘187	88
Geographic Location				Å.	4.9
City	Madera	Northwood	Louisberg	Raleigh	Northwood
State	California	North	North	North న	-North 🔨
		Dakota	Carolína	Carolina	Dakota
Country	USA	USA	USA	USA	USA USA
Soil Taxonomic Classification (USDA)		no in	formation ava	ilablo	
Soil Series	hanford fine	🔊 gardena	saw-awaske	Anchburg	bearden
	sandy loan		v wedowee	sandy loam	perella
	<u> </u>	<u>6</u> , 5	complex	<u> </u>	
Textural Class (USDA)	sandy @am	© loam	sandy loan	Sand	clay loam
Sand $[50 \ \mu m - 2 \ mm]$	69%	32%	Q 7 <u>8</u> %	53%O <sup>v</sup>	©28%/Y
Silt $[2 \ \mu m - 50 \ \mu m]$	28%	~ <u>4</u> 4% ~~	10%	D* 3,0%	42%
Clay $[< 2 \mu m]$	Q 3867	24%		<i>₫</i> ₹7% ~	£5%
pH		§.9	6.6	5.6 V	6.9
Organic Carbon	0.6%	3.1%	0.8%	0.8%	<b>∞</b> 2.4%
Organic Matter <sup>1</sup>	Q 1.0%	5.4%	J.4% ~	14%	<sup>≫</sup> 4.2%
Cation Exchange Capacity [meq. 00 g]	15.2	° 24.0	5.5	°°4.9	28.6
Water Holding Capacity	O A	Ø			
at 0.33 bar (pF 2.5)	8.5%	41.8%	Ø:8% ~	54,2%	40.4%
Bulk Density (disturbed) [g/cm <sup>3</sup> ]	a 1,46 a	0.96	🕵 1.19 🔍	61.38	1.03
<sup>1</sup> % organic matter = % organic carbon	vx 1.724		0' 👋	s y i	
DW: dry weight		S. O		**	
USA: United States of America	*U* ~~				
USDA: United States Department of Ag	viculture 🖌				
B. STUDÝ DESIĞN 🔬 🕺	A S	T <sup>er</sup> a,	w W		
		\$~ <u>`</u> \$	$\sim$		
1. Experimental Conditions 🔬	ČAČ V		× ×		
The test system for adsorption and	desorption in	batch equili	ibrium exper	iments consi	sted of glass
ulture tuber (votume 15 mI) atora	1 Swith Tallon	in ad a form	Glass	wara and ag	$10000 \pm 0.01 M$

## Physico-chemical properties of test soils Table 7.1.3.1.2-1:

## B. STUD<sup>®</sup> DESIGN

## 1. **Experimental** Conditions

The test system for adsorption and desorption in batch equilibrium experiments consisted of glass culture tubes (volume 15 mL) closed with Terlon<sup>®</sup> lined screw caps. Glassware and aqueous 0.01 M CaCl<sub>2</sub> solution were sterilized using an autoclave. The experiments were performed in duplicate.

In preliminary tests, the adsorption of the gest item to the test system surface, the appropriate adsorption and desorption equilibration times and the stability of the test item were determined.

The adsorption phase was carried but using steppized soils with soil-to-solution ratios of 1/5 (soils 174, 186 and 187) and 1/10 (soils 185 and 188). GA 357261 was applied at nominal concentrations of 0.5, 0.2, 0.075 and 0.025 mg/L in sterilized aqueous 0.01 M CaCl<sub>2</sub> solution. The desorption phase was performed by supplying me-adsorbed goil samples with fresh sterilized aqueous 0.01 M CaCl<sub>2</sub> solution. Adsorption and desorption took place for 4 hours equilibration time each (total of 8 hours).

systems were shaken by a platform shaker in the dark at  $25 \pm 1$  °C in an environmental The test chamber. ŝ

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Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

## 2. Analytical Procedures

The suspensions were centrifuged and the radioactivity contents in the supernatants were analysed by liquid scintillation counting (LSC). After the adsorption and desorption step, the soil of 0.5 mg/L samples was additionally extracted three times at ambient temperature using a reciprocatine shaker and acetonitrile/water<sub>pH4</sub> 4/1 ( $\nu/\nu$ ). After each extraction step, extract and soil were separated by centrifugation and decantation. The radioactivity contents of the combined soil extracts after the adsorption and desorption step were determined by LSC. Aliquot of the combined soil extracts were concentrated. Aqueous 0.01 M CaCl<sub>2</sub> solutions and combined soil extracts were analysed by reversed phase HPLC/radiodetection. The extracted soil was dried and the radioactivity content determined by combustion/LSC to establish the material balance.

Adsorption and desorption isotherms were calculated by linear regression analysis of the adsorption or desorption data according to the Freundlich equation. Since significant degradation (\$10%) was observed even in the sterilized soils, the sorption values were calculated based on both the applied radioactivity and on the measured [14C-TP]CGA 357261 concentration.

# II. RESULTS AND DISCUSSION

# A. MATERIAL BALANCE

Mean material balances were 91,0, 94,3, 92.2, 93.3 and 93.5% of applied radioactivity [% AR] for soil 174, 185, 186, 187 and 188 respectively. The complete material balances found for all soils and concentrations demonstrated that there was no significant loss of radioactivity dissipated from the test systems or during sample processing.

# B. DEGRADATION OF PARENT COMPOUND

CGA 357261 was rapidly degraded to CGA 373466 by ester cleavage even in sterilized soil. Therefore, the mean parental mass balance, were \$2.7, 68.7, 774, 62.2 and 62.3% AR after 8 hours for soil 174, 185, 186, 187, and 188, respectively

# C. FINDINGS

At the end of the accorption phase, 28.9-92.8% A7.7-49.3%, 33.5-36.0%, 36.1-38.1% and 42.0-43.8% were adsorbed based on the measured  $\mu^{4}C-TP$  [CGA 35726] concentration in soil 174, 185, 186, 187 and 188, respectively (see Table 1.3, 2-2) Based on the measured [<sup>14</sup>C-TP]CGA 357261 concentration the calculated adsorption coefficients  $K_{F(ads)}$  of the Freundlich adsorption isotherms ranged from 2.78 to 14.9 mL/g (mean:  $\frac{1}{2}$  65 mL/g) and the adsorption constants  $K_{OC(ads)}$  (normalised to organic carbon content) ranged from 289 to 567 mL/g (mean: 487 mL/g). The Freundlich exponents 1/n were in the range of 0.9967 to 4.04 (mean: 1.01), indicating that the concentration of CGA 357261 did not affect the adsorption behaviour in the examined concentration range (see Table 7.1.3.1.2-3).

At the end of the desorption phase, 45.4-52.0%, 24.0-26.1%, 35.3-39.2%, 28.3-31.5% and 25.5-28.0% of the initially adsorbed arount based on the measured [14C-TP]CGA 357261 concentration were desorbed in soil 474, 185, 186, 187 and 188, respectively (see Table 7.1.3.1.2- 2). Based on the measured [14C-TP]CGA 357261 concentration, the desorption  $K_{F(des)}$  (mean: 11.3 mL/g) and the normalised  $K_{O(des)}$  (mean: 761 mL/g) values were higher (1.6 times higher) than those obtained for the adsorption phase, indicating that CGA 357261 once adsorbed to soil is not readily desorbed (see Table 7.1.2, 1.2- 3).

ĉ

Table 7.1.3.1.2- 2:	Percentage of adsorbed and desorbed CGA 357261 in soils (r	nean values)
---------------------	--	--------------

	2. 1	ciccina	ge of au	SUIDCU	and uest		UA 337	201 111 50	uns (mea	an values)
				Test	Concent	ration [n	ng/L]			
			Adsor	ption <sup>1</sup>			Desor	ption <sup>1</sup>		57 (Q'
	Soil	0.5	0.2	0.075	0.025	0.5	0.2	0.075	0.025	
	174	31.8	31.4	32.8	28.9	48.7	47.2	45.4	52.0	
	185	48.2	49.1	49.3	47.7	26.1	24.9	<u>4.0</u>	24.0 Č	
	186	33.5	35.6	36.0	36.0	A39.2	36.5 🗶	<sup>~</sup> 35.3	37,5	
	187	36.1	37.2	38.1	36.8 🔌	31.5	29, <b>5</b> ©	28.3	<b>30</b> /0	
	188	42.0	43.6	43.8	42.6	27.7	203	25.5	<u>م 2</u> 8.0	
<sup>1</sup> e [ <sup>2</sup> e	end of adsorption phase, mean values expressed as percentage of the measured and the initially of the initial of t									
2	dsorbed	l amount	based on	the mean	sured P4C	-TPIGG	A 3 <b>\$7</b> 261	goncent	ration »	
c			0.000	Ő			8 8	Q Q	Service and the service of the servi	4

Adsorption and desorption constants and correlation coefficients in soils of Table 7.1.3.1.2- 3: CGA 357261 , S Å.

		Į,	in s	<u> </u>	<u> </u>	$\checkmark$		× Ő
		Ardson	ption Q			🗘 Deser	ption®	, ča
	KF	$\sqrt{1/n^{1}}$	ř r Ý	Koc .	💙 K 🔊	1/p	<b>A</b>	Koc
Soil	[mL/g]	R Ø	Ò	@mL/g∱	[mLQ]	<u> </u>	<u>Č</u>	°́[mL/g]
174	2.78	1.034	0.9970	¥ 479	<b>5</b> Q79	P.036 2	0.995	996
185	14(9)	1.005 🛸	<b>0.99</b> 87	476	<u>18.4</u>	0.943	0.9984	587
186	<b>3</b> .17	0.962	0.9089	989	5.25	0.962	0,9965	645
187	°∕>∕¥.61 ∢	0.980	009989	567,	7.03	,0,962 a	9975	864
188 🔬	12.8	00990	0.9992	520	×19.8 6	1.001	0.9977	813
arithmetic mean	7.65	<b>0.994</b>	0.9985	<b>48</b> 7	11.30	0.981	0.9972	781

n values were given in the report and converted to the value



The adsorption constant Koc(ads (arithmetic mean) of CGA 2572612 a major photodegradation product

The results are included in the subimary of the adsorption and desorption behaviours of trifloxystrobin and its major degradation products in soil given in section (A 7.1.3.1.



## Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.3.1.2 /06; ; ; 2013
Title:	[Benzeneacetic-phenyl-UL- <sup>14</sup> C]BCS-CU98569 (Sodium Salt of CGA 3813)
	Adsorption / Desorption on Four European Soils
Report No:	EnSa-12-0384
Document No:	M-447879-01-1
Guidelines:	- OECD Test Guideline No. 106
	- DRAFT SANCO 11802/2010/rev 1 in accordance with Regulation (EC)
	No 1107/2009
	- US EPA OCSPP Test Guideline No. 835.1230 Q
	- Canadian PMRA Guideline DAC 8.2.4.2
GLP:	Yes A Q o A A O
Justification:	New data / guideline requirement:
	Adsorption and desorption of major photodogradation product COA 381318

## **Executive Summary**

The adsorption / desorption behaviour of [14G U98569 (sodjum salcof CGA 381918, a 1896 photodegradation product of trifloxystrobing was studied in Your soils in batch equilibrium experiments in the dark at 20.3 °C:

			V
Soil	Source 🖓 🦉	Texture (USDA) pH**	OC [%]
	Monheim, Germany	sandy roam 5.1	1.8
Ŵ	O'Monieim, Germany	sandy loans 5.9	1.5
	Burscheid, Germany	silt loam 6.2	1.6
	<sup>8</sup> Blankenheim, Germany	O clay boam 7.1	4.8

\* pH value was derived from aque to 0.01 A CaCl2 suspension

The adsorption phase was carried but using air-dried soils equilibrated in aqueous 0.01 M CaCl2 solution with soil-to solution ratios of 1/2 (soils and

) and 1/4 (soil ). BCS-CU98569 was applied at concentrations of 1.0, \$3, 0.1, 0.03 and 0.07 mg/15 in aqueous \$01 M CaCl solution. The desorption phase was performed by supplying pre-adsorbed soil samples with fresh aqueous 0.01 M CaCl2 solution for one desorption cycle. For the highest concentration, two additional desorption cycles were performed. Adsorption and desorption cycles took place for 24 hours equilibration time each.  $\bigcirc$  $\bigcirc$ 

BCS-CU98569 was sufficient stable throughout the study. The mean parental mass balances were 96.1, 96.5, 99.0 and 98.6% of applied radioactivity [% AR] for soil

and

, respectively.

Ş Ø 1 P 1 Mean material balances were \$4.3, 94, 95 and 92.6% AR for soil 

and

, respectively.



Adsorption and desorption isotherms were calculated using the Freundlich equation. The calculated adsorption coefficients  $K_{F(ads)}$  of the Freundlich adsorption isotherms ranged from 1.13 to 3.68 pc/g  $\approx$ (mean: 1.86 mL/g) and the adsorption constants  $K_{OC(ads)}$  (normalised to organic carbon content) ranged from 75.5 to 78.2 mL/g (mean: 76.5 mL/g). The Freundlich exponents 1/n were in the range 0.866 to 0.896 (mean: 0.887), indicating that the concentration of BCS-CU98569 affected the adsorption behaviour in the examined concentration range. The desorption  $K_{F(des)}$  (mean: 3.83 mL/g) and the normalised K<sub>OC(des)</sub> (mean: 165 mL/g) values were significantly higher (2 times higher) than those obtained for the adsorption phase, indicating that BCS-QU98569 once adsorbed to soil is not readily desorbed.

BCS-CU98569 can be classified as intermediate mabile for adsorption and low mobile for desorption using the Briggs <sup>10</sup> classification for the estimation of the mobility in soil.
I. MATERIALS AND METHODS
A. MATERIALS
1. Test Item
[benzeneacetic-phenyl-UL-<sup>14</sup>C]BCS-CU98569
Sample ID: KMAD 9352
Specific Activity: 3.54 MBo/mg (95.7 μC/mg)
Radiochemical Purity: 98%
2. Test Soils
Four soils were used (see Pable 1.3.1.2-4). The soils were tables for desorption is a solution of the soils were tables for desorption.

4). The solds were taken from agricultural use areas 2. Test Soils Four soils were used (see Gable 1.3.1.2-4). The soils were taken from agricultural use areas representing different geographicat origin and different soil properties as required by the guidelines.



Briggs, G. G.: A Simple Relationship Between Soil Adsorption of Organic Chemicals and their 10 Octanol/Water Partition Coefficients; Proc. 7th British Insecticide and Fungicide Conference, Nottingham/UK, 1973.

## Table 7.1.3.1.2-4: Physico-chemical properties of test soils

Parameter		Results	/ Units	
Soil Designation				
Geographic Location			1	
City				
State	North-Rhine	Avorth-Rhine	ر North-Rhine	North-Rhine
	Westphalia	Westphalia	Westphalia	Westphalia
Country	Germany	Germany Germany	Germany	~Germany
GPS Coordinates				
Soil Taxonomic Classification (USDA)	loamy, mixed,	sandy, mixed,	Joamy, mixed,	Ç fine-loamy, ₀
	mexic, Typec	mesic, Typic	mesic, Typic	mixed, active,
	Argunan			Futrutent
Soil Series		no informati	opavailable _	U &
Textural Class (USDA)	sandy loam	sandy Jøam	sik Joam 🔊	say loam
Sand $[50 \mu\text{m} - 2 \text{mm}]$	\$ 53 8		~ <u>15%</u>	<b>41%</b>
Silt $[2 \ \mu m - 50 \ \mu m]$	30% 0	L 16%	× 70%	26%
Clay [< 2 μm]	Č <sup>4</sup> 17% 4	~ 9% <sup>~</sup>	× 139%	33%
pH (soil/0.01 M CaCl <sub>2</sub> 1/2)	\$ 5,\$ L	<u>,</u> 5\\9 √√	~~~ 6.2 ×	7.1
pH (soil/water 1/1)		ر <sup>6</sup> .1 (ش	6.20	7.2
pH (saturated paste) 🖓 🧳	5.3 5	6.1 <sup>0</sup>	× ,6,4	7.2
pH (soil/1 N KCl 14)	4.7	S.6	ر 5.8 گ	6.8
Organic Carbon 🖉 🔬 😽	1×8% ~~	≈1.5%_©	1.6%	4.8%
Organic Matter 🖉 🖉 🔗 🖒	× & 3.1% ×	> 2.6%	2.8%	8.3%
Cation Exchange Capacity [meq/109 g]	10.9	§* 8.9 K	11.7	20.7
Water Holding Capacity 🖉 🕺				
maximum [g H2O ad 200 g sof DW]	\$5.0 O	≪ <sup>y</sup> 42.60°	54.8	81.6
at 0.1 bar (pF 2.0)	°26.9%	Ky 14-3%	32.5%	36.1%
Bulk Density (disturbed) [g/cm <sup>3</sup> ]	\$ k. f.	<b>⊘</b> 1.26	1.09	0.97

DW: dry weight

GPS: global positioning system

partment of Agriculture USDA; Chited States De

# B. **ASTUDY DE**

## Experimental Conditions 1.

The test system for adsorption and desorption in batch equilibrium experiments consisted of Teflon<sup>®</sup> centrifuge tubes (volume 42 mL) closed with screw caps. The experiments were performed in duplicate

In proviningry tests, the adsorption of the test item to the test system surface, the optimal soil-tosolution ratio, the appropriate adsorption and desorption equilibration times and the stability of the test item were determined.

and

The adsorption phase was carried out using air-dried soils equilibrated in aqueous 0.01 M CaCl<sub>2</sub> solution for 4 days with soil-to-solution ratios of 1/2 (soils ). The test item was applied at and ) and 1/4 (soil concentrations of 1.0, 0.3, 0.1, 0.03 and 0.01 mg/L in aqueous 0.01 M CaCl<sub>2</sub> solution. The desorption phase was performed by supplying pre-adsorbed soil samples with fresh aqueous 0.01 M Cacily solution for one desorption cycle. For the highest concentration, two additional desorption cycles were performed. Adsorption and desorption cycles took place for 24 hours equilibration time each (with a f 96 hours). The test systems were shaken by a mechanical overhead shaker in ∙the dark at climatic chamber. **Analytical Procedures** 2. The suspensions were centrifuged (4500 x g) and the ontents supernatants were analysed by liquid scintillation counting (LSC). C In the preliminary parental mass balance test, the soil was additionally extracted three times using acetonitrile/water mixtures. The aqueous supernatant/and the combined soil extracts were analysed by reversed phase HPLC/radiodetection to determine the stability of the test item and to establish the parental mass balance. The limit of detection (BOD) and limit of quantitation (LOQ) for HPLC/radiodetection analysis være 0.4 and 1.0% ARS respectively The partition of the test item in the adsorption and desorption batch equilibrium experiment was determined based on the radioactivity content on the superparant only doc to the stability of the test item demonstrated by the parental mass balance. After the desorption steps, the soil was air-dried and the radioactivity content determined by combustion/LSC to establish the material balance. Ö Adsorption and desorption isotherms were calculated by linear regression analysis of the adsorption or desorption data according to the Freundlich equation. MATERIAL B 959 and 92.6% of applied radioactivity [% AR] for soil Mean material balances were

respectively. The complete material balances found for all soils and concentrations demonstrated that there was no significant loss of radioactivity dissurated from the test systems or during sample processing.

# B. ØEGRADATION OF PARENT COMPOUND

BCS-CU98569 was sufficient stable throughout the study. The mean parental mass balances were 96.1, 96.5, 920 and 98.6% AR after 96 lours for soil **1999**, **199** 

and respectively.

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At the end of the adsorption phase, 43.4-59.3% AR, 36.5-49.8% AR, 38.7-50.5% AR and 48.9-61.2% AR were adsorbed in soil and III, respectively (see Table 7.1.3.1.2- 5). The calculated adsorption

coefficients  $K_{F(ads)}$  of the Freundlich adsorption isotherms ranged from 1.13 to 3.68 pL/g (mean: 1.86 mL/g) and the adsorption constants  $K_{OC(ads)}$  (normalised to organic carbon content) ranged from 75.5 to 78.2 mL/g (mean: 76.5 mL/g). The Freundlich exponents for were in the range of 0.866 to 0.896 (mean: 0.887), indicating that the concentration of BCS-CO 98569 affected the adsorption behaviour in the examined concentration range (see Table 7.1.3.1.2 f).

At the end of the first desorption phase, 24.8-35 %, 33.6-41.5%, 30.6, 37.8% and 27.0-33.8% of the initially adsorbed amount were desorbed in soil and a soil and a solution of the solution o

and **Generative** II, respectively (see Table 7.1.3.4.2-5). The desorption  $K_{F(des)}$  (mean: 3.83 mL/g) and the normalised  $K_{DC(des)}$  (mean: 0.65 mDg) values were significantly higher (2 times higher) than those obtained for the adsorption phase, indicating that BCS-CU98569 once adsorbed to soil is not readily desorbed as Table 7.103.1.2-6).

Table 7.1.3.1.2- 5: Percentage of adsorbed and desorbed BCS-CU98569 Sodium salt of CGA 381318) in soils (mean values)

				N <sup>Y</sup> I			Č	¥ %	1	
Test Concentration [mg/L]										
	ÔÔ	× SA	dsorptio	n ' 'U'		$\sim $	°∼y*De	sorptio	n <sup>2</sup>	1
Soil	<u> </u>	• • •	<b>Q</b> .1	<b>.0.03</b>	<b>.</b> 0.01	×1.0	<b>\$0.3</b>	<b>0.1</b>	0.03	0.01
	<b>4</b> 3.	4 6 47.2	\$51.4	56.4	€ 59.3	35.7	31,5Ô	ð 29.8	27.0	24.8
	<i>©</i> 36.	<b>416</b>	44.4	46 D	49.8	415	37.3	36.6	35.3	33.6
	· \$382	7 <b>A</b> 2.3	45.5	~ <b>\$</b> 0.0	\$0.5	37.8	<b>2</b> 5.6	33.4	31.0	30.6
	<u>∖</u> √48.	9‱ 53.6″	¥\$6.7∡	<i>6</i> 0.0 ¢	961.2	33.8	¥ <sup>3</sup> 32.0	29.9	28.5	27.0

<sup>1</sup> end of adsorption plase, man values expressed as percentage of applied radioactivity

<sup>2</sup> end of first desorption phase, mean values expressed as percentage of the initially adsorbed amount

Table 7 1.2- 6: Adsorption and desorption constants and correlation coefficients in soils of BCS-CU98569 (softum salt of CGA 381318)

		y Adsoi	rption .	Ą		Desor	ption	
Q D <sup>Y</sup>	KE	∫ 1⊘n ,	$O^{\mathbb{Y}}R^2$	Koc	KF	1/n	R <sup>2</sup>	Кос
~Soil 🔍 💊	O [mrk,∕g]	N a	× >>	[mL/g]	[mL/g]			[mL/g]
	3.41	F 0.866	0,2998	78.2	2.99	0.891	0.9996	166
	₹¶1.13	0,892	å <b>1</b> 99994	75.5	2.58	0.932	0.9992	172
	1.2	Ø 895 Ž	y0.9992	75.9	2.87	0.925	0.9997	179
		~0.89©	0.9995	76.6	6.90	0.929	0.9998	144
arithmetic me	an / 1.86	0.887	0.9995	76.5	3.83	0.919	0.9996	165

**QII. CONCLUSIONS** 

The adsorption constant K<sub>0</sub> (arithmetic mean) of BCS-CU98569 (sodium salt of CGA 381318, a major photoegradation product of trifloxystrobin) was 76.5 mL/g. The Freundlich exponent 1/n (arithmetic mean) was 0.887.

The results are included in the summary of the adsorption and desorption behaviours of trifloxystrobin and its major degradation products in soil given in section CA 7.1.3.1.



Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.3.1.2 /07; ; 2010 ; 2010
Title:	[Benzeneacetic-phenyl-UL- <sup>14</sup> C]NOA 413161: Adsorption / Desorption on Four
	Soils
Report No:	MEF-09/479
Document No:	M-361829-01-1
Guidelines:	- OECD Test Guideline No. 106
	- US EPA OCSPP Test Guideline No. 35.1230
GLP:	Yes $\nabla $ $O$ $O$ $V$ $V$
Justification:	New data / guideline requirement: $\sqrt{2}$
	Adsorption and desorption of major degradation product NOA 413161

## **Executive Summary**

The adsorption / desorption behaviour of [14G-GP]) OA 459161, a degradation product of trifloxystrobin, was studied in four soils in batch equilibrium experiments in the dark at 19.8° C:

Soil	Source ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Texture (USDA)	р₩	OC [%]
	Monheim, Germany	N lõgin S	\$.3 ×	¢ 1.8
	Monheim Germany	sandy loan	<sup>©</sup> 6.2 <sup>™</sup>	1.8
430	Burscheid, Germany 🎸	🖉 vilt loam 🔍	6.6	2.4
	Blankenheim Germany	🔨 clay Yoam 🖉	67.3	4.6

\* pH value was derived from aqueous 0.01 M Ca D suspension

The adsorption phase was carried out using air dried soils equilibrated in aqueous 0.01 M CaCl<sub>2</sub> solution with soil-te-solution ratios of 1/0 (soils and 1/2 (soil and 1/

NOA 413161 was sufficient stable throughout the study. The mean parental mass balances were 94.7, 96.2, 98.4 and 91.3% of applied stadioactivity 5% AR6 for soil the study of applied stationary in the study.

 $\bigcirc$ 

4a and

Mean material balances were 96,5, 96,90,96.4 and 97,00% AR for soil

å and

, respectively.

respectively.

Adsorption and desorption isotherms were calculated using the Freundlich equation. The calculated adsorption coefficients  $K_{0ads}$  of the Freundlich adsorption isotherms ranged from 0.049 to 0.116 mL/g (mean: 0.082 mJ/g) and the adsorption constants  $K_{OC(ads)}$  (normalised to organic carbon content) ranged from 20 to 64 mL/g (mean: 3.6 mL/g). The Freundlich exponents 1/n were in the range of 0.885 to 0.951 (mean: 0.965), indicating that the concentration of NOA 413161 affected the adsorption behaviour. In the examined concentration range. The desorption  $K_{F(des)}$  (mean: 4.55 mL/g) and the normalised K  $_{O(des)}$  (mean: 157 mL/g) values were significantly higher (50 times higher) than those obtained for the adsorption phase, indicating that NOA 413161 once adsorbed to soil is not readily desorbed. Joinust be considered, however, that due to the low adsorption the measured concentrations of desorbed NOA 413161 were also very low. Therefore, the desorption values should be interpreted with care.

I.

NOA 413161 can be classified as very mobile for adsorption using the Briggs <sup>10</sup> classification for the estimation of the mobility in soil.

**MATERIALS AND METHODS** 

## MATERIALS A.

## 1. **Test Item**

[benzeneacetic-phenyl-UL-<sup>14</sup>C]NOA 413161 Sample ID: KATH 6313 Specific Activity: 3.41 MBq/mg (92.1 Radiochemical Purity: >99% > 99% Chemical Purity:

## 2. **Test Soils**

from agriculturat us steepuined by the s vis were sample Four soils were used (see Table 7.1.3.1.2 7). The soils were taken from agricultural use areas representing different geographical origin and different soil properties as required by the guidelines. No plant protection products were used for the previous years. The foils were sampled from the fields (upper horizon of 0 to 20 cm), neved to a particle size of 2 mm and and dried

Re

Table 7.1.3.1.2- 7:	Physico-@	hemical	properties	of test soils
---------------------	-----------	---------	------------	---------------

Q,

		i i i i i i i i i i i i i i i i i i i	<u>a</u> (	)*
Parameter		🕜 Results	∲Unițs♀ <sub>©</sub>	
Soil Designation				
			4a	
Geographic Location	0 5	× 0	× ~	
City	Ĵ.	S C		
			L'a	
State State	North-Rhme	North-Rhine	North-Rhine	North-Rhine
Country	Westphana	Westphalia	Westphalia	Westphalia
		Germany o	Germany	Germany
GPS Coordinates				
Soil Taxonomic Classification (USDA)	Bamy, mixed,	samly, mixed,	loamy, mixed,	no
	mesic, Typic	mesic, Typic	mesic, Typic	information
	@rgudal®	"Cambudoll	Argudalf	available
Soil Series *		o <sup>*</sup> no informati	on available	
Textural Stass (USDA)	loam 🗸	sandy loam	silt loam	clay loam
Sand $\langle [50 \ \mu m \rightarrow 3^{\circ} mm] \rangle \langle \langle \rangle$	S1%	71%	27%	31%
Silt [2 µm 50 µm]	JU 282	18%	54%	38%
$\hat{C}$ lay [< 2 µm] $\hat{O}^{y}$	~~~~ 20%	11%	19%	31%
pH (soil/0.01 M CaCl <sub>2</sub> )	\$5.3	6.2	6.6	7.3
pH (soil/water)	5.5	6.5	6.8	7.4
pH (soil/14) KCl	<sup>©</sup> 4.9	6.0	6.3	7.0
Organic Carbon	1.8%	1.8%	2.4%	4.6%
Organite Matter 1	3.1%	3.1%	4.1%	7.9%
Cation Exchange Capacity [meq/100 g]	10.8	9.0	13.9	21.9
Water Holding Capacity				
maximum [g H <sub>2</sub> O ad 100 g soil DW]	53.9	45.9	63.2	78.4
at 0.33 bar (pF 2.5)	15.7%	11.2%	22.3%	31.9%
Bulk Density (disturbed) [g/cm <sup>3</sup> ]	1.19	1.24	1.05	1.00



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<sup>1</sup> % organic matter = % organic carbon x 1.724DW: dry weight GPS: global positioning system USDA: United States Department of Agriculture

## B. STUDY DESIGN

## 1. **Experimental Conditions**

The test system for adsorption and desorption in batch equilibrium experiments consisted of performed centrifuge tubes (volume 42 mL) closed with screw caps. The operiments were duplicate.

In preliminary tests, the adsorption of the test if to the test system surface, the optimal soilero solution ratio, the appropriate adsorption and desorption equilibration times and the stability of the test item were determined.

The adsorption phase was carried out using any dried soils equilibrated in aqueous 0.01 M 6 Cl solution for 24 hours with soil-to-solution ratios of 10 (soils)

4a) and 1/2 (soil V The test ite was applied at and concentrations of 1.1, 0.3, 0.1, 0.03 and 0.01 mg/L in aqueous 0.01 McCaCle solution. The desorption phase was performed by supplying pro-adsorbed soil samples with fresh aqueous 0.01 M CaCl2 solution. Adsorption and desorption took place for 24 hours equilibration time each (total of 48 hours).

The test systems were shaken by a mechanical overhead shaker in the datk at 1926 °C in a walk-in climatic chamber.

## **Analytical Procedures** 2.

The suspensions were centrifugee and the radioactivity contents in the supernatants were analysed by liquid scintillation counting (LSC).

In the preliminary parental mass balance test, the soil was additionally extracted three to five times using acetonitrile/water mixtures. The aqueous supernation and the combined soil extracts were analysed by reversed shase APLC/radiodetection to determine the stability of the test item and to establish the parental mass balance. The limit of quantitation (DOQ) for HPLC/radiodetection analysis was 1% AR.

The partition of the less item in the adsorption and desorption batch equilibrium experiment was determined based on the adioactivity content on the Supernatant only due to the stability of the test item demonstrated by the parental mass balance. After desorption, the soil was freeze-dried and the radioactivity content determined by combustion/LSC to establish the material balance (one replicate per soil and concentration)

Adsorption and desorption isotherms@vere calculated by linear regression analysis of the adsorption or desorption data according to the Free indlich equation.

# **RESULTS AND DISCUSSION**

Mean material balances were 96.5, 96.9, 96.4 and 97.6% of applied radioactivity [% AR] for soil

respectively. The complete material balances found for all soils and concentrations demonstrated that

4a and





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## **B. DEGRADATION OF PARENT COMPOUND**

4a and

NOA 413161 was sufficient stable throughout the study. The mean parental mass balances were 94.7, 96.2, 98.4 and 91.3% AR after 96 hours for soil

, respectively.

## C. FINDINGS

At the end of the adsorption phase, 10.1-15.6% AR, 6.3-8.9% AR, 4.7-9.3% AR and 4.9-7.3% were adsorbed in soil

and **Example**, respectively (see Table 7.1.3.1.2–8). The calculated adsorption coefficients  $K_{Ffdg}$  of the Freundlich adsorption isotherms ranged from 0.049 to 0.16 mL/g (mean: 0.082 mL/g) and the adsorption constants  $K_{OC(ads)}$  (normalised to organic carbon content) ranged from 2.0 to 6.4 mL/g (mean: 3.6 mL/g). The Freundlich exponents I/n were in the range of 0.885 to 0.931 (means 0.905), indicating that the concentration of NOA 413161 affected the adsorption behaviour in the examined concentration range (see Table 7.1.3.1.2–9).

4a and respectively (see Table 7.9.3.1.2 8). The desorption  $K_{F(des)}$  (mean: 4.55 mL/g) and the normalised  $K_{O(des)}$  (mean: 4.7 mL/g) values were significantly higher (50 times higher) than those obtained for the adsorption phase, indicating that NOA 413161 once adsorbed to soil is normalized koncentrations of desorbed NOA 413161 were also very low. Therefore, the desorption values should be interpreted with care.

Table 7.1.3.1.2- 8 Percentage of adsorbed and tesorbed NOA 4131@ in soils (mean values)

0		· ¥      & .	Y	d'		ĩ L	ŗ″			
8		Ov		🖉 Terdo	Concent	ration [	mg/L]			
٠ •	$\mathcal{O}_{n} \sim \mathcal{O}_{n}$	Ĉo	Adsorp	ion <sup>1</sup>	0	×,	De	esorptio	n <sup>2</sup>	
soil	×	<b>LI.1</b>	<b>J</b> .3 <b>D</b> .1	0.03	Ø.01 <sub>~</sub>	<b>@Ĭ.1</b>	0.3	0.1	0.03	0.01
	Ĉ	10.1	12.3 12.7	6 <sup>°</sup> 12.4	15.60	34.9	30.5	28.7	40.5	25.1
	L'A	6.3	6 V Z.7	″ <u>₹</u> .0	<u>85</u> 9	32.3	26.6	28.3	31.6	28.5
	4a	Ø.7 🔬	<b>, 3</b> .9 <b>, 3</b> .8	<b>9</b> .5	9.3	19.9	15.0	18.4	38.9	26.7
		م 4.0 <sup>©</sup>	' 6.2 🏹 5.7	<u>م</u> 6.2	7.3	22.2	23.7	36.4	35.2	25.4

<sup>1</sup> end of adsorption mase, mean values expressed as percentage of applied radioactivity

<sup>2</sup> end of desorption phase, mean values expressed as percentage of the initially adsorbed amount

Table 7.1.3.1.2-9: Adsorption and desorption constants and correlation coefficients in soils of NOA 413161

Atsorption						Desorption			
	A A	Ka	1/n	R <sup>2</sup>	Кос	KF	1/n	R <sup>2</sup>	Кос
	Soil / S	[mL/g]			[mL/g]	[mL/g]			[mL/g]
	, , , , , , , , , , , , , , , , , , ,	<b>D?</b> .116	0.912	0.9964	6.4	1.57	0.942	0.9679	87.1
	$\sim$	0.066 y	0.931	0.9924	3.7	2.03	0.971	0.9824	113
	4a	0.049	0.885	0.9673	2.0	11.64	1.184	0.8860	485
	N.	0.095	0.890	0.9877	2.1	2.95	0.907	0.8562	64.2
	arithmetic mean	0.082	0.905	0.9860	3.6	4.55	1.001	0.9231	187



**III. CONCLUSIONS** 

The adsorption constant  $K_{OC(ads)}$  (arithmetic mean) of NOA 413161, a major degradation product of trifloxystrobin, was 3.6 mL/g. The Freundlich exponent 1/n (arithmetic mean) was 0.905.

The results are included in the summary of the adsorption and desorption behaviours of trifloxystrobin and its major degradation products in soil given in section CA 7.1.3.1.

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		8	í de la companya de l	aĩ	
Report:	KCA 7.1.3.1.2 /08;	<b>\$2010</b>	LO <sup>V</sup>	ž	
Title:	[Benzeneacetic-phenyl-UL- <sup>14</sup> C]	OA 413163:	dsorption	/Desorp	tion of Four
	Soils	, 	, <u> </u>	~~`O"	
Report No:	MEF-09/518		N O	ð,	
Document No:	M-361835-01-1	v v	5.0	S.	4
Guidelines:	- OECD Test Guideline No. 106	, O, A		. Ő	
	- US EPA OCSPP Test Guideline	e Nov 835 12	30 A Ő	× ,	
GLP:	Yes	0,4		Â.	
Justification:	New data / guideline requirement		× .0		y U
	Adsorption and desorption of inaj	or photodeg	radation prod	uct NQA	413 683

## **Executive Summary**

The adsorption / desorption behaviour of [146, GP]NØA 413163, av photodegradation product of trifloxystrobin, was studied in four soils in batch equilibrium experiments in the dark at 19.6 °C:

Soil			Source	L.	Texture (USDA)	рН *	OC [%]
		Monh	eim, Germ	¢) Y ¢	Lloam @	5.3	1.8
	Æ	Monh	eina, Gerta	any 🍣	sandy loam	6.2	1.8
	Pa	Bursch	wid, Oorm	any	silt joam	6.6	2.4
	L	Blanken	nheim, Geri	ffány	, 🖓 loam	7.3	4.6

\* pH value was derived from aqueous for M CaCl2 suspension

The adsorption phase was carried out using air-dright soils equilibrated in aqueous 0.01 M CaCl<sub>2</sub> solution with soil to-solution ratios of 1/1 (soils and 4a), and by (soil and 1/2). NOA 413163 was applied at

concentrations of 1.0, 0.3, 0.1, 0.03 and 0.01 mg/L in aqueous 0.01 M CaCl<sub>2</sub> solution. The desorption phase was performed by supplying pre-adsorbed, soil samples with fresh aqueous 0.01 M CaCl<sub>2</sub> solution. Adsorption and desorption took place for 48 hours equilibration time each.

NOA 413163 was sufficient stable throughout the study. The mean parental mass balances were 92.8, 94.7, 93.9 and 94.7% of applied radioactivity [% AR] for soil and the study of applied radioactivity [% AR] for soil and the study of the study of the study.

4a and , respectively.

Mean material balances were \$5.8, 96.2, 96.4 and 97.9% AR for soil

4a and , respectively.



Adsorption and desorption isotherms were calculated using the Freundlich equation. The calculated adsorption coefficients  $K_{F(ads)}$  of the Freundlich adsorption isotherms ranged from 0.115 to 0.201 pg//g (mean: 0.151 mL/g) and the adsorption constants  $K_{OC(ads)}$  (normalised to organic carbon content) ranged from 4.4 to 9.6 mL/g (mean: 6.3 mL/g). The Freundlich exponents 1/p were in the range of 0.887 to 0.949 (mean: 0.912), indicating that the concentration of NOA 413163 affected the adsorption behaviour in the examined concentration range. The desorption  $K_{F(des)}$  (mean: 2.95 mL/g) and the normalised K<sub>OC(des)</sub> (mean: 116 mL/g) values were significantly higher (18 times higher) than those? obtained for the adsorption phase, indicating that NOA #3163 once adsorbed to soil is not readily r th ron val. for adsorption FTHODS desorbed. It must be considered, however, that due to the low adsorption the measured concentrations of desorbed NOA 413163 were also very low. Therefore, the desorption values should be interpreted with care.

with care.
NOA 413163 can be classified as mobile to very mobile for adsorption using the Briggs <sup>10</sup> classification for the estimation of the mobility in soil
I. MATERIALS AND METHODS
A. MATERIALS
I. Test Item
[benzeneacetic-phenyl-UL-<sup>14</sup>C)NOA 4131637
Sample ID: SATH 6756
Specific Activity: 3.41 MBq/mg (92.1 aCi/mg)
Radiochemical Purity: 99%
Chemical Purity: 98%
2. Test Soils
Four soils were used (see Table 7.1.3/1.2-10). The soil, were taken from agricultural use areas
representing different seographical origin and different soil properties as required by the guidelines.
No plant profection through were used for the soil properties as required by the guidelines.

representing different geographical origin and different soil properties as required by the guidelines. No plant protection products were used for the previous 5 years. The soils were sampled from the fields (upper horizon of 0 to 20 cm), sieved to a particle size of  $\leq 2$  pm and air-dried.

0

Table 7 1 3 1 2- 10.	Physico-chemical	nronerties of	test soils
1 abic /.1.3.1.2-10.	I hysico-chemical	properties of	

Parameter		Results	/ Units		Ĉ
Soil Designation					5
8			4a		
Geographic Location			.1		ĥ
City				k i k	Î
			Ő Ö		.(
State	North-Rhine	North-Rhine	North-Rhing	North-Rhine	Ô
Country	Germany	German	Germany	Germany	¥
CDS Coordinates		Germany			
GPS Coordinates					
Soil Taxonomic Classification (USDA)	loamvOmixed	sapoty, mixed.	Joamy, mixed.		
()	mesic, Typic	mesic, Topic	mesic, Typic C	information	
	Argudatt	Cambudoll 🖉	Acudalf	available	
Soil Series		مر novinformati	on available		
Textural Class (USDA)	🖌 (doam 🔊	sandy loam	Silt loam	🕅 clay loam	
Sand $[50 \mu\text{m} - 2 \text{mm}]$	@51% ×	7127 (	> <i>E</i> % ,5	ू≪31%	
Silt $[2 \mu m - 50 \mu m]$	\$ 28 <b>\$</b> \$		~ <sup>054</sup> %	38%	
Clay [< 2 μm]	21%	L 11%	19%	SV 31%	
pH (soil/0.01 M CaCl <sub>2</sub> )	0 <sup>×</sup> 5.3 4	<i>⊙</i> 6.2 × ×	y . 626	7.3	
pH (soil/water)	5 5 5 L	<u></u>	~~~6.8 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	7.4	
pH (soil/1 N KCl)	Å.9 S	<sup>0</sup> 6.0 «	6.20	7.0	
Organic Carbon	@ 1.8%	× 1.8% (	2(4%	4.6%	
Organic Matter <sup>1</sup>	<u>~</u> ♥ 3.1% <sub>~</sub> (	₽° 3@₽%	<u>4.1%</u>	7.9%	
Cation Exchange Capacity [meq. 100 g]	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<i>⇒</i> 9.0 0	<u>م</u> 13.9	21.9	
Water Holding Qapacity			~		
maximum [g H <sub>2</sub> O @ 100 g soil DW]	₹ 5 <u>3</u> 22	Ş 4 <del>5</del> 9 🏑	63.2	78.4	
at 0.33 bar (pF 2.5)	مَ <sup>©</sup> 15.9% _	Q1.2%	22.3%	31.9%	
Bulk Density (disturbed) [g/cn0)	4.19 0	× 1.240	1.05	1.00	
1 % organic matter @ orgenic carbon		k, Š <sup>*</sup>	•	·	

UrS: global positioning system USDA: United States Department of Agricoliture

# B.

1. Experimental Conditions of the solution of centrifuge tubes (volume 42 mL) closed with screw caps. The experiments were performed in duplicate. Ŷ

In prelinginary tests, the adsorption of the test item to the test system surface, the optimal soil-tosolution ratio the appropriate adsorption and desorption equilibration times and the stability of the test item vere deermined. 

The adsorption phase was carried out using air-dried soils equilibrated in aqueous 0.01 M CaCl <sub>2</sub>
solution for 3 days with soil-to-solution ratios of 1/1 (soils
and 4a) and 1/2 (soil ). The test item was applied 3
at concentrations of 1.1, 0.3, 0.1, 0.03 and 0.01 mg/L in aqueous 0.01 McCaCl <sub>2</sub> solution. The desorption phase was performed by supplying pre-adsorbed soil samples with fresh aqueous 0.00 M
CaCl <sub>2</sub> solution. Adsorption and desorption took place for 48 hours equilibration time each (total of
96 hours).
The test systems were shaken by a mechanical overhead shaker in the dark at $100\%$ in the
climatic chamber.
<b>2.</b> Analytical Procedures
liquid scintillation counting (LSC).
In the preliminary parental mass balance test, the soil was additionally extracted three times using actionitrile/water mixtures. The aqueous supernatant and the combined soil extracts were analyzed by
reversed phase HPLC/radiodetection to determine the stability of the test item and to establish the
parental mass balance. The limit of quantitation (DOQ) for HPLC/radiodetection analysis was 1% AR.
The partition of the test item on the descention and descention datch equilibrium experiment was
determined based on the radioactivity concent in the supernatant only due to the stability of the test
item demonstrated by the parental mass balance. After desorption, the soil was freeze-dried and the
per soil and concentration).
Adsorption and desorption isother isother calculated by linear regression analysis of the adsorption or desorption data approximate the Freundlich appreciation of the second sec
C S II. RESULTSANDOISCUSSION
A MATERIAL BAKANCE
Mean material balances were 95,8, 96.2, 96.4, and 97,9% of applied radioactivity [% AR] for soil
, 4a and ,
there was no significant loss of radioactivity dissignted from the test systems or during sample
processing
B DECRADATION OF PARENT COMPARIND
NOA 413163 was sufficient stable throughout the study. The mean parental mass balances were 92.8,
94.7, 93.9 and 94.7% AR after 96 hours for soil,,,
, respectively.
$\bigcirc$

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## C. FINDINGS

At the end of the adsorption phase, 14.3-22.0% AR, 9.8-13.9% AR, 10.5-13.2% AR and 9.1-13.7% AR were adsorbed in soil and the second se

4a and 4

At the end of the desorption phase, 27.5-32.2%, 26.4-32.0%, 22.2%, 26.4-32.0%, 22.2%, and 30.8-37% of the initially adsorbed amount were desorbed in soil and the soil and the

4a and respectively (see Table 7.0.3.1.2.11). The desorption  $K_{F(des)}$  (mean: 2.95 mL/g) and the normalised  $K_{OC(des)}$  (mean: 0.16 mL/g) values were significantly higher (18 times higher) than those obtained for the adsorption phase, indicating that NOA 445163 once adsorbed to soil is not readily desorbed (see Table 7.1.3.4.2-16). It must be considered, however, that due to the low adsorption the measured concentrations of desorbed NOA 413167 were also very low. Therefore, the desorption values should be interpreted with care.

Table 7.1.3.1.2-11: Percentage of adsorbed and desorbed NQ3 413163 in Soils (mean values)

	~~	(ln	N N								
*	¢.	Ő	Ad	sorptio	Test C n∜	Concent	ration [	mĝ⁄JĽ] ∑∑ D¢	Sorptio	n <sup>2</sup>	
Soil 🔬	r d	Ş1.0	<sub>ີວ</sub> 0.3 🕻	0.1 >	<u>0.03 (</u>	0.01%	, 1.0 <sup>°</sup>	<b>0.3</b> Ĉ	<b>0.1</b>	0.03	0.01
	Ø	14	166	19.8	220	21.9	315	2802	27.6	27.5	32.2
	4	, <b>9</b>	Ĵ <b>1</b> .3	13.3	<b>B</b> .9	<b>9</b> .3	27.2	<b>2</b> 0.1	32.0	26.4	30.9
	4a	∜ľ0.5 <sub>&amp;</sub>	10.8	<sub>گر</sub> 12.4	ĵ≫13.2 ≈	۵12.4	29.3	25.6	22.2	25.5	26.4
	.0	9.1©	1020	11.8	13	134	30.8	36.9	37.5	35.2	37.1

<sup>1</sup> end of adsorption phase, mean values expressed as percentage of applied radioactivity

<sup>2</sup> end of desorption phase mean values oppressed as percentage of the initially adsorbed amount

Table 7.1.3.1.2- 12: Adsorption and desorption constants and correlation coefficients in soils of NOA 413163

Q	ñ S n			Ő				
		🗋 🔍 🔍 🔍	pplon 🖉	ř.		Desor	ption	
~Q U		∬/n ∂	<sup>≫</sup> R <sup>2</sup> ⊘	Koc	K <sub>F</sub>	1/n	R <sup>2</sup>	Koc
🖂 Soil		f , Q	, Ø	[mL/g]	[mL/g]			[mL/g]
	Q0.172	0.887	0,9978	9.6	2.42	1.001	0.9940	134
	0.113	<b>9</b> ,920 %	0.9973	6.4	2.33	0.992	0.9788	129
	þå Ø.¥18	Q0.949	0.9981	4.9	2.37	0.965	0.9853	98.8
·	₹0.201 ©	0.893	0.9968	4.4	4.70	1.046	0.9937	102
arithmetic	mean 0.151	0.912	0.9975	6.3	2.95	1.001	0.9880	116
		$\langle D \rangle$						

# III. CONCLUSIONS

The adsorption constant K  $K_{\rm e(ads)}$  (arithmetic mean) of NOA 413163, a major photodegradation product of toffloxy trobin, was 6.2 mL/g. The Freundlich exponent 1/n (arithmetic mean) was 0.912.

The results are included in the summary of the adsorption and desorption behaviours of trifloxystrobin and its major degradation products in soil given in section CA 7.1.3.1.



Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.1.3.1.2 /09; ; ; ; 1997	Ì
Title:	Adsorption-Desorption of [phenyl (B)-U- <sup>14</sup> C]-CGA-357276 in Soil	,
Report No:	210-97	
Document No:	M-036507-01-1	
Guidelines:	- US EPA Pesticide Assessment Guidelines, Subdivision N, Section 16-1	
GLP:	Yes $\sqrt{2}$ $\sqrt{2}$ $\sqrt{2}$	
Justification:	New data / guideline requirement:	Ø
	Adsorption and desorption of major degradation product CGA 352776 2 4	, c

## **Executive Summary**

The adsorption / desorption behaviour of  $[1^{4}C-TP]CGA357276$ , a degradation product of trifloxystrobin, was studied in five soils in batch equilibrium experiments in the fark at  $25 \pm 1$  °C:

	1	n V Q.		<u> </u>
Soil	Source 🔊	Texture (USDA)	АрН О	´ OÇ [%] ´ <sup>©</sup>
174	Madera, US& 🛛	🗇 sandy loan 🤇	7.0	\$0.6 ×
185	Northwood	S loans o	69	§ 3.10°
186	Louisberg, USA	sandy loam	<u>06.6</u>	X
187	Raleigh, USA	sand A	5.6	0.8
188	Northwood, USA	elay loom	6,9	° 2.4°
	× 4, 6×			

The adsorption phase was carried out using a soil-to-solution ratio of 1/50, CGA 357276 was applied at nominal concentrations of 0.25, 0.10, 0.025 and 0.010 my L in aqueous 0.01 M CaCl<sub>2</sub> solution. The desorption phase was performed by supplying pre-adsorbed sol samples with fresh aqueous 0.01 M CaCl<sub>2</sub> solution. Adsorption and desorption took place for 48 hours equilibration time each.

CGA 357276 was sufficient stable throughout the study. The mean parental mass balances were 96.5, 89.5, 96.7, 907 and 91.6% of applied radioactivity [S AR] for soil 174, 185, 186, 187 and 188, respectively.

Mean material balances were 98.3, 102.4, 98.9, 98.3 and 100.99 AR for soil 174, 185, 186, 187 and 188, respectively.

Adsorption and desorption isotherm, were calculated using the Freundlich equation. The calculated adsorption coefficients  $K_{F(m)}$  of the Freundlich adsorption isotherms ranged from 48.5 to 207 mL/g (mean: 116 mL/g) and the adsorption constant  $K_{OC(m)}$  (normalised to organic carbon content) ranged from 658 to 9756 mL/g (mean: 8170 mL/g). The Freundlich exponents 1/n were in the range of 0.813 to 0.962 (mean: 0.877), indicating that the concentration of CGA 357276 affected the adsorption behaviour in the examined concentration range. The desorption  $K_{F(des)}$  (mean: 152 mL/g) and the normalised  $K_{OC(des)}$  (mean: 1120 mL/g) values were slightly higher (1.4 times higher) than those obtained for the adsorption phase.

CGA 357278 can be classified as inomobile for adsorption and desorption using the McCall<sup>9</sup> classification for the estimation of the mobility in soil.

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**Bayer CropScience** Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

## I. **MATERIALS AND METHODS**

## **MATERIALS** A.

### **Test Item** 1.

[phenyl (B)-U-14C]-CGA-357261 Reference No: JAK-XIII-84 Specific Activity: 1.47 MBq/mg (39.8 µCi/mg) Radiochemical Purity: 99.3% Chemical Purity: > 99.9%

2. Test Soils Five soils were used (see Table 7.1.3.1.2-13), representing different peographical origin and different soil properties as required by the guidelines. The soils were speved to a particle size of  $\leq 2^{2}$  mm,

C

# Table 7.1.3.1.2- 13: Physico-chemical properties of test soils

Parameter			Results / Enit	s Q <sup>v</sup> A	0
Soil Designation	@#74 °~>	1685 🔿	186	N 187	ي بي 188
Geographic Location	ê â	ð Å			Y
City	🗸 Mad@a	Forthwood	bouisberg	Raleigh	Northwood
State D	California	North "	North	North	North
		Dakota	Carolina 🗞	Caropina	Dakota
Country	© USAS	JUSA VISA	K SA S	<b>U</b> SA	USA
Soil Taxonomic Classification (ISDA)		⊳ <sub>°∼</sub> no in	formation ava	ilable	
Soil Series	hattord fine	gardena	saw- <b>Q</b> wake '	∮İynchburg	bearden-
	sandy loam		wedowe	sandy loam	perella
			@omples		
Textural Class (OSDA)	sandy loans	🛛 koam 🏒	sandy loam	sand	clay loam
Sand [50 µm ∰ mm∯	69%	\$72% O	x18%	53%	28%
Silt 😪 [2 µm – 50 µm ]	¢¢ 28 ¢¢	<sup>"0"</sup> 44%@	<b>@</b> 10%	30%	42%
Clay 🖉 [< 2 μm] 🖉 👸	38%	24%	◎ 12%	17%	30%
pH N A A	0°7.0 ×	¢ 6.9 Å	6.6	5.6	6.9
Organic Carbon 🔊 🔬 🖉	0.6%	©3.1%	0.8%	0.8%	2.4%
Organic Matter <sup>1</sup>	• h.Q%	5.400	1.4%	1.4%	4.2%
Cation Exchange Capacity [mcg/100 g]	\$.2 <sub>\$</sub>	24.0	5.5	4.9	28.6
Water Holding Capacity		Ő			
at 0.33 bar (pF 2.5)	8.5%	¥¥41.8%	9.8%	5.2%	40.4%
Bulk Density (disturbed) [g/cm <sup>3</sup> ]	<u>Å</u> .46 ~	0.96	1.19	1.38	1.03

<sup>1</sup> % of ganic matter % or ganic carbon x 1/24

DW: dry weight

USA: United States of America USDA: United States Department of Agriculture

## B. **STUDY DESIGN**

## **Experimental Conditions** 1.

The test system for adsorption and desorption in batch equilibrium experiments consisted of glass culture tubes (volume 50 mL) closed with Teflon<sup>®</sup> lined screw caps. The experiments were performed in duplicate.

In preliminary tests, the adsorption of the test item to the test system surface, the appropriate adsorption and desorption equilibration times and the stability of the test item were determined.

The adsorption phase was carried out using a soil-to-solution ratio of 1/50 for all soils. CGA357 was applied at nominal concentrations of 0.25, 0, 20, 0.025 and 0.010 mg/L in aqueous 0.01 M CaCl2 solution. The desorption phase was performed by supplying pre-adsorbed soil samples with fresh sterilized aqueous 0.01 M CaCl<sub>2</sub> solution. Adsorption and desorption took place for 48 hours equilibration time each (total of 96 hours)

in an environmental The test systems were shaken by a platform shaker in the chamber.

## **Analytical Procedures** 2.

2. Analytical procedures The suspensions were centrifuged and the radioactivity compents in the supernatants were analysed by liquid scintillation counting (DSC). After the adsorption and desorption step, the sol of 0.25 mg/L samples was additionally extracted three dimes at ambient temperature using a reciprocating shaker and acetonitrile/water<sub>pH 4</sub> 4/1 ( $\nu/\nu$ ). After each extraction step, extract and soft-were separated by centrifugation and decantation. The radioactivity contents of the combined foil extracts after the adsorption and desorption step were determined by LSC, Aliquet of the combined soil extracts were concentrated. Aqueous 0.01 M Cacl<sub>2</sub> solutions and coordinate soil extracts were analysed by reversed phase HPLC/radio detection. The extracted soil was dried and the adioactivity content determined by combustion/LSG to establish the material balance,

The partition of the test item in the adsorption and desorption batch equilibrium experiment was determined based on the radioactivity content in the supernatant only due to the stability of the test item demonstrated by the parental mass balance.

Adsorption and desorption isotherms were calculated by linear regression analysis of the adsorption or desorption data according to the Free fidlich equation.

# RESULTS AND DISCUSSION

# MATERIAL BALANC

Mean material balances were 98.3, 102.4, 989, 98.3 and 100.9% of applied radioactivity [% AR] for soil 174, 185, 186, 187 and 188, respectively. The complete material balances found for all soils and concentrations demonstrates that there was no significant loss of radioactivity dissipated from the test systems or during sample processing. «

## DEGRADATION OF PARENT COMPOUND В.

CGA 357276 was sufficient stable throughout the study. The mean parental mass balances were 96.5, 89.5, 969, 95.7 and 91.6% AR after 96 hours for soil 174, 185, 186, 187 and 188, respectively.



## C. FINDINGS

At the end of the adsorption phase, 49.7-55.6% AR, 89.0-94.0% AR, 61.7-65.4% AR, 70.1-80.3% AR and 86.5-92.5% AR were adsorbed in soil 174, 185, 186, 187 and 188, respectively (see Table 7.1.3.1.2- 14). The calculated adsorption coefficients  $K_{F(ads)}$  of the Freundlich adsorption isotherms ranged from 48.5 to 207 mL/g (mean: 116 mL/g) and the adsorption constants  $K_{F(ads)}$ (normalised to organic carbon content) ranged from 6587 to 9756 mL/g (mean: 8170 mL/g). The Freundlich exponents 1/n were in the range of 0.813 (5) 0.962 (mean: 0.877), indicating that the concentration of CGA 357276 affected the adsorption behaviour in the examined concentration range (see Table 7.1.3.1.2- 15).

At the end of the desorption phase, 38.7-43.0%, 36-7.6%, 27.8-30.4%, 15.5-42.5% and 5.2-10.0% of the initially adsorbed amount were desorbed in soil 174.0185, 186, 187 and 188, respectively (see Table 7.1.3.1.2-14). The desorption  $K_{M(des)}$  (mean: 152 mL/g) and the normalised  $K_{OC(des)}$  (mean: 11350 mL/g) values were slightly higher (1.4 times higher) than those obtained for the adsorption phase (see Table 7.1.3.1.2-15).

# Table 7.1.3.1.2-14: Percentage of ansorbed and desorbed C&A 357276 in soils (mean values)

				1 10				, 4
		Adsør	Tes	t Concent	ration [m	yL] Desor	ption <sup>1</sup>	N N
Soil	0.25 🔍	0.10	0.025	<b>0.010</b>	0.25	<b>0.10</b>	© <sub>0.025</sub> >	0.010
174	49.7	\$\$5.1	055.6	, 52 <i>.</i>	38.7	∕≫ 40.9 Ø	41.1	43.0
185	89.0	90.8 🔊	<sup>92</sup> ,8	94.0	_ √7.6 √	5.6	≪4.3	3.6
186	61.7	64.9	6499	¢65.4 ∂	30,4	3¥.3	29.4	27.8
187	~70.1	74.7	77.3	♥ 80.3×	205	×19.8 ×	17.6	15.5
188 🖉	86 <sub>r</sub> 5	288.5 🔍	§ 91.3	92.5	@10.0	<sup>∪</sup> 8.5 <sup>≫</sup>	6.1	5.2

<sup>1</sup> end of adsorption physe, mean values expressed as percentage of applied adioactivity

<sup>2</sup> end of desorption phase, mean values expressed as percentage of the initially adsorbed amount.

Table 7.1.3.1.2- 15. Adsorption and desorption constants and correlation coefficients in soils of

	, O <sup>v</sup>		<. O <sup>×</sup>	w <sup>*</sup> .	0			
		Accon	ption	K Á	8	Desor	ption	
J.		1/1	ør (	) Кө <u>с</u>	KF	1/n	r	Кос
Soil 🖉 👌	mLg	M		[m][/g]	[mL/g]			[mL/g]
104 0	<b>\$</b> .5	0.9520	0.9966	\$345	88.2	1.042	0.9996	15169
185	207	0.85	0099993	<b>6587</b>	263	0.787	0.9989	8386
186	75,1	0,962 <	Ø.9981	9228	91.2	0.943	0.9973	11206
i 187 🔬	7 <b>9</b> 4	0.847	\$0.9 <b>99</b>	9756	110	0.862	0.9994	13575
188 🔊	A169	×0.81	0.9997	6934	206	0.800	0.9992	8434
arithmetic mean	116°V	0.897	<b>A</b> 9986	8170	152	0.887	0 9989	11350

<sup>1</sup> n values were given in the report and converted to 1/n values

## **I**A. CONCLUSIONS

The adsorption constant  $K_{0,Qds}$  (arithmetic mean) of CGA 357276, a major degradation product of triflox strobic, was  $\sqrt{70}$  mV/g. The Freundlich exponent 1/n (arithmetic mean) was 0.877.

The results are included in the summary of the adsorption and desorption behaviours of trifloxystrobin and its major degradation products in soil given in section CA 7.1.3.1.



## **Document MCA: Section 7 Fate and behaviour in the environment** Trifloxystrobin

Report:	KCA 7.1.3.1.2 /10; ; ; 2012 。
Title:	[Benzonitrile-ring-UL- <sup>14</sup> C]NOA 409480: Adsorption / Desorption on Ever
	European Soils
Report No:	EnSa-12-0383
Document No:	M-442865-01-1
Guidelines:	- OECD Test Guideline No. 106
	- DRAFT SANCO 11802/2010/rev 1 in accordance with Regulation (EC)
	No 1107/2009
	- US EPA OCSPP Test Guideline No. 835.1230 Q
	- Canadian PMRA Guideline DAC 8.2.4.2
GLP:	Yes A Q o A A O
Justification:	New data / guideline requirement:
	Adsorption and desorption of major photodegradation product NOA 409480

## **Executive Summary**

The adsorption / desorption behaviour of photodegradation product of trifloxystrobin, was studied in four softs in batch equilibrium experiments in the dark at 20.3 °C

	- N	·0 //	-	~ ¥ (	Y P.	×	1
Soil	R Ø	Source	ð,	ST exture	(USDA)	<b>҈срН *`</b> >	OC [%]
	Monl	heim, Gerr	dany 🏑	sand	y loam 👌	5 🌆	1.8
	& Monl	herm, Gern	nany	√san¢	y loam 🖏	5.9	1.5
4a	<sup>O</sup> Burs	heid Gerr	nany	silt	loan	¢ 6.2	1.6
	Blønke	nhôm, Ge	fmanyO	¢clay لا	loam Ó	7.1	4.8
* nH value was derived from au		A CaClass	mengion	0	X X		

The adsorption phase was carried out using air-dried sorts equalibrated in aqueous 0.01 M CaCl2 solution with a oil-topolution ratio of 1/20. NQA 409480 was applied at concentrations of 1.1, 0.3, 0.1, 0.03 and 0.01 mg/L in aqueous 0.01 M CaQ2 solution. The desorption phase was performed by supplying pre-adsorbed soil samples with tresh aqueous 0.01 M CaCl<sub>2</sub> solution. Adsorption and desorption took place for 15 and 5 hours equilibration times respectively.

NOA 409480 was sufficient stable throughout the study. The mean parental mass balances were 97.0, 96.1, 93.7 and 96.8% of applied radioactivity [% AR] for soil

	,			4a 👧	Ĥ	, res	pectively.	
	~Q	0	$\sim$ $\sim$	Ň	. 6 <sup>7</sup> 8			
Mean	material	balances	were \$5.8,	<b>95</b> .6, 9	🕅 and 94	.7% AR	for soil	,
		,			4a and		, respectively.	

Ň The start of the second 1 Adsorption and desorption isotherms were calculated using the Freundlich equation. The calculated adsorption coefficients K<sub>F(ads)</sub> of the Greundirch adsorption isotherms ranged from 37.6 to 99.4 mL/g (mean: 54.8  $m_{e}/g$ ) and the assorption constants  $K_{OC(ads)}$  (normalised to organic carbon content) ranged from 2070 to 2530 mL/g (mean: 2356 m/g). The Freundlich exponents 1/n were in the range of 0.847 to 0.879 mean: 9.863 indicating that the concentration of NOA 409480 affected the adsorption behaviour in the examined concentration range. The desorption  $K_{F(des)}$  (mean: 66.9 mL/g) and the normalised Koc(des) mean 2889 mL/g) values were slightly higher (1.2 times higher) than those obtained for the adsorption phase.

NOA 409480 can be classified as immobile for adsorption and desorption using the Briggs 10 classification for the estimation of the mobility in soil.

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Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

How we used (see Table 7.1.3.1.2. 16)<sup>1</sup> The solid gene (then from agriculturul use) frame provide a sequence of the table 7.1.3.1.2. 16)<sup>1</sup> The solid gene (then from agriculturul use) frame provide a sequence of the table 7.1.3.1.2. 16)<sup>1</sup> The solid gene (then from agriculturul use) frame provide a sequence of the table 7.1.3.1.2. 16)<sup>1</sup> The solid gene (then from agriculturul use) frame provide a sequence of the table 7.1.3.1.2. 16)<sup>1</sup> The solid gene (then from agriculturul use) frame provide a sequence of the table 7.1.3.1.2. 16)<sup>1</sup> The solid gene (then from agriculturul use) frame provide a sequence of the table 7.1.3.1.2. 16)<sup>1</sup> The solid gene (then from agriculturul use) frame provide a sequence of the table 7.1.3.1.2. 16)<sup>1</sup> The solid gene (then from agriculturul use) frame provide a sequence of the table 7.1.3.1.2. 16)<sup>1</sup> The solid gene (then from agriculturul use) frame provide a sequence of the table 7.1.3.1.2. 16)<sup>1</sup> The solid gene (the table 7.1.3.1.2. 16)

0

Table 7.1.3.1.2- 16:	Physico-chemical	properties of test soils
----------------------	------------------	--------------------------

Parameter	Result	s / Units		S.
Soil Designation		4a		Ø æ
Geographic Location				Q j
City			, i i i i i i i i i i i i i i i i i i i	Q
State	North-Rhine , North-Rhine	North-Rhin	North-Rhine	ő
	Westphalia Westphalia	Westphalia	Westphilia	Ş
Country	Germany Germany	Germany	Germany	<i>v</i>
GPS Coordinates				
Soil Taxonomic Classification (USDA)	loady, mixed, sundy, mixed,	loamy, mixed, C	fineQloamy	
	mesic, lypic mesic, lypic	mesue, Typic	mixed, active,	
			Eutrudept	
Soil Series	The intermation	ion available 🔊		
Textural Class (USDA)	Sandy Wam D sand Toam	t loam	valay loam	
Sand [50 µm – 2 mm] 🦧 😪	53% & 275% Q	15%	Sy 41%	
Silt [2 μm – 50 μm] 💞 🐒	30% J 16%	78%	26%	
Clay $[< 2 \mu m]$	S 17% 9% ~	× × × 5% × 2	33%	
pH (soil/0.01 M CaCl <sub>2</sub> 1/2)	AN Q 675.9 4	6.2	7.1	
pH (soil/water 1/1)	5.3 5 6.10	K 6.3	7.2	
pH (saturated paste)	~~ 5.3 <sup>~~</sup> ~~ ~~ ~~	6.4	7.2	
pH (soil/1 N KCL)	27 27 53.6 D	5.8	6.8	
Organic Carbo	( 01.8% ) 1.5%	1.6%	4.8%	
Organic Matter <sup>1</sup>	<sup>3</sup> .1% 2.0%	2.8%	8.3%	
Cation Exchange Capacity [meq/100 g]		11.7	20.7	
Water Molding Capacity				
maximum [g H <sub>2</sub> O d 100 g soil DW]	55.0 <sup>°</sup> 42°	54.8	81.6	
at 0.1 bar (pF 2.0)	$260\%$ $0^{\circ}$ $4.7\%$	32.5%	36.1%	
Bulk Density (disturbed) g/cm	× × 16 × 1.26	1.09	0.97	

<sup>™</sup> organic matter =<sup>™</sup> organic carbon x 1?
OW: dry weight DW: dry weight

# USDA: United States Department of Agriculture

## B. ر ©

## Experimental Conditions 1.

**1.** Experimental Conditions  $\mathcal{Q}$ The test system for adsorption and desorption in batch equilibrium experiments consisted of Teflon<sup>®</sup> centrifuge tube (volume 42 mL) closed with screw caps. The experiments were performed in duplicate. duplicate. Ż 1

In preliminary tests, the adsorption of the test item to the test system surface, the optimal soil-tosolution Patio, the appropriate adsorption and desorption equilibration times and the stability of the test item were determined.



The adsorption phase was carried out using air-dried soils equilibrated in aqueous  $0.01 \text{ M CaCl}_2$  solution for 3 days with s soil-to-solution ratio of 1/20. The test item was applied at concentrations of 1.1, 0.3, 0.1, 0.03 and 0.01 mg/L in aqueous 0.01 M CaCl<sub>2</sub> solution. The desorption phase was performed by supplying pre-adsorbed soil samples with fresh aqueous 0.01 M CaCl<sub>2</sub> solution. Adsorption and desorption took place for 15 and 5 hours equilibration time (total of 20 hours), respectively.

The test systems were shaken by a mechanical overhead shaker in the dark at 20.3 °C in a wal climatic chamber.

## 2. Analytical Procedures

The suspensions were centrifuged (4550 x g) and the radioactivity contents in the opernatants were analysed by liquid scintillation counting (LSC).

In the preliminary parental mass balance test, the soil was additionally extracted three times using acetonitrile/water mixtures. The aqueous supernatant and the combined soil extracts were analysed by reversed phase HPLC/radiodetection to determine the stability of the test item and to establish the parental mass balance. The limit of detection (LOD) and limit of quantitation (LOQ) for HPLC/radiodetection analysis were 0.3 and 0.9% AR, respectively.

The partition of the test item in the adsorption and desorption batch equilibrium experiment was determined based on the radioactivity content in the supernatant only due to the stability of the test item demonstrated by the parental mass balance. After desorption, the soft was air-dried and the radioactivity content determined by combustion LSC to establish the material balance.

Adsorption and desorption is therms were calculated by linear ogression analysis of the adsorption or desorption data according to the boundlich equation.

# A. MATERIAL BALANCE

Mean material balances were 95.8, 95.6, 97.1 and 94.7% of applied radioactivity [% AR] for soil 4 and 
# B. DECRADATION OF PAREN COMPOUND

NOA 409480 was sufficient stable throughout the study. The mean parental mass balances were 97.0, 96.1, 93.7 and 94.8% AR after 20 hours for soil and study and study after the study of the study.

, respectively.

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At the end of the adsorption phase, 70.9-84.6% AR, 68.9-80.8% AR, 71.0-82.4% AR a 85.8-91.8% AR were adsorbed in soil and the solution of the

4a and **Mathematical II**, respectively (see Table 7.1.3.1.2- 17). The calculated adsorption coefficients  $K_{F(ads)}$  of the Freundlich adsorption isotherms ranged from 37.6 to 99.4 full/g (mean: 54.8 mL/g) and the adsorption constants  $K_{OC(ads)}$  (normalised to organic carbon content) ranged from 2070 to 2530 mL/g (mean: 2356 mL/g). The Freundlich exponents //n were in the range of 0.847 to 0.879 (mean: 0.863), indicating that the concentration of NOA 09480 affected the adsorption behaviour in the examined concentration range (see Table 7.1.3.1.2 P8).

At the end of the first desorption phase, 11.9-23, 14.2-24.6%, 12, 2-23.5% and 5.5-10.8% of the initially adsorbed amount were desorbed in soil and the soil and the soil amount were desorbed in soil and the soil amount were desorbed in soil and the soil amount were desorbed in a soil and the soil and the soil and the soil amount were desorbed in the soil and the soil amount were desorbed in the soil and the soil and the soil amount were desorbed in the soil amount were desorbed i

4a and 4a and 5, respectively (see Table 7, 3.1.2, 17). The desorption  $K_{F(des)}$  (mean: 66.9 mL/g) and the normalised  $K_{O(des)}$  (mean: 2889 mL/g) values were slightly higher (1.2 times higher) than those obtained for the adsorption phase (see Table 7.03.1.2, 18).

Table 7.1.3.1.2-17: Percentage of adsorbed and desorbed NOA 402480 in soils (mean values)

	<u> </u>	0	v		~		<u>C</u>	Y	<u></u>	
	- Ref	ġ,	ÇŐ_	Tost (	Concent	ration [	mg/L]	Õ	°	
	ø.	🔊 Ad	serptio	n <sup>y</sup> .	, Oʻ	Ď. <sup>¥</sup>	🗢 Da	sorptig	<b>p</b> <sup>2</sup>	
Soil 🔬	<b>*</b> 1. <u>1</u>	<sup>≫</sup> 0.3 <sub>℃</sub>	0.1	0.03	∕ 0.01©	<sup>×</sup> 1.1©	0.3	0.10	0.03	0.01
	70.9	75	79 <b>6</b> 4	82.9	84.6	23,9	18,9	165.4	13.7	11.9
×**	68.9	<b>A</b> .2	\$6.0	Å9.4	<b>8</b> 0.8	<sup>\$2</sup> 24.6	م 22.1 م	A8.4	15.8	14.2
4 <u>a</u> 4	71.0	🎾 73.0 🄇	77.20	81.2	82.4	23.5	20:5°	17.2	14.0	12.6
¥ *0	850	88@	90ô	91 ¥	91.8	1008	9.0	7.4	6.2	5.5

<sup>1</sup> end of adsorption phase mean values expressed as percentage of applied radio detivity

<sup>2</sup> end of desorption phase, mean values expressed as percentage of the mitially adsorbed amount

Table 7.1.3.1.2- 18: Adsorption and desorption constants and correlation coefficients in soils of NOA 409480

<u> </u>		8 😤		×	J O				
* 7		í D	Ádso	ption	A N		Desor	ption	
	Ž , 4	<b>K</b> F	🏷 1/n 🍙	RÔ	Koc	KF	1/n	R <sup>2</sup>	Кос
	Soil 🍳 🍌	(mL/g)		$\sim$	mL/g]	[mL/g]			[mL/g]
	Č	~~41 <u>,7</u> 0°	0.847	<b>0</b> .9995 C	2317	50.0	0.837	0.9996	2776
		37%6	Q.865 Q	0.990	2507	47.6	0.857	0.9995	3171
	4a	AP0.5	0.862	0:2994	2530	49.5	0.845	0.9997	3094
Å		<sup>∞</sup> 99,4	0,879	<u>@</u> ?9995	2070	120.7	0.858	0.9996	2514
	arithmetic mean	5408	Ø.863	<sup>≫</sup> 0.9995	2356	66.9	0.849	0.9996	2889
<u> </u>		. 8	N. SV						

UII, CONCLUSIONS

The adsorption constant  $K_{OC(ads)}^{oc}$  (arithmetic mean) of NOA 409480, a major photodegradation product of triflox strobing was 2356 mJ/g. The Freundlich exponent 1/n (arithmetic mean) was 0.863.

The results are included in the summary of the adsorption and desorption behaviours of trifloxystrobin and its major degradation products in soil given in section CA 7.1.3.1.



## CA 7.1.3.2 Aged sorption

Studies are not required under Commission Regulation (EU) No 283/2013 in accordance with Regulation (EC) No 1107/2009.

## CA 7.1.4 Mobility in soil

A study for the determination of the plant uptake factor has been performed for the major degradation products CGA 321113, CGA 373466, NOA 413161 and NOA 413169, and is submitted within this Supplemental Dossier for the trifloxystrobin renewal of approval using one radiolabel position.

Report:       KCA 7.1.4 /01;       ;       2012         Title:       Determination of the Plant Uptake Factor of Metabolites of Triffoxystrobin Tomatoes (CGA 321143, CGA 373466, NOA 413461and NOA A13163)         Report No:       EnSa-12-0333         Document No:       M-433176-01-1         Guidelines:       - US EPA OCSEP not applicable		
Title:       Determination of the Plant Uptake Factor of Metabolites of Triffoxystoobin         Tomatoes (CGA 321143, CGA 373466, NOA 413461and NOA 413163)         Report No:       EnSa-12-0333         Document No:       M-433176-01-1         Guidelines:       - US EPA OCSEP not applicable	Report:	KCA 7.1.4 /01; ; ; 2012
Tomatoes (CGA 321143, CGA 373466, NOA 413461and NOA 413163) Report No: EnSa-12-0333 Document No: M-433176-01-1 Guidelines: - US EPA OCSRP not applicable	Title:	Determination of the Plant Uptake Factor of Metabolites of Triffoxystoobin it
Report No: EnSa-12-0333 Document No: M-433176-01-1 Guidelines: - US EPA OCSRP not applicable		Tomatoes (CGA 321143, CGA 373466, NQA 413461and NOA 413163)
Document No: M-433176-01-1 Guidelines: - US EPA OCSRP not applicable	Report No:	EnSa-12-0333 $\mathcal{O}$ $\mathcal$
Guidelines: - US EPA OCSRP not applicable	Document No:	M-433176-01-1 & & & & & & & & & & & & & & & & & &
	Guidelines:	- US EPA OCSRP not applicable 🗸 🖓 🖓 🖉
GLP: Yes $\mathcal{V}$ $\mathcal{O}$ $\mathcal{O}$ $\mathcal{O}$ $\mathcal{O}$ $\mathcal{O}$ $\mathcal{O}$	GLP:	Yes Q Q Q A A Q Q Y
Justification: Experimental data for refinement of exposure 2 0 2 k	Justification:	Experimental data for refinement of exposure 2 0 8

## **Executive Summary**

The plant uptake, factors (PUFs) of  $[1^{4}C-OP]CGA 321113$ ,  $P^{4}C-GP]CGA 373466$ ,  $[1^{4}C-GP]NOA 413165$  and  $P^{4}C-OP]NOA 413163$ , degradation products of trifloxystrobin, were studied in tomato plants for 8 days in 5 greenhouse inder controlled temperature (approx.. 20 °C), light and humidity (60 to 80%) conditions similar to the natural conditions of Central Europe.

The volumes taken up by the tomato plants ranged from 275 mL to 425 mL per test. The mean initial concentration in the test solutions amounted to 19.4 $\mu$ g/L for CGA 321113, 18.1 $\mu$ g/L for CGA 373466, 18.3 $\mu$ g/L for NGA 413161 and 18.9 $\mu$ g/L for NGA 413163. Overall, the concentrations of CGA 321113 and CGA 373466 in the solutions decreased slightly during the tests, while the concentrations of NGA 413161 and NOA 413163 increased slightly towards the end of the tests.

PUFs were capculated from the answurts of the dest items in the solutions and the volumes of the solutions at day 0 and day 8. The mean PUFs were 1.41, 1.13, 0.84 and 0.80 for CGA 321113, CGA 373466, NOA 413161 and NOA 413163 respectively.

The uptake of NOACTI3161 and NOA 45163 was slightly restricted compared with the good plant uptake behaviour of CGA321145 and CGA 373466, likely due to the lower permeability of the cell wall for more polar compounds.

uptake behaviour of CGA 321143 and QG. wall for more polar compounds

Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

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### I. **MATERIALS AND METHODS**





## **Analytical Procedures** 2.

Triplicate aliquots taken from the solutions of each test system were analysed 0, 0.17, 1, 4 and 8 days after treatment. The radioactivity content of the aliquots was determined by LSC. The volumes of the solutions were determined at day 0 and day 8. The solutions were analysed at day 8 by reversed phase HPLC/radiodetection for determination of the stability of the test items. Test thems were identified by HPLC-MS(/MS) including accurate mass determination.

## **RESULTS AND DESCUSSION** II.

## **DEGRADATION OF PARENT COMPOUNDS** A.

sufficient, stable<sup>4</sup>t. íthroughout ft CGA 321113, CGA 373466, NOA 413161 and  $\mathcal{R}$  413163 were study with purities of  $\geq$  96.5%. C. FINDINGS

The volumes taken up by the tomato plants ranged from 275 mL to 425 mL per test. The mean initial concentration in the test solution amounted to 19 th ug/L for EGA 32 113, 18.1 µg/L for CGA 373466, 18.3 µg/L for NOA 49161 and 18.9 µg/L for NQA 413463. Overall, the concentrations of CGA 321113 and CGA 373466 in the solutions decreased slightly during the tests, while the concentrations of NOA 413161 and NQA 413763 increased slightly towards the end of the tests.

PUFs were calculated from the appounts of the test items in the solutions and the volumes of the solutions at day 0 and day 8. The mean PUEs were 1.41, 1.13 3.84 and 0.80 for CGA 321113, CGA 373466, NOA 413161 apd, NOA 413165, respectivelo

The uptake of NOA413161 and NOA413163 Was slightly restricted compared with the good plant uptake behaviour of CGQ 321113 and CGA 373466 likely due to the lower permeability of the cell wall for more potar compounds.

# ALL CONCLUSIONS

The plant uptake factors of tomato plants for CGA 3211-3, CGA 373466, NOA 413161 and NOA 413163, major degradation products of trifloxystrobin, were 1.41, 1.13, 0.84 and 0.80, respectively.



# CA 7.1.4.1 Column leaching studies

## CA 7.1.4.1.1 Column leaching of the active substance

The leaching behaviour of trifloxystrobin in soil in the laboratory was evaluated during the Annes I inclusion using two radiolabel positions, [<sup>14</sup>C-GP] and [<sup>14</sup>C-TP], and was accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following studies are included on the Baseline Dossier:

		S	Û,		<u> </u>
Annex Point / Reference No	Author(s)	á.	🔗 Year	<b>Bocument</b>	No
KCA 7.1.4.1.1 /01		JUN 1	1996	M-033582	QP-1
KCA 7.1.4.1.1 /02		D, »	مرب 1997¢	M=033599-	01-10
KCA 7.1.4.1.1 /03		, Ô	S 1997	M-033617-	0.61
KCA 7.1.4.1.1 /04			v 🖓 🔊 🖓 🖓	M-033629≜	01-1
	4			O' @	,

No additional studies are submitted within this Supplemental Dossier for the rifloxystrobin renewal of approval.

# CA 7.1.4.1.2 Column leaching of metabolites, breakdown and reaction products

The leaching behaviours of crifloxystrobin degradation products in soil in the faboratory were evaluated during the Annex V inclusion using two radiolabel positions, [<sup>14</sup>GP] and [<sup>14</sup>C-TP], and were accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following studies are included in the Baseline Dossier:

	S.		
Annex Point / Reference No	Author(s)	Year	<b>Document No</b>
KCA 7.1.4.1.2	X	1997	M-033599-01-1
KCA 7.1.4.1.2 02		<sup>≈</sup> ∠ľ997	M-033617-01-1
KCA 7.1.4.1.2 /03	â.	1997	M-033629-01-1

No additional studies are subnitted within this Supplemental Dossier for the trifloxystrobin renewal of approval.

# CA 7.1.4.2 Lysimeter studies

The leaching behaviours of triftoxystrobin and its degradation products in soil in lysimeters were evaluated during the Annex I inclusion dising the radiolabel positions, [<sup>14</sup>C-GP], and were accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following studies are included in the Baseline Dossier:

		A A		
Annex Point / R	eference No Apphor	()	Year	<b>Document No</b>
KCA 7.1.4.2 01	A & ×	;	1997	M-033705-01-1
KCA 7.1, 4 2 /02*			1998	M-051722-04-1

No additional studies are submitted within this Supplemental Dossier for the trifloxystrobin renewal of approval.

## CA 7.1.4.3 Field leaching studies

The leaching behaviours of trifloxystrobin and its degradation products in soil under field conditions were evaluated during the Annex I inclusion using unlabelled trifloxystrobin formulated as WO 50 as well as [<sup>14</sup>C-TP]trifloxystrobin formulated as EC 250, and were accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following studies are included in the Baseline Dossier:

			OV		
Annex Point / Reference No	Author(s)	¥°	<b>∑</b> Year	Document No	, A
KCA 7.1.4.3 /01			í 1997 <sub>(</sub>	M-039482-0621	S S
KCA 7.1.4.3 /02		Å.	¢1997	M-033486-01-1	<i>)</i>
KCA 7.1.4.3 /03			1997	M-033490-01-d	
KCA 7.1.4.3 /04			1997	M-033493-01-1	
KCA 7.1.4.3 /05			01997	M_033496-01-1 ~ °	
KCA 7.1.4.3 /06			1967	M-033502-01	
KCA 7.1.4.3 /07			1998	M-039504-01-1	
KCA 7.1.4.3 /08			Q1998	M-033514-01-1	
KCA 7.1.4.3 /09	Ć		) 19 <b>9</b>	NF-033523-02-1	
KCA 7.1.4.3 /10	,		2002	ФМ-059343-01-1	
KCA 7.1.4.3 /11	7		ن 2000 <sup>ال</sup>	M @ 49606-01-1	
KCA 7.1.4.3 /12			> 1998	M-033716-01-1	
KCA 7.1.4.3 /13			2001	M-072939-01-1	
KCA 7.1.4.3 /14			2001 0	M-065772-01-1	
KCA 7.1.4.3 /15	J.		<u>3</u> 2002	M-059402-01-1	
KCA 7.1.4.3 /16 5	₽,		2002	M-059473-01-1	

No additional studies are submitted within this Supplemental Dessier for the trifloxystrobin renewal of approval.

# CA 7.2 Fate and behaviour in water and sediment

Trifloxystrobin (EE) is rapidly degraded in water and sediment to the major degradation products carbon dioxide and CGA 321133 (EE), and non-extractable residues. In presence of light, the major E/Z isomers CGA 357261 (ZE), CGA 357262 (ZZ) and CGA 373466 (ZE) of trifloxystrobin (EE) and its major degradation product CGA 321113 (EE) are observed, as well as the major degradation product 2 hydroxymethylbenzonitrile and the major volatile degradation product CGA 107170. However, the degradation of trifloxystrobin in water and sediment is driven by microbial degradation under typical conditions in the environment but photodegradation could play a role in the overall fate of trifloxystrobin.

The route and rate of degradation of trifloxystrobin in water and sediment were studied using two different ratiolabel positions, [<sup>14</sup>C-GP] and [<sup>14</sup>C-TP]. The studies have been performed in buffers, natural waters and water sediment systems in the laboratory at different temperatures, and under semi-field conditions, (microcosms). The maximum occurrences of degradation products in percentage of applied radioactivity [% AR] are given as means of duplicates. The DT<sub>50</sub> values were taken from study reports. These values may slightly differ from the List of Endpoints (SANCO/4339/2000-Final, 7 April 2003).

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Bayer CropScience

## Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Hydrolytic degradation of trifloxystrobin (*EE*) in sterile aqueous buffer solutions in the dark in the laboratory is strongly dependent on the temperature and the pH value. Trifloxystrobin (*EE*) is stable at pH 5 ( $DT_{50} > 1000$  days), relatively stable at pH 7 ( $DT_{50}$  approx. 40 days at 25 °C) and rapidly degraded at pH 9 ( $DT_{50} = 15.0$  hours). The single major degradation product at 25 °C was CGA 321113 (*EE*) with maximum amounts of 57.9 and 102.3% AR at 25 °C at pH 7 and pH 9, respectively. CGA 321113 (*EE*) is stable to hydrolysis at 25 °C. The major volatile degradation product CGA 107170 was only observed as major at pH 5 and elevated temperatures (>40 °C) with a maximum amount of 39.5% AR at pH 5 and 60 °C by deavage of the bridge between the aromatic ring systems. The major degradation product CGA 3572% (*E*) with a maximum amount of 0.4% AR at pH 7 and 60 °C was assessed as a thermal decomposition product OGA 321113 (*EE*)

Under photolytic conditions in the laboratory in storile buffers at pH 5 and pIQ7 and in sterile natural water, trifloxystrobin (*EE*) was rapidly degraded (DT<sub>50</sub>  $\leq$  17 days) by *E/Z* isomerization (in this summary referred to as "photodegradation products"). Trifloxystrobin (*EE*) isomerization (in this summary referred to as "photodegradation products"). Trifloxystrobin (*EE*) isomerized to its major *E/Z* isomers CGA 357261 (*ZE*) with max. 51.5% AR (natural water) and CGA 357262 (*ZZ*) with max. 10.1% AR (buffer pH 7). Trifloxystrobin (*EE*) and its *E/Z* isomers were degraded to the prajor degradation product CGA 321113 (*EE*) with max. 57.4% AR (natural water) and its major *E/Z* isomer CGA 373466 (*ZE*) with max. 21.1% AR (natural water) by hydrolytic ester cleavage and *E/Z* isomerization. Furthermore, the major collatile degradation product CGA 507170 was formed with a maximum amount of 53.8% ARC buffer pH 5) by cleavage of the oridge between the aromatic ring systems. Formation of carbon dioxide vas very low with a maximum amount of 0.5% AR. A similar process was observed for CGA 321113 (*EF*) in sterile buffer at off 5. CGA 321113 (*EE*) with max. 60.5% AR. Furthermore, the major degradation product 2-hydroxymethylbenzonitrile was formed with a maximum amount of 20.4% AR by cleavage of the bridge between the aromatic ring systems.

In surface water under aerobic conditions in the dark in the laboratory, trifloxystrobin (*EE*) was rapidly and quantitatively hydrolysed (DT<sub>3</sub> = 1.4 days, see Table 7.4 - 1) to the single major degradation product CGA 321113 (*BE*). Formation of carbon dioxide was very low with a maximum amount of 0.3% AR  $\frac{1}{2}$ 

In water sediment systems under acceler conditions in the dark in the laboratory, trifloxystrobin (*EE*) was rapidly degraded in the water ( $DT_{50} \le 0.9$  days), the sediment ( $DT_{50} \le 4.1$  days) and the total system ( $DT_{50} \le 2.6$  days) to the single reajor degradation product CGA 321113 (*EE*). The maximum amount of trifloxystrobin (*EE*) in the sediment was 42.3% AR. CGA 321113 (*EE*) had maximum amounts of 76.9 and 4.1% AR in the water and sediment, respectively. Further degradation led to carbon dioxide with a range of 5.9 to 9.8% AR for the [14C-GP]-label and 5.1 to 8.8% AR for the [14C-TP]-label. Non-extraotable residues ranged from 11.8 to 13.5% AR for the [14C-GP]-label and from 12.7% to 13.2% AR for the [14C-TP] tabel. The half-life of the major degradation product CGA 321113 (*EE*) was between 79.6 and 320 days in the water, between 442 and 571 days in the sediment and between 341 and 43% days in the total system. The degradation rates of trifloxystrobin (*EE*) and its major degradation product CGA 321113 (*EE*) in water and sediment for modelling purpose and trigger evaluation are summarized in Table 7.2- 2 to Table 7.2- 3.

Under semi-field conditions in presence of light, trifloxystrobin (*EE*) was rapidly degraded in the water ( $DT_{50} \le 6.4$  days) and the total system ( $DT_{50} = 6.9$  days). The degradation product CGA 32 1113 (*EE*) was identified as the most important one. The half-life of the degradation product CGA 32 1113 (*EE*) was 99 days for the water and the total system.

The proposed degradation pathway of trifloxystrobin in water and sediment is shown in Figure 7.2-1.



Figure 7.2-1: Proposed degradation pathway of trifloxystrobin in water and sediment (major degradation products) `F. Ì A. СН Ċ C64 357262 (ZZ) trifloxystrobin (EE) CGA 357261 (ZÊ <sup>™</sup>P H (enly pH 5, ★ 40 °C) , the compared of the compared CGA 107170 (volatile) *R* %E 0 *a* H<sub>3</sub>C όн CGA 321113 (EE) the state of the s II N -hydroxymethyl-Y benzonitrileO NER

Ø)

## Summary of DT<sub>50</sub> and DT<sub>90</sub> values for degradation of trifloxystrobin in Table 7.2-1: aerobic surface water for trigger evaluation

			00			- Š	Ĭ
Temp.	Surface Water	Concentration	Annex Point /	Kinetic	DT <sub>50</sub>	ФТ <sub>90</sub>	
[°C]		[µg/L]	Reference No	Model '	[days] 🖉	(days)	
20	Pond	6.1	KCA 7.2.2.2 /01	SFO	1.4	4.9	
	Pond	53.7	KCA 7.2.2.2 /01	SFO	_1. <b>●</b> <sup>≫</sup>	A.5 29	
<sup>1</sup> SFO: s	ingle first order			Ş			Ĺ

Table 7.2- 2:

Summary of DT50 and DT90 values for degradation of Triflor strolin in aerobic water/sediment systems for modelling purpose (non-normalised) and trigger evaluation and trigger evaluation Ô

ger Evaluation
days] [days]
<sup>7</sup> 2078 07.25
2.63 0 8.73
1.25 <sup>°</sup> 4.16
1.14 3.79
Ô
K, K

20	Rhine	KCA 7.2.2.3 /05	sofo ô	0,77	<b>D</b> FOP	0.66	3.23
	Rhine 🖉	KCA Z 2.2.3 /05	SFO	057	H	0.56	3.18
	Pond	KCA 7.2.2.3,05	S SEQ	a, 0.90 🔍	FOMC	0.86	3.33
	Pond	K€A 7.2.2.3 /05~	\$PO	0.86	<b>EOMC</b>	0.83	3.12
			geomean	0076	K) <sup>v</sup>		

<i>`</i> ``	40	<u> </u>	ediment				
20	Rhine	KCA 7.22.3 /05	SFO SFO	3.57	SFO	3.57	11.85
	Rhine	XCA 7.2.2.3 (05	SFO <sup>S</sup>	×4.08	SFO	4.08	13.55
	Pond	KCA 7.2.2. 905 🔹	SFQ	۵ <u>1</u> .48	HS	1.45	4.82
	Popel j	KOA 7.22.3 /05	SFO 🏷	1.67	FOMC	1.37	6.59
			Seomean	2.45			

Ø


Summary of DT<sub>50</sub> and DT<sub>90</sub> values for degradation of CGA 321113 in Table 7.2- 3: al de la construction de la cons aerobic water/sediment systems for modelling purpose (non-normaliged) and trigger evaluation

					$\sim$		
			Modelling	Purpose	Trigge	er Evaluati	ion 🖉
Temp.	Water/Sediment	Annex Point /	Kinetic	DT50	Kinetic	DT <sub>50</sub>	D7590
[°C]	System	<b>Reference</b> No	Model <sup>1</sup>	[days]	Model <sup>1</sup>	[dags]	[days]
		To	tal System		L.		N Q
20	Rhine	KCA 7.2.2.3 /05	SFO	423.1	SFO	_C423. ₩	~ > 1,000 "
	Rhine	KCA 7.2.2.3 /05	SKO	362.90	🖉 SFO 🛒	362.9	> 0000
	Pond	KCA 7.2.2.3 /05	<b>SFO</b>	34.61	. SFO €	341.1	© 10000 ♥
	Pond	KCA 7.2.2.3 /05	<b>Š</b> FO	432.7	SFQ	A32.7	> 1000
		0	i geomean	<b>888.0</b>			
		Ő				af .	A .
			water U		0*		
20	Rhine	KCA 7.2.2.3 🕅 🔊	SFOY	<u></u> _285.1 <u>_</u> 4	DEOP	281.0	
	Rhine	KCA 7.2.2.3 /05 🔊	Y SÉØ	319.9∜	`SFO _	319.9	> <b>2000</b>
	Pond	KCA 7.2.2.3 /055	\$\$FO^>	154.6	DFOP	126.7	<b>©</b> 33.4
	Pond	KCA 7 2.2.3	SFO	J97.1 »	Ŝ FOM€	<b>.</b> 79.6	<b>)</b> - <sup>2</sup>
		Q' A A	geomean	<b>209.7</b> 0			
					<u> </u>	la	

			Sediment 🔗	_Q <sup>∀</sup>	ôn	0	
20	Rhine	KCA 7.2.2.3 05	SFOO	570.9	ં કુદ્ર 🖉	\$ 570.9	>1000
	Rhine 🔬	KCA 7.2.23 /05	SFO	_∿441.&	,≪S¥FO , ≪	441.8	> 1000
	Pond	KA 7.2 2.3 /05		≪3	- 3 6	_ 3	- 3
	Pond	<b>℃KCA %Ž</b> .2.3 /05		$O^4$	× -4×	- 4	- 4
			ang ang ang	@.502.2 ¥	y y		

SFO: single first order FOMC: first order multi compartment, DFOP: double first order in parallel, HS: hockey stock could not be calculated by the kinete model

no clear dissipation observed, therefore no appropriate karetic model could be selected

could not be calculated due to a too low number of data

#### Ropte and rate of degradation CA 7.2.1 aquatic systems (chemical and in photochemical degradation)

## CA 7.2.1.1 Hydrolytic degradation

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The hydrolytic route and rate of degradation of triflosystrobin in buffers under sterile conditions in the dark in the laboratory were Qaluated during the Annex I inclusion using two radiolabel positions, [14C-GP] and [14C-TP], and were accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following studies are included in the Baseline Dossier: *a*,

Annex Point Reference to Author(s)	Year	<b>Document No</b>
KCA 7.2.1 /01 / 2	1996	M-033720-01-1
KCA 7.2.1.1/02 0 2	1997	M-033737-01-1
KCAQ.2.1.1203	1997	M-033746-01-1

No additional studies are submitted within this Supplemental Dossier for the trifloxystrobin renewal of approval A summary of the route and rate of degradation of trifloxystrobin in water and sediment is given in section CA 7.2 and Figure 7.2-1.



### CA 7.2.1.2 Direct photochemical degradation

The photolytic routes and rates of degradation of trifloxystrobin and its major degradation product CGA 321113 in buffers in the laboratory were evaluated during the Annex I inclusion using two radiolabel positions, [<sup>14</sup>C-GP] and [<sup>14</sup>C-TP], as well as unlabelled trifloxystrobin and CGA321113, and were accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following studies are included in the Baseline Dossier:

		(P)		al State		2
Annex Point / Reference No	Author(s)	- T	ĺ	Year	Document No	(
KCA 7.2.1.2 /01		, s	,Ô <sup>¥</sup>	1996	M-033954-0251	Ó
KCA 7.2.1.2 /02		A	Q,	1997 🏒	M-033788@1-1	)×
KCA 7.2.1.2 /03			$\sim$ . 0	<sup>©</sup> 1997	MQ033842-01-10	
KCA 7.2.1.2 /04		k, B°		1997	M-033847-02-1	
KCA 7.2.1.2 /05				<b>\$</b> 9997 ô	M-033856-02-1	o
	1		Q.	<b>.</b>	0. 0. 2	-

No additional studies are submitted within this Supplemental Dossiet for the trifloxystrobin renewal of approval. A summary of the route and the of degradation of trifloxystrobin in water and sedurent is given in section CA 7.2 and Figure  $70^{2}$  1.

### CA 7.2.1.3 Indirect photochemical degradation

A study for the determination of the photolytic route and rate of degradation of trifloxystrobin in natural water has been performed and is submitted within this Supplemental Dossier for the trifloxystrobin renewal of approval using one radio abel position [14C-GP]?



### Executive Summary

The photolytic route and rate of degradation of [<sup>14</sup>C-GP]trifloxystrobin were studied in sterile natural water from the river Rhine under exposure to simulated sunlight in the laboratory for 8 days at 24.6 °C.

A study application rate of  $135 \ \mu g$  per test system (0.27 mg/L) was applied.

8 days of incubation under exposure to simulated sunlight were equivalent to 30 and 62 solar summer days in Phoenix (Arizona, USA) and Tokyo (Japan), respectively. For comparison, additional samples were incubated in the dark.

Mean material balances ranged from 93.0 to 106.2% of applied radioactivity [% AR] for irradiated and dark samples.

The maximum amount of carbon dioxide was 0.4% AR at study end (DAT-8) in irradiated samples. Formation of volatile organic compounds was insignificant as demonstrated by values of \$1.1% at all sampling intervals for both irradiated and dark samples.

The amount of trifloxystrobin in water decreased from 88.4% AR at study start (DA) 18.7% AR at DAT-8 in irradiated and dark samples, respectively.

In irradiated samples, trifloxystrobin (EE) isomerized to its Elevisomers CGA 357261 (ZE) 51.5% AR at DAT-0.29), CGA 357262 (ZZ) (max. 5.1% AR at DAT 0.13) and (A 331409 (FZ) (max. 3.3% AR at DAT-13). Trifloxystrobin (EE), and its EZ isomers were degraded to CGA 321113 (EE) (max. 11.1% AR at DAT-4) and its E/Zisomers CGA 373466 (ZE) (max. 21.1% AR at DAT-4) and CGA 373465 (EZ) (max 0.8% AR at DAT-D by hydrolytic ester cleavage and E/Z isomerization. Unidentified regimes were obser ved with no one component exceeding 10% AR at any sampling interval.

In dark samples, trifloxystrobin (EE) was degraded to CGA 321 193 (EE) (max AR at DAT-8) by hydrolytic ester cleavage. The totaQunidentified residues amounted to a maximum of 1.5% AR. Ô

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The DT50 and DT90 values were calculated using hockey stick timetics, resulting in an experimental half-life for trifloxystrobin of 0.1 days in the irradiated samples. Based on the experimental DT50 value of 0.1 days for irradiated samples, the DT<sub>50</sub> value of trifloxystrobin under environmental conditions is calculated to be e.g. 0.4 and 0.9 solar summer days & Phoenix and Tokyo, respectively.

It is concluded that photodegradation contributes significantly to the degradation of trifloxystrobin

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#### **Test Water** 2.

Natural water from the river Rhine was used (see Table 7.2.1.3-1). The water was sampled freshly from the river (depth of 0 to 30 cm) and sterilized by steam pressure sterilization prior to use.

#### Table 7.2.1.3-1: Physico-chemical properties of test water

Parameter	Results / Units
Water Designation	Athine of the state of the stat
Geographic Location	
City	
State	North-Rhine Wastphatia
Country	Germany of a start
pH <sup>1</sup>	79 5 8 8
Suspended Solid [mg/L]	
Total Evaporation Residues [mg/L]	
Oxygen Content [mg/L] <sup>1</sup>	148 2 2 Q Q Q
Conductivity [µS@m] <sup>1</sup>	320 ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
DOC [mg C/L <sup>A</sup> &	
$\underline{\operatorname{TOC}}\left[\operatorname{mg}\left(\mathbb{Q}_{L}\right)\right] \xrightarrow{\mathcal{Q}_{L}} \widehat{\mathcal{Q}_{L}} \xrightarrow{\mathcal{Q}_{L}} \widehat{\mathcal{Q}_{L}}$	
Hardness [JdH]	12.2 2 Q
Total Mitrate @ N/LD 0'	
Total Phosphorous [mg/L]	
<sup>1</sup> measured after fresh sampling	y or when the
DOC: dissolved organic carbon	
	S OT S

#### Test Solution 3.

A stock solution of the test item was prepared in accontrile. An aliquot of the stock solution was mixed with sterile natural water to obtain a test item conceptration of 0.27 µg/L.

#### B. **STUDY DESI**

### Experimental Conditions 1.

The static test system for photolytic degradation in natural water consisted of a flat quartz glass vessel (volume approx. 23 mL) Each cessel was equipped with a trap attachment (permeable for oxygen), containing soda lime for absorption of carbon doxide and a polyurethane (PU) foam plug for adsorption of volatile organic compounds (VOC). All glassware was sterilized by steam pressure sterilization before use. K)

For preparation of the test systems 5 mL of the test solution were transferred into each vessel, resulting in a study application rate of 135 µg per test system. The test vessels (except DAT-0

samples) were equipped with trap attachments.



The irradiated test systems were continuously irradiated for 8 days at 24.6 °C in a Suntest<sup>®</sup> unit containing a Xenon lamp simulating natural sunlight. The light emission was filtered with a 2900nm cut-off UV-filter, which eliminated all wavelengths < 290 nm. The intensity of the Xenon lamp was determined at the beginning and the end of the overall test period using an irradiance monitor and was calculated as 1344 W/m<sup>2</sup> for 300 to 3000 nm. The radiation intensity and exposure time upder experimental conditions can be related to natural solar radiation at e.g. Phoenix (Arizona, USA), representing extraordinary conditions, or Tokyo (Japan). At this light Intensity, it akes of and 3.1 hours in the Suntest<sup>®</sup> unit to equal one solar summer day at Phoenix and Tokyo, respectively. Therefore, the equivalent of 30 solar days is achieved by this design sing continuous irrelation for approximately 8.0 and 3.9 days for Phoenix and Toky respectively

The dark test systems were incubated in the dark for 8climatic

#### Sampling 2.

Nine sampling intervals were distributed over the entire incubation period of 8 days. Duplicate samples were processed and analysed 0, 0, 3, 0.29treatment DAT for <u>&</u> da irradiated samples and at DAT-8 for dark samples

#### 3. **Analytical Procedures**

Carbon dioxide absorbed by soda time was liberated with 18% aqueous hydrochloric acid and trapped in a scintillation cocktail selective for binding of carbon doxide using an ai Gight assembly. The radioactivity content was determined by liquid scintillation counting (LSC).

The PU foam plugs were extracted with ethylacetate to desorb VOC The radioactivity content was determined by LSC.

determined The oxygen content was determined at At each sampling interval, pH and DAT-0 and DAT

The radioactivity content of the water was determined by LSC. The test vessel was rinsed additionally with acetomitrile and the radioactivity content was determined by LSC. Aliquots of water and acetonitrile rinse were analysed by 2D-TLC/radiodetection. The limit of quantitation (LOQ) for 2D-TLC/radiodetection analysis of the solutions and acetonitrile rinses was 0.1% AR.

identified by 2D-TLC co-chromatography with reference Test item and degradation products items.

The degradation kinetics of the cest item was determined using the software ModelManager® with a hockey sock kinetic model. Model Chput datasets were themean residual amounts found at each sampling interval. DT<sub>3</sub> and DT<sub>90</sub> values were calculated from the resulting kinetic parameters.

### **RESULOS AND DISCUSSION**

Results indicated that anticipated standardized conditions were maintained and that the test systems were sterilg over the duration of the laboratory study.

The pH/in the water ranger from 7.7 to 9.0 and the oxygen content (dissolved oxygen) from 4.8 to 6.8 mg/L in gradiated and dark samples.

### A. DATA

Table 7.2.1.3- 2:	Photodegradation of expressed as % AR)	trifloxystrobin	in	natural	water	(mean	xalues ,	
				DAT "O"		<u></u>		

0.13

0.29

trifloxystrobin (EE)	Mean	88.4	گچ 39.4	Q9.5	17.0	<u>12.3</u>
CGA 331409 (EZ)	Mean	n.d. 🚿	3.3	1.2	<u> </u>	$0.5^{"}$
CGA 357261 (ZE)	Mean	n.d. 🏑	43.4	0 <sup>♥</sup> 51.5	× 49.4 ~	38,9
CGA 357262 (ZZ)	Mean	n.d.	5.1	4,4	<sup>O</sup> 4.7 <sup>™</sup>	ČÅ.3
CGA 321113 (EE)	Mean	43	4,9	~5.0 Q	. 768	ُه 9.6
CGA 373465 (EZ)	Mean	n.d.	n@d.	n.d <sub>∕</sub> ∕∕∕	<b>∞</b> 0.2 ×	v 0,\$\$
CGA 373466 (ZE)	Mean	n.d 🤗	×2.3 L	3	Z 11.1 ×	16.7
Sum of Unid./Diff. Residues <sup>1</sup>	Mean	642	<sup>ک</sup> 0.2 <sup>(1)</sup>	<b>4</b> .4	0° 11.6	20.2
Carbon Dioxide <sup>2</sup>	Mean	san a	< 0.1	< 0.1√S	< 0.1	©.<0.€
Volatile Organic Compounds <sup>2</sup>	Mean	∕≫ n.a. 🏸	Ø.1 ×	$\sqrt{3} < 0$	0.1 ×	< <b>\$</b>
Total Recovery <sup>3</sup>	Mean 🕺	9340	≥>98.6	<b>\$</b> 9.3	V 102 S	<b>Q0</b> 2.8
		A Y			ş Q	<i>b</i> -

Mean

### Table 7.2.1.3-2 (continued)

Compound

Гable 7.2.1.3- 2 (continued)      «						Ĵ
			<u>~</u>	DAT (		
Compound	🖉 Mean 🖉	∕3 ∩	- 4∛	<u>ُمْ ۲ هِ الْمَ</u>	<u>8</u>	8 (dark)
trifloxystrobin (EE)	Mean	~ 10.7 <sub>C</sub>	<u>5</u> .4 «	2.6	∞ 2.1	18.7
CGA 331409 (EZ)	Mean 🍐	n D	0.3 <sub>4</sub>	0.1	n.d.	n.d.
CGA 357261 (EE)	≪ Mean	29.1	× 15.©	×7.1 ×	7.2	n.d.
CGA 35726 (ZZ)	Moan	A3.5 A	<b>2</b> ,7	<sup>∪</sup> 2.0 <sup>∞</sup>	1.3	n.d.
CGA 321673 (EEO >>	Mean ^	9:6	Q1.1	Å.	9.0	86.0
CGA 379465 (52)	& Mean 💭	, 0Ç3	$\sim 0.6$	ר.8	0.3	n.d.
CGA 7346 (ZE)	O Meany	5.9 Č	21	<i>Q</i> 19.5	18.7	n.d.
Sum of Unid./Diff. Residues 1	M <u>é</u> an a	× 27.3	45.6	ی 62.9	65.3	1.5
Carbon Dioxide 🖉 🔬	Mean	0,1	$0.2 \sim 0.2$	0.3	0.4	< 0.1
Volative Organic Compound	Mean		$\bigcup^{v} < 0$	< 0.1	< 0.1	< 0.1
Total Recovery 3 X	Mean	×104.3×	1.02.3	104.6	104.4	106.2

n.d.: not detected, p.a.: not analysed, DAT; days after treatment

<sup>1</sup> Minor degradation products are summed up to sam of unidentified / diffuse residues, with no one component exceeding 10% QR.

<sup>2</sup> Values taken from Material Balance.

rounding errors as well as clean up and chromatographic <sup>3</sup> Difference to Material Balance values losses

### B. MATERIAL

Mean material palances ranged from 93.0 to 106.2% of applied radioactivity [% AR] for irradiated and dark samples The complete material balances found at all sampling intervals for both irradiated and dark samples demonstrated that there was no significant loss of radioactivity dissipated from the test systems or during sample processing.

### D. 'O

The maximum amount of carbon dioxide was 0.4% AR at study end (DAT-8) in irradiated samples. Formation of volatile organic compounds was insignificant as demonstrated by values of  $\leq 0.1\%$  AR at all sampling intervals for both irradiated and dark samples.

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### E. DEGRADATION OF PARENT COMPOUND

The amount of trifloxystrobin in water decreased from 88.4% AR at study start (DAT-0) to 2 and 3 
In irradiated samples, trifloxystrobin (*EE*) isomerized to its *E*/Z isomers CGA 357261 (*ZE*) (max. 51.5% AR at DAT-0.29), CGA 357262 (*ZZ*) (max. 5.1% AR at DAT-0.43) and CGA 331409 (*EZ*) (max. 3.3% AR at DAT-13). Trifloxystrobin (*EE*) and its *E*/Z isomers were degraded to CGA 321113 (*EE*) (max. 11.1% AR at DAT-4) and its *E*/Z isomers CGA 379466 (*ZE*) (max. 21.1% AR at DAT-4) and CGA 373465 (*EZ*) (max. 0.8% AR at DAT-7) by hydrolytic exter cleavage and *E*/Z isomerization. Unidentified residues were observed with no one component exceeding 10% AR at any sampling interval.

In dark samples, trifloxystrobin (*EE*) was degraded to  $CGA_321112$  (*EE*) (plax. 86% AR at DAT-8) by hydrolytic ester cleavage. The total unidentified residues absounded to a maximum of 15% AR

The experimental  $DT_{50}$  and  $DT_{90}$  values of trifloxystrobin in fradiated samples were calculated using hockey stick (HS) kinetics (see Table 2.1.3.7).

Table 7.2.1.3- 3: Photodegradation kinetics of trifloxystrobin in sterile natural water

			o' s	i ai	N O	
		× ×.		<b>HS</b> <sup>1</sup>	<u>j</u> y d	
	· · · · · ·	DT/se C	ĎT90 🖑	Bate 🔧	ૢ૾૾૾ૼૢ૾ <sup>*</sup> DT	50 under
	, Q	(exp.)	(exp)	Constant	atura	conditions
	Test System	[days] [	days]	[days] 🖁	Š 🗸	days
	Irradiated	0.10	2.9	k <sub>1</sub> ,≜%6.46 ©	0,4 (Ph	oenix, USA)
			$\sim$	s = 0.4 <b>3</b> ,	0.9 (To	okyo, Japan)
	1 HS: Sockey Stick	× *				0
		¥ &			y d'	
	ð <sub>s</sub> a <sub>s</sub> o	° IIK	CONCLU	USIONS <sup>®</sup>	, ()	
Ĩ	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Ô.1	A C	Å.	K)	

Trifloxysttebin (*EE*) was rapidly degraded by E/Z isomerization in sterile natural water (experimental half-life of 0.1 days). When being exposed to simulated sumlight in the laboratory.

1

In irradiated samples, trifloxy trobin (EE) isomerized to its major E/Z isomer CGA 357261 (ZE). Trifloxystrobin (EE) and its E/Z somer were degraded to the major degradation product CGA 321113 (EE) and its major E/Z isomer CGA 373466 (ZE) by hydrolytic ester cleavage and E/Z isomerization. CGA 321113 (EE) was observed as the single major degradation product in dark samples. Formation of carbon divide was very low.

It is concluded that photodegradation contributes significantly to the degradation of trifloxystrobin under typical conditions in the aquatic environment.

The results are in good agreement with the proposed degradation pathway of trifloxystrobin in water and sediment known from studies included in the Baseline Dossier.

The results are included in the proposed degradation pathway of trifloxystrobin in water and sediment shown in Figure 7, 1 and in the summary of the route and rate of degradation of trifloxystrobin in water and sediment given in section CA 7.2.

### CA 7.2.2 Route and rate of biological degradation in aquatic systems

### CA 7.2.2.1 "Ready biodegradability"

The "ready biodegradability" of trifloxystrobin was evaluated during the Amaex I inclusion using unlabelled trifloxystrobin, and was accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following study is included in the Baseline Dossier:

			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
Annex Point / Reference No	Author(s)	Ô	Year	Document No
KCA 7.2.2.1 /01		(	R 1994	M-033914-014
		a second and a second	1	

No additional studies are submitted within this Supplemental Dossier for the triffoxystrobin renewal of approval. A summary of the route and rate of degradation of trifloxystrobin in water and sediment is given in section CA 7.2 and Figure 7.2-1.

# CA 7.2.2.2 Aerobic mineralisation in surface water

A study for the determination of the route and rate of degradation of trifloxystrobin in surface water under aerobic conditions conditions in the dark in the laboratory has been performed and is submitted within this Supplemental Dossier for the trifloxystrobin renewal of approval using one radiolabel position, [<sup>14</sup>C-GP].

Report:	KCA.7.2.2.2/94; ;;2013
Title:	[Benzeneacetic-phenyl-UK*4C]Tofloxystrobin: Aerobic Mineralization in
	Surface Water 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Report No:	$\mathbf{p}\mathbf{c}0632$ $\mathbf{c}\mathbf{v}$ $\mathbf{c}\mathbf{v}$ $\mathbf{c}\mathbf{v}$ $\mathbf{c}\mathbf{v}$ $\mathbf{c}\mathbf{v}$ $\mathbf{c}\mathbf{v}$
Document No:	N1-449602-0757 V ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
Guidelines:	- OFCD Test Guideline No. 309
GLP:	Yes o o w b co ce a
Justification:	New data / guideline requirement: 7
	Route and rate of degradation of trifloxy trobin in aerobic surface water

Executive Summa

The route and rate of degradation of [<sup>14</sup>CoGP]troloxystrobin were studied in surface water under aerobic conditions in the dask in the laboratory for 62 days at 22.9 °C.

Study application rates of 1.83  $\mu$ g (6.0  $\mu$ g/L) and 16.1  $\mu$ g (53.7  $\mu$ g/L) per test system were applied for the low and the high concentration, respectively.

Mean material balances were 98,1% of applied radioactivity [% AR] (range from 96.1 to 102.1% AR) for the low concentration and %6.9% AR (range from 95.5 to 98.8% AR) for the high concentration.

The maximum amount of arbon dioxide was 0.3 and 0.2% AR after 62 days of incubation for the low and high concentrations, respectively. Formation of volatile organic compounds was insignificant as demonstrated by values of < 0.1% AR at all sampling intervals for both concentrations.



Trifloxystrobin was rapidly and quantitatively hydrolysed to CGA 321113 with its amount decreasing from 95.1% AR and 94.8% AR at study start (DAT-0) to < LOD (limit of detection) from DA 228 onwards in the low and high concentration, respectively. In parallel, the amount of the single degradation product CGA 321113 reached a maximum of 99.4 and 97.0% AR at study end (DAT-62) in the low and high concentration, respectively. The same was observed in sterile controls (max. amount of 98.3% AR at DAT-62 for CGA 321113). The total unidentified residues amounted to a maximum of 4.5% AR.

The experimental  $DT_{50}$  and  $DT_{90}$  values were calculated using single first order kineses. The half drys for both concentrations. 

It is concluded that hydrolysis will be the major process in the degradation of triffoxystrobin under typical conditions in the aquatic environment. I. MATERIALS AND METHODS A. MATERIALS 1. Test Item [benzeneacetic-phenyl-UL-<sup>14</sup>C]tfulloxystrobin Sample ID: KML 9414 Specific Activity: Sol1 MBq/mg (81.4 µCi/mg) Radiochemical Purity: 99% Chemical Purity: 99% 2. Test Water Natural water from a pond system not receiving effluent discharges was used (see Table 7.2.2.2- 1). The water was sampled theshly from the pond (depth of prox. 30 cm) and sieved through a 0.2 mm

2. Test water Natural water from 9 pond system not receiving effluent discharges was used (see Table 7.2.2.2-1). The water was sampled theshly from the pond (depth of price. 30 cm) and sieved through a 0.2 mm sieve prior to use.

Parameter	Results / Units
Water Designation	Pond O
Origin	AG, Switzerkard
GPS Coordinates	
pH <sup>1</sup>	8.2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2
Redox Potential E <sub>H</sub> [mV] <sup>1</sup>	466 0 0 0
Oxygen Content [mg/L] <sup>1</sup>	$\frac{10.6}{2}$
Hardness [°dH] <sup>1</sup>	
BOD [mg/L]	
DOC [mg C/L]	
TOC [mg C/L]	
Total Nitrogen [mg/L}	1 2422 A OF VI
Total Phosphorous [mg]2]	
Total Nitrate [mg/L]	
Total Nitrite [mg/5]	
Total Ammonium [mg/k]	
Dissolved Offrophosphate [mg/L]	
Microbial Activity	$\mathcal{D}T_{50} < 3 \operatorname{days} $
<sup>1</sup> measured at sampling site	
BOD: biological oxygen demand	
DQG: disserved organic carbon	
Ges: global posaroning system ~	

### Table 7.2.2.2-1: Physico-chemical properties of test water

### B. STUDY DESIGN

### 1. Experimental Conditions

The flow through test system for degradation in Oirface water under aerobic conditions consisted of glass metabolism thasks (inner diameter approx. 5.3 cm, volume approx. 500 mL). Each flask was equipped with a gas inlet and outlet and a flow of humidified air was maintained. The outlet was connected to a series of trapping solutions (ethylere glyco) and 2 N sodium hydroxide) for adsorption of carbon diox de and volatile organic compounds.

For preparation of the test systems, 300 mL of the natural water were transferred into each flask. The flasks were then connected to the traps and coullibrated to study conditions for 7 days prior to application. The water was continuously agitated using a magnetic stirrer.

Study application rates of 1.83  $\mu$ g (64  $\mu$ g/J) and 16.1  $\mu$ g (53.7  $\mu$ g/L) per test system were applied for the low and the high concentration respectively.

The test item was applied dropwise onto the water surface of the respective test systems in 300  $\mu$ L methanol using a pipette. After application, the test vessels were connected to the traps (except of DAT samples).

The test stems were incubated in the dark for 62 days at 22.9 °C in an air-conditioned room.



 $\bigcirc$ 

#### 2. Sampling

Eight sampling intervals were distributed over the entire incubation period of 62 days. Duplicate samples were processed and analysed 0, 1, 2, 4, 7, 14, 28 and 62 days after treatment (DAT) for both low and high concentration. Sterile controls were processed and analysed at DAT-62 for the high concentration, microbial activity samples at DAT-0, DAT-3 and DAT-14.

#### **Analytical Procedures** 3.

The radioactivity content of the ethylene glycol and 2 is sodium hydroxide trapping solutions was determined by liquid scintillation counting (LSC). In addition, odium hydroxide gaps we exchanged at DAT-21.

At each sampling interval, pH, oxygen content ap@redox potential in the water were determined. The water was acidified to pH 5 and the test vessel was rinsed additionally with methandl. From DATE to DAT-7, the rinsing solutions were pooled with the water, from DAT-14 opwards the rinsing solutions were treated separately due to biofilm formation. The radioactively content of the (powled) water and the methanol rinses was determined by LSC. Due to the low amounts of radioactivity in the methanol rinses (≤ 1.8%% AR), the rinsing solutions were not analysed by HPLC/radiodetection. The acdified water was submitted to one to three liquid-liquid extraction steps using ethyl actuate. The ethylacetate extracts were combined, concentrated to diverse dissolved in methanol/water 2/3 (5v) and analysed by reversed phase HPLC/radiodetection. The limits of quantitation for HPLC radiodetection analysis of the water were 0.8 and 0.4% AP, for the low and high concentration respectively

Test item and CGA 321113 were identified by HPLO and TEC co-thromatography with reference items.

The degradation kinetics of the test utem was determined according to POCUS kinetics (2006) 1 using the software KinGLV2 with a single first order kinetic model, Model input datasets were the residual amounts found in Fach, replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model.  $DT_{30}$  and  $DT_{90}$  values were calculated from the resulting kinetic parameters ô

### ND DESCUSSION RES&LTS

Results indicated that the anticipated standardized conditions were maintained and that the water was microbially active over the duration of the laboratory study.

The pH in the water ranged from 8.2 to 85 for both low and high concentration. Ø

Oxygen contents (range from 8.1 to 9.4 mg/L) and redox potential measurement (E<sub>H</sub>, range from 336

Oxygen contents (range from 8.1 to 9.4 mg/L) and redox potential measurem to 410 mV) indicated aerobic conditions in the water for both concentrations.

### A. DATA

Гаble 7.2.2.2- 2:	Degradation of trifloxystrobin in natural pond water under aerobic	9
	conditions (low concentration, mean values and SD expressed as % (RR)	

							Ň	A.		-
	Mean				DA	٩T	.0	$\sim$		
Compound	SD	0	1	2	4	7	ا⊈_ 14	28	62	Ô
trifloxystrobin	Mean	95.1	55.1	36.2	(4.3	3.6 🗸	0.8	×0.6 ~	🔊 n.d. 🗬	
	SD	$\pm 0.3$	$\pm 3.3$	$\pm 2.4$	₩1.1	$\pm 0 2^{0}$	$\pm 0.2$	Q.8.0 ±0.8		Ľ
CGA 321113	Mean	n.d.	42.8	61.6	Ç 77.1	9203	95.7 🛒	چ 97 <del>ک</del>	<b>99</b> .4	0
	SD		$\pm 5.2$	$\pm 0.4$	±1.9	<b>€</b> 1.3	∘ ±1,40	± 2.9	€¥ 2.7 ¢	, v
Sum of Unid./Diff.	Mean	0.9	n.d.	1,10,	4.5 🔈	n.d.	1-Q,	, Õ¥.0 ⊘	0.6	
Residues <sup>1</sup>	SD	$\pm 0.0$		~~	₀±1.1_0°		₼0.6	⇒±2,70°	¢.	
Total Residues	Mean	96.0	97.9	<b>98.8</b>	96.0	<b>Q</b> 5.9	S97.7 S	101.8	100.0	
in Water <sup>2</sup>				Ů ≪Ŭ	Õ	$\mathcal{O}'$	, 10°			
Carbon Dioxide <sup>2</sup>	Mean	n.a.	< 0.1	< Qq	~0.1	∞ 0.2	<b>Q</b> 2	0.3	0.	
Volatile Organic	Mean	n.a.	< 000	\$0.1	$> < 0.1^{\circ}$	$< \sqrt{2}$	°∼ 0.1 °	J < 0.1	<b>SO</b> .1	
Compounds <sup>2</sup>							V Ö	Â,	$\bigcirc$	

n.d.: not detected, n.a.: not analysed, D.OT. days after treatment, SD: standard deviation

Minor degradation products are summed up to sum of unidentified, diffuse residues. R

Values taken from Material Balance. 2

Degradation of telfloxystrobin in natural pond water under aerobic Table 7.2.2.2-3: conditions (high concentration, mean values and SD expressed as % AR) L,

		2		LS .	a	Ň.	2		1 <sup>°</sup>	
	Mean	¢,	ĴŶ,	$\bigcirc$	ð i	No DA	V &,	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
Compound	<i>\$</i> \$	6	~~ <u>1</u>	@ 2 <u></u>	🖇 4 炎	ŕ 7 <sup>()</sup>	1€	28	62	62 (sterile)
trifloxystrobin	Mean	\$ <del>9</del> 4.8	Ø54.&	33.2	140	A Y	£1.2	<i>©0</i> .3	n.d.	n.d.
Ô	SD∕	± 6.2	±_1.1	±2.8	, <b>∉ 0</b> .1	€1.3 گ	$\mathbb{Q}_{\pm}^{\mathscr{A}} 0.9^{\mathscr{A}}$	/7 m		
CGA 321113	Mean	ngd.	<b>∰0</b> .7	¢ 03.0	&82.3∂	91.0	93 <u>.</u> 7	93.1	97.0	98.3
 ≫_	∕®Ď	×)	$\pm 2.3_{4}$	± 2.6	$\pm 0.4$	± 2.2	* 3.1	$\pm 3.0$	$\pm 2.1$	$\pm 2.1$
Sum of Unid./Diff.	Mean	∫ 1.0≪	n.do	0.9	n.d.	Ø.3 /	<b>@</b> 1.4	4.4	1.0	0.9
Residues 1	S₽	$\pm \otimes 1^{\nu}$	li al	0.0	Ő <sup>y</sup> v	Ĵ, c	) = 0.5	$\pm 0.6$	$\pm 0.4$	
Total Residues	Mean	98.8	ي 5.5 🕲	96.5 <i>°</i> ^	96.8	95.4	96.3	97.8	98.0	98.8
in Water <sup>2</sup>	¥ .		$\sim$		- O <sup>¥</sup>					
Carbon Dioxide 🖓	Mean	n.a	$< \beta$	<i>≤</i> 0.1	Q.1	<b>0</b> .1	< 0.1	0.2	0.2	< 0.1
Volatile Organic	Mon	pr:a.	. <b>€0</b> .1	Ø <sup>7</sup> 0.1	Õ≷ 0.1 《	× 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Compound	Û	~0 <i>"</i>								

n.d.: not dedicted, n.a.: not analysed DAT days after treatment, SD: standard deviation

Minor degradation products are summed up to sum of unidentified / diffuse residues.

2 Values taken from Material Balance L 1

### B. MATERIAL BALAN Ø

Mean materia balances were 98.1% of applied radioactivity [% AR] (range from 96.1 to 102.1% AR) for the low concentration and %.9% AR (range from 95.5 to 98.8% AR) for the high concentration. The complete material balances found at all sampling intervals demonstrated that there was no significant loss of radioactivity dissipated from the test systems or during sample processing.

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### C. VOLATILES

The maximum amount of carbon dioxide was 0.3 and 0.2% AR after 62 days of incubation for the low  $\beta$  and high concentrations, respectively. Formation of volatile organic compounds was insignificant as demonstrated by values of < 0.1% AR at all sampling intervals for both concentrations.

### E. DEGRADATION OF PARENT COMPOUND

Trifloxystrobin was rapidly and quantitatively hydrolysed to CGA 32 113 with its phound decreasing from 95.1% AR and 94.8% AR at study start (DAT-0) to < LOD (Jimit of detection) from DAT-28 onwards in the low and high concentration, respectively. In parallel, the amount of the single degradation product CGA 321113 reached a maximum of 99.4 and 97 6% AR at study end (DAT-62) in the low and high concentration, respectively. The same was observed in sterile controls (max. amount of 98.3% AR at DAT-62 for GGA 321113). Low, amounts of charaterisable by chromatography residues were observed (max. 4.5% AR in total).

The experimental  $DT_{50}$  values of triflox strobin were calculated using single first order (SFO) kinetics (see Table 7.2.2.2-4).

Table 7.2.2.2- 4:	Degradation k	inetics of	trifloxystrobin	in natur	al pond	water	under
		0 9		S AU		V	
	aerobic condition	un's accordi	ing to FOCUS	ý Or	~ <u>0</u> (4		

	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		102	4	Û	ĥ	Ċ
		, Or		⌀.	<sup>™</sup> SFQ <sup>™</sup>	i na k	
		Q A	S DI	50	DT <sub>96</sub>	Chi <sup>2</sup> Error	
, ",	Test Syster	B Ő	<b>d</b> a	ys] گ	[days]	× [%)	
Lowcon	centration	6.1 μ <u>ε</u> /L)		40	<b>9</b> .7 O	× 3.6	_
High con	entration (	53,7Åug/L)		¥,	4.5 J	Ø 3.9	
SFQ:\sin	gle fyst or	ler 🥎		Q.		Å.	
	O Ó	× <sub>k</sub> oʻ	1 ST	ð	Star .	~	
	S a	III. Č	QNCL	<b>SION</b>	9 <sub>«</sub> "		

Trifloxystrobin was rapidly and quantitatively hydrolysed to the single major degradation product CGA 321113 in natural water under aerobic conditions in the dark in the laboratory. The calculated half-lives were 1.4 days for both low and high concentration. Formation of carbon dioxide was very low.

It is concluded that hydrolysis will be the major process in the degradation of trifloxystrobin under typical conditions in the aquatic environment.

The results are in good agreement with the proposed degradation pathway of trifloxystrobin in water and sediment known from studies included in the Baseline Dossier.

The results are included in the proposed degradation pathway of trifloxystrobin in water and sediment shown in Figure 7.2 1 and in the sumptary of the route and rate of degradation of trifloxystrobin in water and sediment given in section CA 7.2.

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### CA 7.2.2.3 Water/sediment study

The route and rate of degradation of trifloxystrobin in water/sediment systems under acrobic conditions were evaluated during the Annex I inclusion using two radiolabel positions, [<sup>14</sup>C-QP] and [<sup>14</sup>C-TP], as well as unlabelled trifloxystrobin, and were accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following studies are included in the Baseline Doster:

				si, y		<u>. 9<sup>.</sup> <sub>1</sub>.</u> "
Annex Point / Reference No	Author(s)	Ű.		Year	Docume	nt No 🖓
KCA 7.2.2.3 /01		, Sr	Q	1997	M-0339	22-04-1
KCA 7.2.2.3 /02		Ĩ	4	1997	′ M-0939.	3301-1
KCA 7.2.2.3 /03		Â		° 1997	M 0492	72-01-4
KCA 7.2.2.3 /04			le la	2002	M-0672	01-00-1
						, W
					2	

An updated kinetic evaluation of the degradation behaviours of trifloss strobin and its prajor degradation product CGA 321113 in water and sediment under aerobic conditions in the dark in the laboratory has been performed according to FOCUS kinetics (2006) <sup>1</sup> to derive kinetic parameters suitable for modelling purpose and environmental risk assessment and is submitted within this Supplemental Dossier for the triflosystrobin renewal of approval. A summary of the route and rate of degradation of triflosystrobin in water and sediment is given in section CA7.2 and Figure 7.2-1.

Report:	KCA 7, 2.2.3, /05; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
Title:	Kinetic Evaluation of Degradation and Dissination Behaviour of Trifloxystrobin
	and its Metabolite CGA 321913 in Water Sediment Systems According to
	FOCUS Kinetics Using the KinGUS Tool
Report No:	ŽenSa 43-07,20 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Document No	M-@8895-01-1 ~ _ ~ _ ~
Guidelines: <sup>O*</sup>	$\mathcal{P}$ OCUS kinetics (2006) <sup>1</sup>
GLP:	No & S & S & C
Justification:	New Catata Agaideline requirement $\mathcal{A}$
	Kinetic analysis of the degradation of triflexystrobin and its major degradation
	product CGA \$21113 for modelling purpose

### Executive Summary

A kinetic analysis of residue data from the two aerobic water/sediment degradation studies M-033922-01-1 and M-033933-01-1 (Baseline Dossier, KCA 7.2.2.3 /01 and KCA 7.2.2.3 /02) was performed with the software KinGUI 2 according to FOCUS kinetics (2006)<sup>1</sup> to derive half-lives for triflexystrobin and its degradation product CGA 321113, which are suitable for modelling purpose and trigger evaluation.

Single first order was the most appropriate kinetic model for modelling purpose for the degradation of trifloxystrobin in vater/sediment/systems Rhine and Pond under aerobic conditions in the dark in the laboratory at 20°C and test concentrations of 0.3 mg/L water. The single first order kinetic model was used for modeling purpose to describe the degradation of CGA 321113.

The half-life of trifloxystrobin for modelling purpose (geometric means) was 0.76 days in the water, 2.45 days in the sediment and 1.69 days in the total system. The half-life of CGA 321113 for modelling purpose (geometric means) was 209.7 days in the water, 502.2 days in the sediment and 388.0 days in the total system.



The half-lives of trifloxystrobin for trigger evaluation were between 0.6 and 0.9 days in the water, between 1.4 and 4.1 days in the sediment and between 1.1 and 2.6 days in the total system. The balflives of CGA 321113 for trigger evaluation were between 79.6 and 320 days in the water, between 442 and 571 days in the sediment and between 341 and 433 days in the total system.

### I. METHODS

Residue data from the two aerobic water/sediment degradation studies M-033922 01-1 and M-033933-01-1 (Baseline Dossier, KCA 7.2.2.3 /01 and KCA 7.2.2.3 /02) were used. In these studies, the degradation of trifloxystrobin was studied in water/sediment systems Rhite and Pond inder aerobic conditions in the dark in the laboratory for up to 214 days at 20 °C and test concentrations of 0.3 mg/L water.

The kinetic analysis was performed according to FOCUS kinetics (2006) Susing the software kin h. fill KinGUI 2 with four different kinetic models: single first order, first order multi compartment, hockeystick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system a each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model for modelling purpose and trigger evaluation was selected on the basis of detailed statistical analysis including visual assessement of the goodness of the fits, chi<sup>2</sup> coaled error corterior t-test significance, correlation analysis and standard deviation. The D150 value was calculated from the esulting kinetic correlation analysis and standard deviation. The DT<sub>50</sub> value was calculated from the resulting kinetic parameters. The degradation of degradation products was described with the single first order model for modelling purpose.



Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

#### II. **RESULTS**

Single first order (SFO) was the most appropriate kinetic model for modelling purpose for the degradation of trifloxystrobin in water/sediment systems Rhine and Pond. The SFO kinetic model was used for modelling purpose to describe the degradation of CGA 321113. Table 7.2.2.3-1 to Table 7.2.2.3- 4 are summarizing the results of the kinetic analysis for modelling purpose and trigger evaluation.

Ĉŝ

Table 7.2.2.3- 1: Kin	etic parameters	for the	degradation	of triffoxys	bin <sup>©</sup> in <sup>©</sup>
wat	er/sediment syste	m underty aer	bic condition	s for modelling	putrpose O
acco	ording to FOCUS	A	Q <sup>×</sup> ~ °	Å Å	C O
Water/Sediment	Kinetic D7	<sup>50</sup> <sup>∞</sup> Chi <sup>2</sup> Er	roto totest	Wisual	, 4
System	Model da			Arssessment	2 0
D1 '	SEO A	lotal System	<b>X</b> 2 02 10-		<u>**</u>
Phine	SFO 22.	$18 \sim 9.2$	2.92 X 10		
Pond	SFO  1	1	$\sqrt{10}$		- di
Pond	SFO SFO				)
1010	geomean > 1.	59a a			—
		T S O			
		Water 🕎		0	
Rhine	SFO 0.	77 🔊 🞯.7	6.01×x 10	-999 & O	
Rhine 🗞	SFO DO.		<u>833 x 10</u>	<b>0</b>	
Pond		$\frac{10}{10}$ $\frac{10}{10}$ $\frac{10}{10}$	6.51 x 10	-5	
Polid 28			<u> </u>	0	
	<u>geomean</u> v.			, Ĵ	
	<u> </u>	Sediment <sup>©</sup>			
Rhine 🖉	SFO SFO	57 9 9.2	0 4,85 x 10	-9 0	
🔍 🖗 Rhine 🔍	SFØ 4.0	12.3 O 12.3	22 x 10	-7 o	
Pond O	SFO 1.4	48 📿 6:Q	2.28 x 10	<sup>-6</sup> 0	
Pond N	SFQ SFQ	6.3	4.05 x 10	-5 0	
	geomean 2.4		2 2		
$^{1}$ SFO: single first or $^{2}$ visual association of the second sec	der		Y		
visual assessment.					
à h	J OF	y . L			
		~Q <sup>*</sup>			
* <sup>©</sup>		$\bigcirc^{\nu}$			
L. 1 \	N S Q	<i>y</i>			
	L <sup>Y</sup>				
S. S. S. S.	¥				
× Åy					
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Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Table 7.2.2.3- 2: degradation of trifloxystrobin in Kinetic parameters for the al de la construction de la cons water/sediment system under aerobic conditions for trigger evaluation according to FOCUS

					$\sim$	
Water/Sediment	Best-Fit	DT50	DT90	Chi <sup>2</sup> Error	t-test,2	Kisual 🔊
System	Kinetic Model <sup>1</sup>	[days]	[days]	[%]	<i>\0</i> *	Assessment <sup>3</sup>
			<b>Total Sys</b>	tem		
Rhine	SFO	2.18	7.25	්ර 4.2	Q.92 x 10 <sup>-13</sup> x	
Rhine	SFO	2.63	8.73	☞ 6.1	<sup>∞</sup> 1.39 x 10 <sup>-10</sup>	~9 + v ~
Pond	SFO	1.25	4.16	<u>ا</u> 1.9	0 <sup>♥</sup> 4.28 x 10 <sup>™</sup>	
Pond	SFO	1.14	3.79	1.0 Q	$9.17 \times 10^{-10}$	, ° ¢ ,0°
			Water			
Rhine	DFOP	0.66	0 <sup>3.23</sup>		k <sub>1</sub> ; 0.42 x 40 <sup>-5</sup> 10; 2.41 x 10 <sup>-7</sup>	
Rhine	HS	0.56	3,18		$k_1: 7.3$ x $10^{-5}$ $k_2: 8.05 x 10^{-5}$	
Pond	FOMC	<b>8</b> .86	ر×3.33 ر	~} <b>i</b> .4 √	≸.44 x 1@*	Ç O
Pond	FOMC	O).83 🖉	3.12	× 0.7 0	_51.06 x 90 <sup>-2</sup>	&+
			~ /			

	@-		Sedimer	H O L		** //
Rhine	SFO 🔊	°≫3.57	11.850	Ly 9.2	,4.85 x 19 <sup>−9</sup>	🗡 о
Rhine	SFO <sup>®</sup>	<u>ل</u> 4.08	13(55	12.3	× 2.22 × 10 <sup>-7</sup>	0
Pond	,H\$9 0 ≫ ∢	1.45	4.82	2.2	$k_1: 9.68 \times 10^{-6}$	+
Pond	<i>S</i> <sup>™</sup> OMCS	A.37	6.50	2.4	$k_2 \approx 1.39 \times 10^{-3}$ $k_1: 7.16 \times 10^{-3}$ $k_2: 1.89 \times 10^{-2}$	+

SFO: single first order, FOMC, first order multi compartment, DFOP: double first order in parallel, HS: 1

Table 7.2.2.3-3: Kinetic parameters for the degradation of CGA 321113 in water/sediment system under aerobic conditions for modelling purpose according to FOCUS

						)
Water/Sediment	Kinetic	DT50	Chi <sup>2</sup> Error	t-test	Visual 🏑	
System	Model <sup>1</sup>	[days]	[%]	Ő	Assessment <sup>2</sup>	
		Total	System		, Oř k	
Rhine	SFO	423.1	22	5.59 x 0 <sup>-12</sup>		Ş.
Rhine	SFO	362.9	2.1	2.64 x 10 <sup>-11</sup>	O + O'	
Pond	SFO	341.1	ا.5 €	$l_{c}$ $0.05 \times 10^{-15}$	$\sqrt{+0}$	Ç <sub>k</sub> oʻ
Pond	SFO	432.7	2.6	∠Q2.05 x 10 <sup>-7</sup>		, O <sup>x</sup>
	geomean	388.0	ð ~		V V V	Ŵ
		ŴW	ater x			S
Rhine	SFO	285.1	~ 6 P	<sup>0</sup> 1.30 <del>0</del> 10 <sup>-4</sup>		al a construction of the second secon
Rhine	SFO	×319.9 ×	<b>\$</b> .2	¥ 4.55 x 10 <sup>-3</sup>	o 🖑	<u></u>
Pond	SFO	154,6	7.1 L	544 x 105		
Pond	SFO 🔊	1,3%/1	× 11.39	≪J.23 x 10 <sup>-3</sup>		
	geomean	<b>209.7</b> `~				
	Q'	j Bedi	imerit			
Rhine	SFO ~	5590.9	2.1	€4.00 x 10 <sup>-4</sup>	00	Ī
Rhine	SFQ	441.8 Å	<b>Ø</b> .4	$1.26 \times 10^{-3}$	õ õ	
Pond 🗞	SFO SFO	\$ - <sup>3</sup>	$\sqrt{-3}$	$\sqrt[3]{3}$	- 3	
Pond	SFO 6		<u>, 5</u>	- 4 <sup>1</sup>	6 <sup>3</sup> - <sup>4</sup>	

O

Ogeomean 502.2

<sup>1</sup> SFO: single first order
 <sup>2</sup> visual assessment = good, o = moderate
 <sup>3</sup> no clear dissipation observed, therefore no appropriate kinetic model could be selected
 <sup>4</sup> could not be calculated due to a too fow number of that

d M M
4

Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Table 7.2.2.3-4: Kinetic parameters for the degradation of CGA 321113 in water/sediment system under aerobic conditions for trigger evaluation according to FOCUS

							0
Water/Sediment	Best Fit	DT50	DT90	Chi <sup>2</sup> Error	t-test,2	Kisual 🖉	
System	Kinetic Model <sup>1</sup>	[days]	[days]	[%]	10.	Assessment <sup>3</sup>	
			<b>Total Syst</b>	tem	A	O B	Ô,
Rhine	SFO	423.1	> 1000	ලී 2.2	\$.59 x 10 <sup>-12</sup> ≰		a.
Rhine	SFO	362.9	> 1000	☞ 2.1	2.64 x 10 <sup>-11</sup>	+ √	S
Pond	SFO	341.1	> 1000 @	» 1.5 ا	D♥ 1.76 x 10∰		
Pond	SFO	432.7	> 1000	2.6	2.05 x 10		Ň
			Water				_
Rhine	DFOP	281.0		J.4 (	k <sub>1</sub> , 5.19 x 10 <sup>-3</sup> 10 <sup>-1</sup> 1.99 x 10 <sup>-4</sup>		-
Rhine	SFO	319,9	>•1000	~~ 5 <u>2</u> ~~	<u>4.55</u> <b>€</b> 10 <sup>-3</sup>	i de la como	
D 1	DEOD	1007	1 Ann 1				

Pond	DFOP		\$3.4 7 £3	$k_1: 4, 042$	
Pond	FOMC	079.6	- 4 S 5.2	2 0° 🕺 🖓 4.42 🔊	10 <sup>-2</sup> @+

	<i>@</i> .		1000			0
Rhine	SFO 🔊	°5770.9	>1000	L 2.1	≥4.00 x 19 <sup>-4</sup>	У o
Rhine	SFO <sup>®</sup>	<b>441.</b>	> 1000	3.4~	°∼y 1.26& 10 <sup>-3</sup>	0
Pond	<u>,</u> -Ø 0		<u></u> 5	-5 %		- 5
Pond	<u>~</u> %	_%	<u>- 6</u>		₩ <sup>×</sup> - 6 X	_ 6

<sup>1</sup> SFO: single first order, FOXE: first order multi compartment, DFOP: double first order in parallel, HS: hockey stick

- <sup>2</sup> for FOMC: worst case value of rate parameters alpha and beta
- <sup>3</sup> visual assessment: += cood, of moderate
   <sup>4</sup> could not be calculated by the kinetic model?
- no clear dissipation observed, therefore no appropriate kinetic model could be selected 5
- 6 could not be calculated due to a too low number of data

~~~	P.			J.	$\sim$		$\sim$
20		A Y			~	· /	V c
R V	a.	ON .		TTTO	andi		hara C
\$ \$			0		l ONC	LUSI	UNS
		e V	× 1				~ × ×
	≈∩ ″	d		. U	s i	×./	
		- V	A.V.	° la n	~~	$\bigcirc$ "	

The calculated half-life for modelling purpose (geometric mean) for the degradation of trifloxystrobin in water/sediment systems under accobic conditions in the dark in the laboratory was 0.76 days in the water, 2.45 days in the sedment and 1.69 days in the total system. The half-life of CGA 321113 for modelling purpose (geometric pean) was 209.7 days in the water, 502.2 days in the sediment and 388.0 day in the total system

The calculated half lives for trigger evaluation for the degradation of trifloxystrobin in water/sediment systems under aerobic conditions in the dark in the laboratory were between 0.6 and 0.9 days in the water, between 4.4 and 4.1 days in the sediment and between 1.1 and 2.6 days in the total system. The half-lives of CGA 21112 for trigger evaluation were between 79.6 and 320 days in the water, between 442 and 571 days in the sediment and between 341 and 433 days in the total system.

The results are included in the summary of the route and rate of degradation of trifloxystrobin and its major degradation products in water and sediment given in section CA 7.2.



#### CA 7.2.2.4 Irradiated water/sediment study

The route and rate of degradation of trifloxystrobin in water and sediment (including photolytic conditions) were comprehensively studied in sections CA 7.2.1.1 to CA 7.2.3 and CA 7.2.1 to CA 7.2.2.3. Therefore, the route and rate of degradation of trifloxystrobin in invadiated water sediment systems were not studied. A summary of the route and rate of degradation of trifloxystrobin in and sediment is given in section CA 7.2 and Figure 7.2-1.

#### CA 7.2.3 Degradation in the saturated zone

The degradation of trifloxystrobin in the saturated zone was not studied since trifloxystrobin is not expected to reach the saturated zone after its use acording to good agricultural practices. A summary of the route and rate of degradation of trifloxystrobin in water and sedtmentos given in section CN 7.2 and Figure 7.2-1.

#### Fate and behaviour in air CA 7.3

The volatilization of trifloxystrobin tom been leaves under indeer conditions was valuated during the Annex I inclusion using one radiolaber position, [4C-GP], and was accepted by the European Commission (SANCO/4339/2000 Final, 7 April 2003). The following study is included in the **Baseline Dossier:** 

Annex Point / Re	ference	No	Auth	PIC(S)	Ő	Ø	2			rear .	Document No
KCA 7.3 /01	° N	, 1				Ş	<u></u>	<i>s</i> or	J.	1997	M-033956-01-1
	4	Žj	Ô	0		. (	)		».	ς ΟΣ	

#### CA 7.3.1 Route and rate of degradation in air

The degradation rate of trifloxystrobin in air was valuated during the Annex I inclusion using the Atkinson method, and was accepted by the European Commission (SANCO/4339/2000-Final, 7 April 2003). The following study is included in the Baseline Possier.

	~~~~					
Annex Point / R	eference No	Author(s)	Ó <sup>y</sup> K	<u> </u>	Year	<b>Document No</b>
KCA 7.3.1 /01		J.K.		Å	1997	M-033960-01-1
		av v		<u>۸</u>		

Ľ,0 An additional Atkinson calcolation has been performed for the major volatile degradation product CGA 107170 and is submitted within this Supplemental Dossier for the trifloxystrobin renewal of





### Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.3.1 /02; ; 2013
Title:	CGA 107170: Calculation of the Chemical Half-Life in the Troposphere
Report No:	EnSa-13-0667
Document No:	M-465896-01-1
Guidelines:	- Commission Regulation (EU) No 283/2013 in accordance with Regulation (EG)
	No 1107/2009
	- US EPA OCSPP Test Guideline: not applicable
GLP:	No & A A A
Justification:	New data / guideline requirement: $\nabla$
	Degradation rate of CGA 107170 in Air

### **Executive Summary**

rior assumming the typical OH addical The half-life in air of CGA 107170, a volatile degradation product of trafloxystrobin, was estimated according to structure-activity relationship (SAR) methods developed by Atkinson et al.

The half-life in air was estimated with 34.9 days (long term scenario) concentration averaged over 24 hours @.5 x 10° radicals/cm).

M

It is concluded that CGA 107170 will be degraded in air.

The half-life of CGA 107 70 in air was estimated according to structure activity relationship (SAR) methods developed by Atkinsen et al. The approach of Atkinson et al., was based on a comprehensive set of experimental data to result in a quantitative structure-activity relationship (QSAR) mathematic model that allows for estimation by calculation, starting from the molecular structure of a compound. The calculation procedure has been transferred into the personal computer program "Atmospheric Oxidation Program" (DOP) by Meylan & Howard, The current version AOPWIN<sup>™</sup> 1.92a (U.S. EPA, 2008) was used for the calculations being part of the EPI SuiteDM set@f programs.

Considering the chemical structure of CGA 100170, or can be concluded that reactions with photochemically produced hydroxyl radicals will mainly determine its degradation rate in air. The typical OH radical concentration of 0.5 106 radicals cm<sup>3</sup> per day (24 hours) was taken for the longterm estimation.

## RESULTS AND DISCUSSION

The overall reaction rate of CGA 107170 with hydroxyl radicals is estimated to be  $0.4593 \times 10^{-12} \text{ cm}^3 \text{ x}$  molecule  $x \ll \text{ This rate. } \Theta$  derived mainly from incremental reactions like hydrogen abstraction  $(0.1020 \text{ x} \cdot 10^{12} \text{ cm}^{\circ} \text{x} \text{ motocule}^{-1} \text{ x s}^{-1})$  and an addition reaction to the aromatic ring  $(0.3573 \text{ x } 10^{-12} \text{ cm}^3 \text{ molecule}^{-1} \text{ x s}^{-1})$ .

Based on the overall hydroxyl radical reaction rate constant in combination with the long-term concentration of these Dadicates in the atmosphere, i.e. 0.5 x 10<sup>6</sup> radicals/cm<sup>3</sup>, the half-life of CGA 107970 in air was estimated with 34.9 days. This estimate should be regarded as worst-case assumption as the approach does not consider the contribution of any other reactive species to the overal atmospheric degradation of CGA 107170 in air.

### **III. CONCLUSIONS**

CGA 107170, a major volatile degradation product of trifloxystrobin, will be degraded in air with an estimated half-life of 34.9 days.



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Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

#### CA 7.3.2 **Transport** via air

CA 7.3.2 Transport via air The transport via air of trifloxystrobin was not studied since its vapour pressure is below the togger

#### CA 7.3.3 Local and global effects

 $\frac{1}{2} \frac{1}{2} \frac{1}$ Local and global effects of trifloxystrobin were not considered since its half-life in  $air_{12}$  M-033960-01-1, Baseline Dossier, KCA 7.3.1 /01).

#### CA 7.4 **Definition of the residue**

#### CA 7.4.1 Definition of the residue for fisk assessment

The proposed residue definitions relevant for risk as sessment for each compartment are the following:

Residue Definition
trifloxystrobin, CGA@57261, CGA@21119, CG@373466, CGA 381218,
NOA 413161, NOA 413163, CGA 357276, NGA 409480 8
same as soil
same as soil plus CG \$257262, CG \$107100, 2-kydroxymethybenzonitrile
trifloxystrokin, CGA 321113 0 4 6 6
trifloxyströbin, CGA 100170 🔬 😽 🖓

#### CA 7.4.2 Definition of the residue for monitoring

The proposed residue definition for monitoring is triflexystrobin only for all compartments since none of the major degradation products is of toxicological or ecotoxicological relevance.

### CA 7.5 Monitoring data

Monitoring data from the literature review have been evaluated and are submitted within this Supplemental Dosside for the trifloxystrobin Genewal of approval. Data were available for trifloxystrobin in and for the major trifloxystrobin degradation products CGA 321113, NOA 413161 and NOA 413163 In groundwater and surface water and are summarized below:

The detected concentrations of the major wifloxystrobin degradation products CGA 321113, NOA 413161 and NOA 403162 in groundwater and surface water were always below the European Union drinking water and groundwater limit of 0.1 mg/L.

The detected concentrations of trifloxysterbin in air were very low and therefore of no toxicological or ecotoxicological relevance.



# Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.5 /01; , T.; , L.;	, U.; 2013 。	
Title:	Emerging pesticide metabolites in ground	water and surface water as determined	ð
	by the application of a multimethod for 15	0 pesticide metabolites	T
Report No:	M-462781-01-1		•
Document No:	M-462781-01-1	Å Å Å	
Guidelines:	None		Ro
GLP:	No, published study		Ø I
Justification:	New data / guideline requirement:		a
	Literature review		Å
Classification:	b) supplementary information (EFSA Journ	nal 2019; 9(2):2092) 🖉 🧔 🖓	$\mathcal{G}$

### **Executive Summary**

The trifloxystrobin degradation products of GA 221113 NOA 413167 and NOA 413163 were determined in 58 groundwater and surface water samples by a multimethod comprising 150 pesticide degradation products in total.

The detected concentrations of CGA 21113 NOA 413161 and NOA 403163 were abways below the European Union drinking water and groundwater limit of 0.5 µg/L whereas NOA 413161 was the most frequently detected trifloxystrobin degradation product compared to CGA 321113 and NOA 413163.

All detected pesticide degradation products were ranked separately in groundwater and surface water according to their concentration and frequency of detection. NOA 43161 was on rank 7 in groundwater but NOA 413161 is assessed as non-relevant for drinking water.

1.5 MATERIALS AND METHODS

## A. MATERIOLS

### 1. Standards

CGA 321013, NOA 419161 and NOA 413163 were provided by Bayer and were of certified quality.

### 2. Test Waters

58 water samples in total were used, 42 groundwater and 16 surface water samples. Samples of groundwater and surface water were received from the State Institute for Environment, Measurements and Nature Conservation Baden-Wuerttemberg (Karlsruhe, Germany) and the State Institute for Nature, Environment and Conserver Protection North Rhine Westfalia (Duesseldorf, Germany) in October 2009. A part of the groundwater wells were selected based on the previous determination of pesticide degradation products. Additionally samples of surface runoff from impervious urban areas were received from Berliner Wasser-Benjebe (Berlin, Germany).

pesticide degradation products. Additionally samples of surface were received from Berliner Wasser-Berliebe (Berlin, Germany).



### **B. STUDY DESIGN**

### 1. Sampling

All samples were transported and kept cooled (approx. 7 °C).

### 2. Analytical Procedures

A multimethod was developed for the determination of 150 pesticide degradation products in groundwater and surface water by HPLC-MS/MS, including the trifloxy strobin degradation products CGA 321113, NOA 413161 and NOA 413163. Water samples were thered and directly analysed by reversed phase HPLC-MS/MS in multiple reaction monitoring mode using standard addition at two concentration levels and matrix-matched three-point calibration curves. The method was validated using ultrapure water and drinking water as surfogate matrix. The lower finits of calibration in drinking water were 0.01  $\mu$ g/L for CGA 321113 and 0.025  $\mu$ g/L for NOA 413161 and NOA 413163.

### II. RESULTS AND DISCUSSION

### A. DATA

Table 7.5-1: Summary of the concentration data obtained from 58 samples of groundwater and surface water (expressed in pg/L)

				Ĉo
Compound	No of Detections	25 <sup>th</sup> Percentile	50 <sup>0</sup> Percentile	75 <sup>th</sup> Percentile
CGA 321113		6 000 O	& <u>0.001</u>	-
NOA 413161	× ~ 39 .	~~0.001 ~~	O 04003 x	0.045
NOA 413163		~~ 0.0 <b>0</b> 2	0.008	0.012

### B. FINDINGS

The detected concentrations of CGA 321113, NOA 403161 and NOA 413163 were always below the European Union drinking water and groundwater timit of 0.1 µg/L, whereas NOA 413161 was the most frequently detected trifloxystrobic degradation product compared to CGA 321113 and NOA 413163.

All detected pesticide begradation products were sinked separately in groundwater and surface water according to their concentration and trequency of detection. NOA 413161 was on rank 7 in groundwater but NOA 419161 is assessed as non-relevant for drinking water.

## CONCLUSIONS

The detected concentrations of the major trifloxystrobin degradation products CGA 321113, NOA 413161 and NOA 413163 in groundwater and surface water were always below the European Union drinking water and groundwater limit of 0.1 µg/L.



# Document MCA: Section 7 Fate and behaviour in the environment Trifloxystrobin

Report:	KCA 7.5 /02; , C.; , E.; , B.; , A.;
	, R.; <b>M</b> .; 2010
Title:	Temporal variations of concentrations of currently used pesticides in the
	atmosphere of Strasbourg, France
Report No:	M-457521-01-1
Document No:	M-457521-01-1
Guidelines:	None
GLP:	No, published study
Justification:	New data / guideline requirement:
	Literature review
Classification:	b) supplementary information (EASA Journal 2011;9(2):2092)
Executive Summ	

Trifloxystrobin was determined in atmospher@ samples collected in Strasbourg, France, between April 17<sup>th</sup> and May 29<sup>th</sup>, 2007, by a multimethod comprising 71@pesticides in total.

The detected concentrations of trifloxy strobin ranged from 0.49 to 4.58 ng/m with an average of 2.62 ng/m<sup>3</sup>. Trifloxystrobin was mostly present in the say phase with a gas particle distribution of approximately 60:40.

Trifloxystrobin showed a statistically significant picrease of its concentration in the with rising temperature (r = 0.69) and its high average concentrations suggest that it was applied during or just before the sampling period. This correlation indicates that trifloxystrobin volatilises from surfaces and that this volatilisation is strongly influenced by temperature.

I. MATERIALS AND METHODS

### A. MATERIA

## 1. Standards

Trifloxystrobin and techazen, which was used as internal standard, were of certified quality (purity > 98%)

### 2. Test Site

Air samples were collected in Strasbourg with a high olume sampler, which was placed in the botanical garden of Strasbourg University approximately 0.5 km from the town centre, 2 km from industrial zones and about 5 km from the first exploitation of high maize and cereal crops. Trifloxystrobin was not used in the botanical garden.

## B. STUDY DESIGN

### 1. Experimental Conditions

A high volume sampler collected simultaneously particulate and gaseous samples on 30 cm (diameter) glass fibre filters and 200 XAD-2 resime a copolymer of styrene/divinylbenzene and macroporous acrylic ester, at a dow rate of 9.96 L/min.

### 2. Sampling a

Air samples were collected at 10 sampling intervals for 48 hour periods on average between April 17<sup>th</sup> and May 29<sup>th</sup>, 2007. After sampling, filters and resins were stored in the dark at -20 °C for a maximum of 4 days until extraction



### 3. Analytical Procedures

Prior to sampling, the glass fibre filters and the XAD-2 resin were Soxhlet-cleaned for 24 hours with n-hexane/CH<sub>2</sub>Cl<sub>2</sub> 1/1 and dried. After drying, they were individually wrapped in clean plastic basis or aluminium foil, and stored in the dark at -20 °C.

The extraction of the pesticides from the filters and the resin was done separately by Soxhlet extraction for 20 hours with n-hexane/ $CH_2Cl_2$  1/1. After extraction, the softwents were concentrated to approximately 1 mL in a rotary evaporator at 40 °C, and spiked with tecnazen, which was used as internal standard.

A multimethod was developed for the determination of 71 posticides in an by GC-MS/MS of GC-ECD, including trifloxystrobin. Intraday and interday accuracies and variabilities were determined by spiking blank filters and resin samples with two difference concentrations. The analysis has been performed on samples of particulate and gaseous phases, respectively. The results of both phases were combined to obtain the concentration found in the total atmosphere. The limit of detection main was approximately 100 pg/m<sup>3</sup> for trifloxystrobin.

### A. DATA

 Table 7.5-2:
 Summary of the concentration data obtained in 10 air samples (expressed in ng/m³)

	0	O N	de la			
Compound 🖉	» No of	Detections	s 🖉 Ran	ge 🌾 Av	erage ± 95% CI <sup>1</sup>	
triflox	N.	10	0.49,10	4.580	¥ 2.62 ± 1.44	
	and a		¥ A	Ú	ÿ	Ì

CI: confidence interval

Average and CI were calculated from the arithmetic mean and sundard deviation of samples with concentration superior to the LOD.

### B. FINDINGS

The defected concentrations of trifloxystrobin ranged from 0.49 to  $4.58 \text{ ng/m}^3$  with an average of 2.62 ng/m<sup>3</sup>. Trifloxystrobin was postly present in the gas phase with a gas-particle distribution of approximately 60.40.

Trifloxystrobin showed a tratistically significant increase of its concentration in air with rising temperature ( $\dot{r} = 0.69$ ) and its high average concentrations suggest that it was applied during or just before the sampling period. This correlation indicates that trifloxystrobin volatilises from surfaces and that this volatilisation is strongly influenced by temperature.

The detected concentrations of triffoxystrobin in air were very low and therefore of no toxicological or ecotoxicological relevances

The distribution between cas and particle phase and therefore the suggested volatilisation of trifloxystrobin from surfaces is questionable due to the study design, which is overestimating the gas phase concentrations (e.g. sampling of aerosols from spraying as false-positive indication for volatilisation or artificial extraction of particles during the sampling period of 48 hours due to the high volume sampler), and because the vapour pressure of trifloxystrobin is  $< 10^{-5}$  Pa (see section CA 7.3.2).