Propoxycarbazone-sodium

Herbicide

Dossier for Renewal of Approval
according to Commission Regulation 844/2012

Document M-CA, Section 7

Fate and behaviour in the environment

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Version history

Date	Data points containing amendments or additions [1]	Document identifier or version number

[1]Note how the amendments or additions are represented (italics/colour etc)

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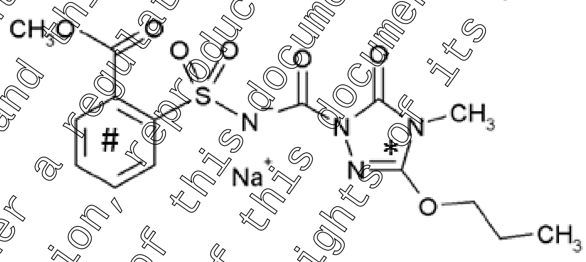
CA 7 FATE AND BEHAVIOUR IN THE ENVIRONMENT

Data on the fate and behaviour of propoxycarbazone-sodium (MKH 6561) in soil, water, sediment and air were submitted within the EU Dossier (Baseline Dossier), which resulted in the Annex I inclusion under Directive 91/414/EEC in 2003. In this Supplemental Dossier for renewal of approval of propoxycarbazone-sodium only those environmental fate studies are described in CA 7.1 to CA 7.5, which were not submitted within the Baseline Dossier. However, for a better understanding of the behaviour of propoxycarbazone-sodium in the environment, short summaries including the results of all environmental fate studies are given additionally in the summary in CA 7.1.1, CA 7.1.2, CA 7.1.3, CA 7.1.4, CA 7.2.1, CA 7.2.2, and CA 7.3.

The studies concerning the fate and behaviour of propoxycarbazone-sodium in soil, water, sediment, and air were conducted using two different radiolabel positions, [^{14}C-phenyl] and [^{14}C-triazolinone], as well as unlabelled propoxycarbazone-sodium. These radiolabel positions are sufficient to define the routes of degradation of propoxycarbazone-sodium. The structure of propoxycarbazone-sodium and the positions of the two radiolabels are as follows:

Structural formula of propoxycarbazone-sodium: #: [phenyl-U-^{14}C] = [phenyl-UL-^{14}C] *: [triazolinone-3-^{14}C] = [triazole-3-^{14}C]	

The results of the studies are summarised in the following points CA 7.1 to CA 7.5. The proposed degradation pathways in soil, water and sediment are given in Figure 7.1-1 and Figure 7.2-1, respectively.

In addition, studies have been performed with radiolabelled and unlabelled major degradation products. In the original study reports the authors may have used different names or codes for degradation products of propoxycarbazone-sodium. In this section, a single name or 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 Fate and behaviour in soil

Propoxycarbazone-sodium is moderately fast to slowly degraded in soil under aerobic and anaerobic conditions to the final degradation product CO_2 and the major metabolites MKH 6561-sulfonamide methyl ester - M05, MKH 6561-saccharin - M07, MKH 6561-4-hydroxy-saccharin - M08, MKH 6561-N-methyl propoxy triazolinone amide - M09, MKH 6561-N-methyl propoxy triazolinone - M10, and MKH 6561-4-methoxy saccharin - M11. Furthermore, non-extractable residues were formed depending on the soil type investigated. In the presence of light, propoxycarbazone-sodium is degraded to a certain extend to minor amounts of metabolites. However, photodegradation on soil is not to be expected the major route for dissipation of the compound from the environment. More details for the route and rates of degradation of propoxycarbazone-sodium and its major degradation products in soil are given in CA 7.1.1 and CA 7.1.2, respectively.

CA 7.1.1 Route of degradation in soil

The route of aerobic soil degradation of propoxycarbazone-sodium was investigated in four soil degradation studies under laboratory conditions. Propoxycarbazone-sodium was applied as test substance

using [phenyl-U-^{14}C]- and [triazolinone-3-^{14}C]propoxycarbazone-sodium. The maximum occurrences of degradation products in percentage of applied radioactivity (AR) were identical with the values given in the List of Endpoints (SANCO/4067/2001-Final, 30 September 2003) except for M08 where a slightly higher value was found after a longer period of time in the original study report.

The mineralisation of phenyl-labelled propoxycarbazone-sodium ranged from 13.9 to 41.9% during the first 123 days of incubation (approximate study duration according to OECD test guideline 307) and reached maximum amounts of 21.7 to 49.0% afterwards (179-361 days). For triazolinone-labelled propoxycarbazone-sodium mineralisation ranged from 1.6 to 10.5% during the first 120 days and reached maximum amounts of 2.6 to 13.0% afterwards (174-365 days).
The corresponding amounts of non-extractable residues for the phenyl-label ranged from 8.2 to 33.3% during the first 123 days and from 8.2 to 28.3% afterwards (179-361 days). For the triazolinone-label the amounts of non-extractable residues ranged from 11.5 to 64.9% during the first 120 days and from 17.9 to 65.7% afterwards (174-365 days).
Five major metabolites were identified in these studies: M05 (max. 20.9% at day 6), M07 (max. 26.7% at day 14), M08 (max. 21.9% at day 180[1]), M09 (max. 13.2% at day 253) and M10 (max. 55.2% at day 182). Furthermore, some minor degradation products were observed that did not occur > 10% of applied radioactivity (AR) at any sampling point or > 5% AR on two consecutive sampling points in any of the studies (e.g. MKH 6561-carboxylic acid - M04, MKH 6561-sulfonamide acid - M06).

Based on these studies, it is proposed that propoxycarbazone-sodium is degraded in first steps via cleavage of the ester bond yielding MKH 6561-carboxylic acid (M04) and/or cleavage of the triazolinone amide bond resulting in MKH 6561-sulfonamide methyl ester (M05) for the part of the molecule containing the phenyl-moiety or MKH 6561-N-methyl propoxy triazolinone amide (M09) and MKH 6561-N-methyl propoxy triazolinone (M10) for the part of the molecule containing the triazolinone-moiety. M09 is further degraded to M10 and M05 as well as M04 are further degraded to MKH 6561-sulfonamide acid (M06) followed by the formation of MKH 6561-saccharin (M07) and oxidation to MKH 6561-4-hydroxy saccharin (M08). The proposed pathway, evaluated and accepted during the Annex I inclusion, assumed a retransformation of M08 to M07 (not shown in the pathway figure below), which is seen as questionable based on new results and discussed in detail below.

A new anaerobic soil degradation study was performed (refer to CA 7.1.1.2/01), which was requested by France to support propoxycarbazone-sodium autumn use and which was not submitted and evaluated during the Annex I inclusion. In the aerobic incubation phase of this study (14 days), non-extractable residues (NER) in soil increased from 1.2 / 1.3% AR to 20.5 / 22.5% AR (triazolinone-label / phenyl-label). The level of NER remained at about this level during the entire anaerobic incubation period (maximum 25.5% AR). During the aerobic phase the maximum amounts of $^{14}CO_2$ were 7.6% AR (triazolinone label) and 13.3% AR (phenyl-label). $^{14}CO_2$ formation was very low (0.3% AR) during the anaerobic incubation phase. Formation of other volatile radioactivity was insignificant during the entire study period. Within the aerobic phase of the study (14 days) the amount of propoxycarbazone-sodium decreased rapidly from 95.3 / 96.1% AR to 43.2 / 42.8% AR for the triazolinone- and the phenyl-label, respectively. During the following anaerobic incubation period a further decrease was observed to about 15.3 / 15.1% AR (triazolinone-label / phenyl-label) until the end of the study. In addition, three metabolites known from former aerobic studies (M10, M07 and M08) and one new metabolite (MKH 6561-4-methoxy saccharin - M11) were found with maximum occurrences of 54.1% AR, 35.5% AR, 15.5% AR and 17.1% AR, respectively. Due to the fact that the conditions in this study were not strictly anaerobic, it cannot definitely be concluded that M11 is solely formed in anaerobic environments. With the results of this study and the occurrence of M11 as a new metabolite the possible retransformation of M08 to M07 as assumed in the pathway, evaluated and accepted during the Annex I inclusion, is seen as questionable. It cannot be excluded that in the former studies M07 and M11 were detected as mixtures in one peak. The analytical separations could be insufficient due to similar polarity of M07 and M11.

[1] In the first EU review report the maximum occurrence of metabolite M08 was given with 19.5% at day 36.

Therefore, aerobic transformation of M08 and the occurrence of its possible transformation products M07 and M11 were investigated in a new degradation study (refer to CA 7.1.1.1/09). In this study M11 was detected in individual samples with amounts of 4.5 and 5.5% AR, respectively. The presence of M11 was qualitatively confirmed by specific LC-MS/MS analysis. No further metabolites (including M07) were detected. The degradation pathway of propoxycarbazone-sodium in soil will therefore be revised: the retransformation M08 to M07 will be neglected and the new metabolite M11 will be included and newly addressed as relevant soil degradation product in this Supplemental Dossier. The new postulated pathway is shown in Figure 7.1-1.

Propoxycarbazone-sodium degraded in the soil photolysis studies under light influence to a certain extent during 18 days of incubation from 88.8 / 91.7% AR to 70.2 / 50.6 % AR for the phenyl- and the triazolinone-label, respectively. During the incubation period 5 / 9% AR (phenyl- / triazolinone-label) was degraded to CO_2. Two major soil metabolites could be observed, M05 and M10 with maximum occurrences of 9.7% AR at day 11 and 8.6% AR at day 18, respectively. Furthermore, a series of minor metabolites was detected for both labels, whereof only M07 could be identified (max. 4.7% AR at day 18). However, it is not to be expected that photodegradation is a major route for dissipation of the compound from the environment.

Figure 7.1-1 Proposed degradation pathway of propoxycarbazone-sodium in soil under aerobic conditions

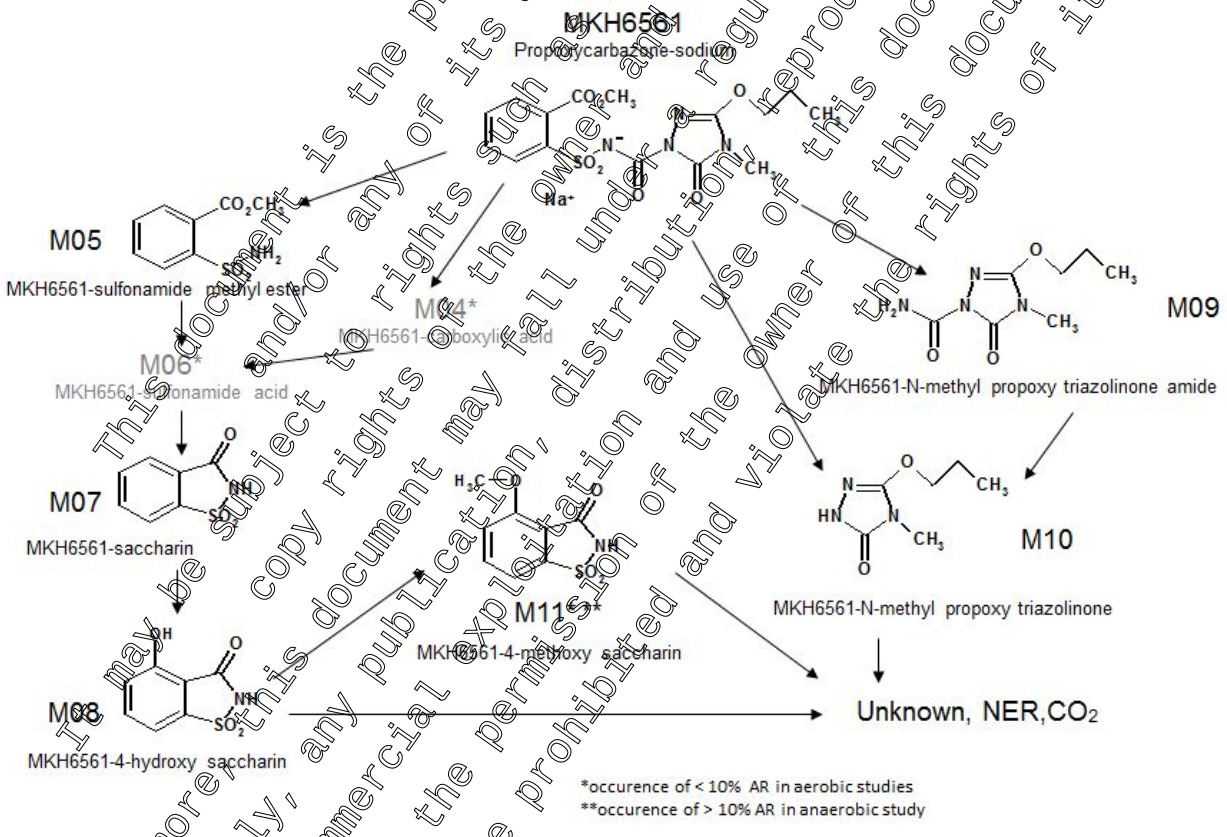


Table 7.1-1 Overview of the laboratory aerobic route of degradation studies

Reference		Guideline(s)	Application rate (µg/g)	Temp (°C)	Duration of test (days)	Moisture (%WHC)	Soil characteristics				Major metabolites (% max AR)					
							Soil origin	Soil type	pH	OC (%)	M05	M07	M08	M09	M10	M11
KCA 7.1.1.1/01	[redacted] et al. 1999	EPA Ref: Subdivision N, 162-1	0.031[1]	20	361	104.9[2]	[redacted]	loamy sand	6.4[3]	0.81	4.1	1.4	13.8	-	-	-
KCA 7.1.1.1/02	[redacted] et al. 1999	EPA Ref: Subdivision N, 162-1	0.035[4]	20	365	75[2]	[redacted]	loamy sand	6.8[3]	0.86	-	-	-	**13.2**	17.6[4]/ 33.1[5]	-
KCA 7.1.1.1/03	[redacted] et al., 1999	SETAC-Europe (1995) Offical Journal of the European Communities No L172, 95/36/EC EPA Ref: Subdivision N, 162-1 OECD Proposal (1997)	0.093[1]	20	184	40-45	[redacted]	silt	7.2	2.62	**20.9**	**26.7**	19.5	-	-	-
			0.093[1]	20	183	40-45	[redacted]	loamy sand	6.4	1.80	9.9	18.4	**21.9**	-	-	-
			0.093[1]	20	184	40-45	BBA 2.3	loamy sand	6.3	2.48	4.6	2.0	1.8	-	-	-
KCA 7.1.1.1/04	[redacted] et al., 1999		0.095[6]	20	182	45-48	[redacted]	silt	7.2	2.62	-	-	-	0.8	32.0	-
			0.095[6]	20	182	45-48	[redacted]	loamy sand	6.4	1.80	-	-	-	0.8	43.9	-
			0.095[6]	20	182	45-48	BBA 2.2	loamy sand	6.3	2.48	-	-	-	8.0	**55.2**	-
M08																
CA 7.1.1.1/09	[redacted], 2013	OECD 307 (2002) Commission Directive 2004/73/EC, Method C.23	0.250[1]	20	120	51.25	LUFA 2.2	loamy sand	5.5	1.77	-	n.d.	applied	-	-	4.5[7]
			0.250[1]	20	120	49.78	LUFA 2.3	sandy loam	6.8	0.94	-	n.d.	applied	-	-	**5.4**[8]
			0.250[1]	20	120	48.97	LUFA 6S	clay	7.1	1.64	-	n.d.	applied	-	-	n.d.

1) [phenyl –UL-^{14}C] label
2) at 1/3 bar
3) pH in H_2O
4) After extraction with formic acid.
5) After extraction with phosphoric acid.
6) [triazolinone-3-^{14}C] label
7) at day 6 (single value)
8) at day 13 (single value)

n.d.: not detected
Maximum is given in ***bold***
Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

Table 7.1-2 Overview of the anaerobic soil degradation study

Reference		Guideline(s)	Application rate (µg/g)	Temp (°C)	Duration of test (days)	Soil characteristics			Major metabolites (% max AR)			
						Soil type	pH	OC (%)	M07	M08	M10	M11
CA 7.1.1.2/01	[redacted], O. 2010	OECD 307, 2002 Commission Directive 95/36/EC amending Council Directive 91/414/EEC, 1995 US EPA, Subdivision N, § 162-2 (1982)	0.19	20	150 (anaerobic)	loam	6.7	2.5	35.5	15.5	54.1	17.1

Table 7.1-3 Overview of the soil photolysis studies

Reference		Guideline(s)	Application rate (µg/g)	Temp (°C)	Duration of test (days)	Soil characteristics			Major metabolite (% max AR)		DegT$_{50}$ (days)	
						Soil type	pH	OC (%)	M05	M10	Irradiated	Dark
KCA 7.1.1.3/01	[redacted] & [redacted], 1999, amended 2002	US EPA, Subdivision N, § 162-3 (1982) Commission Directive 95/36/EC amending Council Directive 91/414/EEC, 1995	0.47	20	18	loamy sand	6.8	0.47	9.7	n.a.[1)]	51	-[2)]
KCA 7.1.1.3/02	[redacted] & [redacted], 1999, amended 2002		0.47	20	18	loamy sand	6.8	0.47	n.a.[3)]	8.6	22	-[2)]

1) not applicable, phenyl-label used
2) not degraded in the dark
3) not applicable, triazolinone-label used

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

CA 7.1.1.1 Aerobic degradation

The route of aerobic soil degradation of propoxycarbazone-sodium was investigated in four soil degradation studies and was evaluated during the Annex I inclusion using two radiolabel positions, [phenyl-U-^{14}C] and [triazolinone-3-^{14}C], and was accepted by the European Commission (SANCO/4067/2001-Final, 30 September 2003).

Annex point	Author(s)	Year	Edition No.
KCA 7.1.1.1/01	[redacted] et al.	1999	M-012902-01-1
KCA 7.1.1.1/02	[redacted] et al.	1999	M-012867-01-1
KCA 7.1.1.1/03	[redacted] et al.	1999	M-012912-01-1
KCA 7.1.1.1/04	[redacted] et al.	1999	M-012933-02-1

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph.

Four aerobic degradation rate studies of the metabolites in soil (KCA 7.1.1.1/05 – 08) evaluated during Annex I inclusion are discussed in detail in CA 7.1.2 (KCA 7.1.2.1.2/01-04) in this Supplemental Dossier for the renewal of approval.

One additional study has been performed to further elucidate the transformation of M08 and is submitted within this Supplemental Dossier for the renewal of approval. The aerobic transformation of metabolite M08 and the occurrence of its possible transformation products M07 and M11 were investigated in this new degradation study using one radiolabel [phenyl-U-^{14}C]. The study was used to further elucidate the degradation pathway of the parent compound propoxycarbazone-sodium. A summary of the route of degradation of propoxycarbazone-sodium in soil is given in CA 7.1.1 and Figure 7.1-1.

Report:	[redacted]; [redacted];2013;M-474425-01
Title:	Aerobic transformation of MKH 6561-4-hydroxy-saccharin in soil [OECD 307]
Report No:	70434173
Document No:	M-474425-01-1
Guidelines:	**GLP compliant study based on the Commission Directive 2004/73/EC, Method C.23, Aerobic and Anaerobic Transformation in Soil (EEC Publication No. L 152, 2004); OECD Guideline for Testing of Chemicals No. 307: Aerobic and Anaerobic Transformation in Soil, adopted April 24, 2002**
Deviations:	none
GLP/GEP:	**yes**

Executive Summary

The present laboratory study investigated the degradation of ^{14}C-labelled MKH 6561-4-hydroxy-saccharin (M08) in three different soil types under aerobic conditions at 20±2 °C for a period of 120 days. The used soils were a loamy sand (LUFA 2.2, pH 5.5, organic carbon of 1.77%), a sandy loam (LUFA 2.3, pH 6.8, organic carbon of 0.94%) and a clay soil (LUFA 6S, pH 7.1, organic carbon of 1.64%). The test item was applied at a nominal treatment rate of about 250 µg/kg soil (equivalent to the 1.2 fold PEC of the parent compound propoxycarbazone-sodium) to allow for technical feasibility (detection of two transformation products). The soil moisture was maintained between 47 and 51% of the soils´ respective maximum water holding capacity for the duration of the study.

The test item MKH 6561-4-hydroxy-saccharin (M08) was extracted with acetonitrile and HCl whereas MKH 6561-saccharin (M07) and MKH 6561-methoxy-saccharin (M11) were extracted with acetonitrile and CaCl2 containing NH4OH. Quantification of the parent compound and establishing a complete mass balance was accomplished for the acidic extract only, whereas quantification of occurring transformation products was accomplished only for the alkaline extracts by HPLC coupled with radiodetection. Overall extraction efficiencies were considered linear for all three chemical structures from nominal treatment rate down to the 5%-level, however extraction recoveries fell below 90% with increasing clay content of the soil in case of the parent compound.

MKH 6561-4-hydroxy-saccharin was subjected to a varying extent of complete degradation in the three soil types under aerobic conditions. Fastest decline occurred in LUFA 2.2 (loamy sand) with high mineralisation rates of over 45%. In the other two soil types, decline of MKH 6561-4-hydroxy-saccharin was slower. Decline seemed to be slower with increasing clay content and corresponded to the overall amount of CO2 developed. With sandy loam LUFA 2.3 26% CO2 were detected and only 4% with the clay soil LUFA 6S. Formation of volatile organic compounds was less significant, with an overall formation of less than an average of 0.3%. After extracting the soil considerable amounts of non-extractable residues (NER) remained. The pattern of formation of NER was similar in the two soil types LUFA 2.2 and 2.3. Immediately after application NER were low and steadily increased until the end of the incubation period of 120 days. Amounts ranged from 37% in LUFA 2.2 to 54% in LUFA 2.3. In case of the clay LUFA 6S amounts of NER were higher with 32% immediately after application. The trend of increase however was similar, accounting for 55% after 120 days.

Screening for the two transformation products of interest by HPLC coupled with radiodetection confirmed the presence of MKH 6561-methoxy-saccharin (M11) in low amounts (≤ 5%). MKH 6561-saccharin (M07) was not detected using HPLC coupled with radiodetection. The presence of MKH 6561-methoxy-saccharin as well as the absence of MKH 6561-saccharin were confirmed by specific LC-MS/MS, too.

I. MATERIALS AND METHODS

A. MATERIALS

1. Test material (radiolabelled)	^{14}C-MKH 6561-4-hydroxy-saccharin (M08)
Chemical Name:	[phenyl-UL-^{14}C] BCS-AG76922 referred to as ^{14}C-MKH 6561-4-hydroxy-saccharin based on the structure provided on the Certificate of Analysis
Description:	Solid; colour was determined upon preparation of the stock solution. The resulting stock solution was clear and colourless. The test item was off-white to grey-pinkish.
Sample-ID:	KML 9194
Origin-ID:	KML 9246
Specific Activity:	4.43 MBq/mg (equivalent to 119.73 µCi/mg)
Radiochemical Purity:	> 98%
Chemical Purity:	> 99%
Date of Certificate of Analysis:	May 23, 2012
Storage:	In original container, < - 20 °C, in the dark and the absence of moisture
Expiry Date:	Not applicable; the amount of total radioactivity was determined by LSC and absence of degradation products was verified by HPLC coupled with UV- and radiodetection.

Stability of test compound:	Stability of the concentrated extracts (only 5%-level) was assessed after 28 days storage time by HPLC coupled with radiodetection and no loss was observed.

2. Test material (non-labelled)	MKH 6561-4-hydroxy-saccharin (M08)
Chemical Name:	4-Hydroxy-1,2-benzisothiazol-3(2H)-one 1,1-dioxide
Description:	Solid powder, light beige
Batch #:	AE 1364277-01-01
Origin Batch #:	BCOO 6427-19-15
CAS No.:	80563-77-5
Customer Order No.:	09339-00
Purity:	99.5%
Storage:	At +10 to +30°C under dark and dry conditions
Expiry Date:	November 16, 2013
Stability of test compound:	not tested

3. Reference material (non-labelled)	MKH 6561-saccharin (M07)
Chemical Name:	1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide
Description:	Solid crystals, off-white
Batch #:	AE F159737 00 1B99 0002
Origin Batch #:	M00402
CAS No.:	81-07-2
Purity:	99.9%
Date of Analysis:	May 29, 2009
Storage:	5 ± 5°C, under dark and dry conditions
Expiry Date:	May 29, 2016
Stability of test compound:	Storage stability after 53 days was investigated for concentrated (5%-level) and untreated soil extracts (nominal treatment level) by specific LC-MS/MS-analysis. A minor decrease in concentration down to 82% of initially analysed concentration was observed only in absence of organic solvents. In untreated soil extracts (nominal treatment level) no loss was observed.

4. Reference material (non-labelled)	MKH 6561-methoxy-saccharin (M11)
Chemical Name:	4-Methoxy-1,2-benzothiazol-3(2H)-one 1,1-dioxide
Description:	Powder, light yellow
Batch #:	BCS-AG71018-01-01
Origin Batch #:	BCOO 6413-13-5
Customer Order No.:	TOX-No: 09341-01

Purity:	99.7%
Date of Analysis:	June 19, 2012
Storage:	At +10 to + 30 °C, under dark and dry conditions
Expiry Date:	June 19, 2013
Stability of test compound:	Storage stability after 53 days was investigated for concentrated (5%-level) and untreated soil extracts (nominal treatment level) by specific LC-MS/MS-analysis and no loss was observed.

5. Soils

Three different soils (refer to Table 7.1-4) were used for the study. The soils were passed through a 2 mm sieve prior to use to ensure uniform particle size. Soils were stored at room temperature (approx. 20°C) in the dark for less than 3 months until use. The soil was pre-incubated for a period of 19 days in case of untreated control samples and 20 days in case of treated soil samples before the test started.

Table 7.1-4 Soil physicochemical properties

Soil	LUFA 2.2	LUFA 2.3	LUFA 6S
Location	[redacted]	[redacted]	[redacted]
Country	Germany	Germany	Germany
Batch	F2.21912	F2.31912	F6S2012
Soil type[1)]	Loamy sand	Sandy loam	Clay
Sand (%)	78.9 ± 2.5	63.1 ± 5.0	24.5 ±3.5
Silt (%)	13.8 ± 2.7	28.4 ± 4.5	35.0 ± 2.9
Clay (%)	7.3 ± 1.2	8.5 ± 1.7	40.5 ± 2.1
Organic carbon (%)	1.77 ± 0.20	0.94 ± 0.10	1.64 ± 0.12
pH (0.01 $CaCl_2$)	5.5 ± 0.2	6.8 ± 0.2	7.1 ± 0.1
CEC (meq/100 g)	10.1 ± 0.5	10.9 ± 1.1	27.2 ± 1.4
Moisture (g/100g)	41.8 ± 3.0	37.3 ± 1.8	40.5 ± 1.8
C_{mic} of C_{org} (%) at test start	1.8	1.7	1.9
C_{mic} of C_{org} (%) at test end	1.1	1.5	1.6

1) According to USDA

B. STUDY DESIGN

1. Experimental conditions

The test systems were maintained in the dark or diffuse light at a temperature of 20 ± 2°C in an air-conditioned room.

500 mL biometer-type flasks equipped with traps housing 4 M liquid NaOH to absorb CO_2, polyurethane foam to absorb volatile organic compounds, and activated charcoal as a safety trap to absorb any further volatile degradation products were used as test systems. Additional external traps housing 10 mL ethylenglycol and 10 mL 4 M NaOH were attached to the incubation flask. Aerobic incubation conditions were monitored once a week in the control vessels of all three soils. Active ventilation of the incubation vessels was not necessary as the oxygen content did not fall below 3% absolute from the nominal value of approximately 21%.

Three soils representing a range of relevant soils were used: a loamy sand (LUFA 2.2, pH 5.5, organic carbon of 1.77%), a sandy loam (LUFA 2.3, pH 6.8, organic carbon of 0.94%) and a clay soil (LUFA 6S, pH 7.1, organic carbon of 1.64%). The soils were freshly collected from

the field, sieved through a 2 mm sieve and pre-incubated for a period of 19 days in case untreated control samples and 20 days in case of treated soil samples at temperature and moisture conditions approximating those of the test.

The treatment rate was based on the highest recommended single field use rate for the parent compound propoxycarbazone-sodium which is 70 g/ha, equivalent to 190 µg/kg dry soil. To allow for technical feasibility (detection of the two potentially occurring transformation products at 5-10 %-level), a conservative estimate of 250 µg/kg dry soil was chosen. The test item was applied solely as ^{14}C-labelled material; no mixing with unlabelled material was performed. The stock solution of ^{14}C-labelled test item was prepared in ethanol. The radioactive stock solution obtained was analysed by LSC to determine the exact activity of the stock solution. Determination of the test item by HPLC coupled with UV-detection was accomplished after preparation of the stock solutions. As values obtained agreed with the value based on liquid scintillation counting and no significant amounts of contaminants were observed, it was considered valid to determine the concentration at later stages of the study based on liquid scintillation counting only.

The test item was added to the soil using quartz sand as a carrier. A corresponding amount of an ethanol stock solution of the ^{14}C-labelled test item was added to the quartz sand and the solvent was evaporated overnight in a fume cupboard in the dark. The quartz sand was then added to the soil followed by thoroughly mixing. The added amount of quartz sand was below 1%.

For each soil four control samples were prepared which were also treated with quartz sand after evaporation of the corresponding amount of ethanol.

For each soil two sterile controls were prepared. The soil was heated for 15 min to 121°C in total four times (wet sterilisation using an autoclave).

About 70 g of the treated soil (wet weight basis) was placed into each incubation flask. Each sampling point was measured in duplicate. For the four untreated control samples per soil approximately 150 g were filled in identical incubation flasks.

The soil moisture was adjusted to and maintained at 47 to 51% of the soils´ respective maximum water holding capacity during the incubation period. Water losses were compensated by addition of water (sterile filtered tap water).

The experiment was terminated after a maximum of 120 days. Untreated control samples were taken after 122 days.

2. Sampling

At least duplicate incubation flasks were sampled and sacrificed at day 2, 6, 13, 21, 43, 63, 91 and 120 for all soils.

For soil sampling at day 0 the first aliquot was taken immediately after end of mixing the test item, the second after half of the incubation flasks had been filled, and the third at the end of the entire application process to verify uniform distribution of the test item in the soil.

For the determination of the test item content in the soil approximately 10 g aliquots of soil were taken from each sample.

The NaOH and ethylene glycol in the additional external traps, the polyurethane foam, and the activated charcoal were not changed until sampling of the entire incubation flask at the respective sampling date. The NaOH from the inner traps was sampled at the actual sampling points; however they were also changed prior to the actual sampling time point to ensure adequate trapping capacity at day 28, 56 and 85. In case of control samples, exchange of inner NaOH was done at day 29, 57 and 86.

3. Description of analytical procedures

Different soil extraction procedures were established for the parent compound MKH 6561-4-hydroxy-saccharin (M08) and the two transformation products M07 and M11, due to low extractability of the parent compound from loamy sand LUFA 2.2 with alkaline extraction

mixtures. Thus, for removal of the parent compound M08 a mixture of acetonitrile and 0.1 M HCl (50/50 v/v) was chosen and the metabolites M07 and M11 were extracted using a mixture of acetonitrile and 50 mM $CaCl_2$ containing 10 mM NH_4OH (50/50 v/v). As a consequence of the two different extraction liquids, two separate aliquots of approximately 10 g were taken out of each incubation vessel. In case of the acidic mixture, extraction was accomplished three times, in case of the alkaline mixture, extraction was accomplished four times. Extraction time was for each step 20 min on a reciprocal shaker, preceded by 10 min ultrasonic treatment. Phase separation was accomplished by centrifugation, supernatants of the individual extraction steps were combined and the final volume adjusted to 50 mL using the respective extraction liquid. In case of the two reference items (alkaline extracts), extracts were neutralised by addition of 6.25 µL formic acid. Concentrated extracts were filtered through 0.2 µm cellulose acetate filters and untreated soil extracts through 0.45 µm PTFE syringe filters prior to analysis. For concentration of the respective soil extracts the organic solvent was removed at reduced atmospheric pressure (50 mbar) at 40°C (vacuum concentrator). In case the final volume was below 2 mL, the final volume was adjusted to 5 mL using the aqueous phase of the respective extraction mixture.

All soil extracts were analysed by LSC (TRI-CARB 2900TR, Perkin Elmer) for total radioactivity. Further analysis was accomplished by calibration against either labelled test item (HPLC coupled with radiodetection), unlabelled test item (determination of active ingredient by HPLC coupled with UV-detection) or unlabelled reference item (LC-MS/MS).

In HPLC the identity of the test item and the two transformation products was confirmed by comparison of the retention time with a mixture of unlabelled compounds. Quantification was accomplished by external calibration using ^{14}C-MKH 6561-4-hydroxy-saccharin. Quantification of occurring transformation products was not accomplished by external calibration but based on the percentage of integrated area of the chromatogram related to total extractable radioactivity in the respective soil extract. Resolution of three signals of interest was accomplished by injection of a mixture containing MKH 6561-4-hydroxy-saccharin, MKH 6561-methoxy-saccharin, and MKH 6561-saccharin. In case deterioration of analytical performance was observed, a new analytical column had to be used to ensure satisfactory separation of the three chemical structures.

Only in two samples an additional signal was detected by HPLC coupled with radiodetection apart from the parent compound. These samples were qualitatively analysed by specific LC-MS/MS (Agilent 1200 and API 3200) to verify the presence or absence of the chemical structures.

The following LOQ values were detected:

- HPLC coupled with ^{14}C-dection: 8.64 µg/L or 7.8 µg/kg (M08)
- HPLC coupled with UV-detection: 46.22 µg/L (M08)
- LC-MS/MS: 0.06 µg/L or 0.32 µg/kg (M07) and 0.05 µg/L or 0.24 µg/kg (M11)

With the linear extraction pattern considered linear over the entire concentration range, the quantification limit (LOQ) was thus determined to be 12.5 µg/kg (equivalent 5% of nominal treatment rate) for each of the three compounds.

The radioactivity of $^{14}CO_2$ and other labelled volatiles was determined using liquid scintillation counter (LSC).

Non-extractable amounts of radioactivity in the soil samples were determined by combustion of the solid matter using a sample oxidizer (Oxidizer 307, Perkin Elmer) after drying and homogenisation in a ball mill. During combustion $^{14}CO_2$ was trapped in a solvent (Carbosorb) and was then analysed using LSC.

The pH was determined according to DIN 19684 ($CaCl_2$).

Dry soil weight and water content were determined gravimetrically according to DIN 19683.

The microbial biomass was determined according to the DIN guideline 14240. The soil was supplemented with glucose and the respiration rates of the soil microflora were measured.

II. RESULTS AND DISCUSSION

A. DATA

Table 7.1-5 Mass balance and quantification of test item (M08) in LUFA 2.2 soil with a treatment rate of 250.5 µg/kg soil at 20°C based on acidic extraction

Incubation time (d)	^{14}C-activity in soil extracts (% AR)	NER[1] (% AR)	VOC[2] (% AR)	CO_2 (% AR)	total (% AR)	conc. of M08 (µg/kg)	mean conc. of M08 (µg/kg)	mean M08 nominal (%)
	Method: LSC					*Method: HPLC coupled with radiodetection*		
0	89	6	n.a.	n.a.	95	254	217	87
0	90	6	n.a.	n.a.	97	202		
0	91	7	n.a.	n.a.	98	204		
2	77	18	0	3	99	156	174	69
2	80	21	0	3	104	191		
6	66	19	0	7	92	128	132	53
6	66	22	0	7	95	137		
13	53	26	0	14	94	118	118	47
13	54	28	0	14	96	117		
21	43	29	0	23	95	70	78	31
21	49	25	0	22	97	85		
43	25	37	0	33	94	44	50	20
43	26	38	0	30	94	57		
63	18	38	0	39	95	28	28	11
63	19	39	0	37	95	18		
91	15	39	0	42	96	29	22	9
91	14	35	0	42	91	16		
120	14	37	0	45	95	31	31	13
120	12	37	0	47	95	32		
120[3]	87	12	n.a.	n.a.	99	196	187	74
120[3]	85	11	n.a.	n.a.	96	178		

1) Non-extractable residues
2) Volatile organic compounds
3) Sterile control
n.a. not applicable
italics: values determined were below the smallest standard of 0.5 ppb, thus values were excluded

Table 7.1-6 Mass balance and quantification of test item (M08) in LUFA 2.3 soil with a treatment rate of 250.6 µg/kg soil at 20°C based on acidic extraction

Incubation time (d)	^{14}C-activity in soil extracts (% AR)	NER[1] (% AR)	VOC[2] (% AR)	CO_2 (% AR)	total (% AR)	conc. of M08 (µg/kg)	mean conc. of M08 (µg/kg)	mean M08 nominal (%)
	Method: LSC					*Method: HPLC coupled with radiodetection*		
0	96	4	n.a.	n.a.	100	216	220	88
0	97	4	n.a.	n.a.	101	214		
0	95	4	n.a.	n.a.	100	229		
2	95	5	0	0	100	239	229	91
2	93	6	0	0	98	219		
6	91	8	0	1	100	191	202	80
6	92	8	0	1	101	213		
13	86	11	0	2	99	204	211	84
13	87	5	0	3	95	218		
21	87	7	0	3	97	183	178	71
21	79	12	0	4	94	168		
43	72	12	0	10	93	161	165	66
43	82	15	0	3	101	170		
63	62	20	0	13	95	156	158	63
63	59	22	0	14	95	159		
91	57	29	0	16	102	107	105	42
91	47	25	0	17	88	103		
120	34	53	0	27	114	59	62	25
120	34	56	0	26	115	64		
120[3]	83	10	n.a.	n.a.	93	161	170	67
120[3]	88	8	n.a.	n.a.	96	179		

1) Non-extractable residues
2) Volatile organic compounds
3) Sterile control
n.a. not applicable

Table 7.1-7 Mass balance and quantification of test item (M08) in LUFA 6S soil with a treatment rate of 250.5 µg/kg soil at 20°C based on acidic extraction

Incubation time (d)	^{14}C-activity in soil extracts (% AR)	NER[1] (% AR)	VOC[2] (% AR)	CO_2 (% AR)	total (% AR)	conc. of M08 (µg/kg)	mean conc. of M08 (µg/kg)	mean M08 nominal (%)
	Method: LSC					*Method: HPLC coupled with radiodetection*		
0	62	30	n.a.	n.a.	92	146	169	67
0	69	30	n.a.	n.a.	98	190		
0	65	35	n.a.	n.a.	100	170		
2	57	33	0	0	91	149	146	58
2	57	32	0	0	89	144		
6	54	42	0	1	97	148	114	46
6	39	61	0	1	100	80		
13	57	48	0	1	106	150	157	63
13	57	46	0	1	103	164		
21	51	53	0	1	105	143	125	50
21	43	41	0	1	85	107		
43	55	48	0	2	106	139	135	54
43	36	56	0	2	94	131		
63	57	44	0	2	103	161	155	62
63	55	47	0	2	104	148		
91	49	53	0	3	105	128	131	52
91	53	55	0	4	112	134		
120	49	55	0	4	108	118	112	45
120	47	55	0	4	107	106		
120[3]	66	35	n.a.	n.a.	100	150	143	57
120[3]	64	33	n.a.	n.a.	97	136		

1) Non-extractable residues
2) Volatile organic compounds
3) Sterile control
n.a. not applicable

MKH 6561-saccharin (M07) was not detected in any of the soil extracts by HPLC coupled with radiodetection after an alkaline soil extraction (ACN-50 mM $CaCl_2$ with 10 mM NH_4OH (50/50 v/v)), whereas MKH 6561-methoxy-saccharin (M11) was detected in individual samples of LUFA 2.2 taken after 6 days (4.5% AR) and of LUFA 2.3 taken after 13 days (5.4% AR). In extracts of LUFA 6S none of the transformation products was detected. The presence of MKH 6561-methoxy-saccharin (M11) as well as the absence of MKH 6561-saccharin (M07) were confirmed by specific LC-MS/MS, too.

B. MASS BALANCE

Complete ^{14}C-mass balance was established based on extracts obtained with acetonitrile and 0.1 M HCl (extraction for the test item) and corresponding non-extractable residues. The alkaline extraction using acetonitrile with 50 mM $CaCl_2$ and 10 mM NH_4OH served only for screening for transformation products.

Mass balances ranged from 93 to 101%, 95 to 115% and 90 to 108% for LUFA 2.2, LUFA 2.3 and LUFA 6S, respectively.

The mass balance for the sterile control samples accounted for 95% to 99% after 120 days.

C. BOUND AND EXTRACTABLE RESIDUES

In all three soils the formation of soil bound residues was observed after extraction with acetonitrile-0.1 M HCl (50/50 v/v). Immediately after application non-extractable residues were low and steadily increased until the end of the incubation period of 120 days. Amounts ranged from 37% in LUFA 2.2 to 54% in LUFA 2.3. In case of the clay LUFA 6S amounts of NER were higher with 32% immediately after application. The trend of increase however was similar, accounting for 55% after 120 days. Attempts during preliminary experiments to improve extraction recoveries from the heavy clay soil were not satisfactory.

The pattern of extractable radioactivity observed was comparable for all three soil types.

Extraction of the soil for MKH 6561-4-hydoxy-saccharin using ACN-0.1 M HCl (50/50 v/v):
Extractable activity decreased from 90% to 13%, from 96% to 34% and from 65% to 48% at test end after 120 days for soils LUFA 2.2, LUFA 2.3 and LUFA 6S, respectively. Extractable radioactivity followed a clear trend of decline over time, with highest amounts of extractable radioactivity found in the clay soil at the end of the incubation period.

Extraction of the soil for MKH 6561-saccharin and MKH 6561-methoxy-saccharin using ACN-50 mM $CaCl_2$ with 10 mM NH_4OH (50/50 v/v):
Extraction was accomplished for soil samples from day 2 until day 120. The extractable activity was lower compared to the ^{14}C-activity obtained for the acidic extraction, starting with 16%, 65%, and 47% for LUFA 2.2, 2.3 and 6S, respectively. However, the alkaline extraction mixture was shown to remove both transformation products at a satisfactory rate from soil, hence subjected to analysis by HPLC coupled with radiodetection. Extractable radioactivity followed a similar trend of decline towards the end of the study with 4%, 17% and 34% in soil extracts of LUFA 2.2, 2.3 and 6S respectively.

Sterile controls were analysed after extraction with acetonitrile and 0.1 M HCl. Non-specific LSC analysis of extractable radioactivity and combustion of non-extractable residues confirmed no loss of radioactivity over the incubation period of 120 days. Extractable radioactivity accounted for 86% (LUFA 2.2 and 2.3) and 65% (LUFA 6S). Non-extractable residues accounted for 9% to 34% at test end.

D VOLATILISATION

^{14}C-MKH 6561-4-hydroxy-saccharin was mineralised to a different extent in the three soil types. Maximum mineralisation rates were 45.4% at day 120 in LUFA 2.2, 26.4% after 120 days in LUFA 2.3 and 4.1% after 120 days in LUFA 6S.

The formation of volatile organic transformation products was negligible under aerobic incubation conditions in the three soil types. Overall maximum amounts ranged from 0.1% in LUFA 6S to 0.3% in LUFA 2.2.

E. TRANSFORMATION OF PARENT COMPOUND

In all soils, the extractable radioactivity and extractable test item decreased steadily over the duration of the study. The decline observed was consistent with a decline of extractable total radioactivity analysed by LSC, although total extractable radioactivity was higher compared to extractable test item. This was attributed to the possibility that radioactivity could potentially be associated to extractable soil humic matter which is not detected as a distinct signal by HPLC coupled with radiodetection.

The test item MKH 6561-4-hydroxy-saccharin disappeared fast from all soil extracts over time. The fastest decline was observed in loamy sand LUFA 2.2 where after 120 days 13% were

detected, whereas 25% and 45% were still found in case of LUFA 2.3 and LUFA 6S (soil C-clay).

MKH 6561-saccharin (M07) was not detected in any of the soil extracts by HPLC coupled with radiodetection, whereas MKH 6561-methoxy-saccharin (M11) was detected in individual samples of LUFA 2.2 taken after 6 days (4.5% AR) and of LUFA 2.3 taken after 13 days (5.4% AR). In extracts of LUFA 6S none of the transformation products were detected. The presence of MKH 6561-methoxy-saccharin (M11) as well as the absence of MKH 6561-saccharin (M07) were confirmed by specific LC-MS/MS, too.

Detailed values obtained for each sampling point can be found in Table 7.1-5 to Table 7.1-7.

In sterile soil, overall amounts of non-extractable residues were in a similar range of the amounts observed in active soil immediately after application. As overall mass-balance did not point to any important loss of ^{14}C by the formation of volatiles and/or $^{14}CO_2$, it was concluded that non-extractable residues were formed by identical abiotic process which lead to NER in the treated soil after application or by minor residual biotic activity which may not have been completely suppressed despite extensive wet sterilisation.

III. CONCLUSIONS

MKH 6561-4-hydroxy-saccharin (M08) degraded under aerobic conditions in all three soils types investigated. The parent compound exhibited slight mineralisation to CO_2 in the clay soil LUFA 6S whereas high mineralisation rates of 45% and 26% were observed in loamy sand LUFA 2.2 and sandy loam LUFA 2.3. Disappearance did not seem to be strictly correlated to the highest microbial activity (C_{mic}). Abiotic parameters, such as for example the clay content, seemed to have an impact on the mineralisation and transformation rate. No persistent degradation products were observed. In case of two single samples the transformation product MKH 6561-methoxy-saccharin (M11) was observed with 4.5% AR and 5.4% AR after 6 days and 13 days, respectively. The presence of MKH 6561-methoxy-saccharin (M11) was qualitatively confirmed by specific LC-MS/MS-analysis. MKH 6561-saccharin (M07) was not detected at all.

A kinetic evaluation following current FOCUS guidance was conducted and is summarised in CA 7.1.2.1.2/10.

CA 7.1.1.2 Anaerobic degradation

An anaerobic soil degradation study was performed using two radiolabel positions, [phenyl-U-^{14}C] and [triazolinone-3-^{14}C], which was requested by France to support propoxycarbazone-sodium autumn use and which was not submitted and evaluated during the Annex I inclusion. The study is submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval. A study summary is provided below.

Report:	[redacted]o;[redacted];2010;M-378046-01
Title:	[Triazolinone-3-14C]- and [phenyl-UL-14C]propoxycarbazone-sodium: Anaerobic soil metabolism
Report No:	MEF-09/221
Document No:	M-378046-01-1
Guidelines:	**OECD 307; EU 95/36/EC amended 91/414; US EPA, Subdivision N, Paragraph 162-2**
Deviations:	none
GLP/GEP:	**yes**

Executive Summary

The present laboratory study investigated the route and rate of degradation of the herbicide propoxycarbazone-sodium in one European soil under initially aerobic and then anaerobic flooded conditions. The test was performed in the dark at about 20°C using static-type incubation test systems. The used soil was a loam originating from [redacted], Germany ([redacted] 4a, pH 6.7 in $CaCl_2$, 2.5% organic carbon). The test items [triazolinone-3-^{14}C]- and [phenyl-UL-^{14}C]propoxy-carbazone-sodium (named label A and B, respectively) were applied to soil at a nominal treatment rate of about 19 µg/100 g dry soil. Assuming a homogeneous distribution in the 2.5 cm topsoil layer, this rate was equivalent to the intended field application rate of 70 g/ha.

Following application of the test items to soil, the samples were incubated under aerobic conditions in the dark at about 20°C and 55% of the maximum water holding capacity for 14 days. Then, the soil samples were flooded with oxygen-depleted, de-ionised water (ca. 3 cm layer above soil level) and set under an atmosphere of nitrogen. The water-logged samples were maintained under anaerobic conditions for 150 days. At the respective sampling intervals, the soil was extracted three times at room temperature with aqueous organic solvent (acetonitrile/water (1/1, v/v) containing 0.025% aqueous NH_3 (ambient organic extract)) and by a microwave extraction step at about 70°C (aggressive extract). Ambient organic and aggressive extracts were kept separate for the determination of the radioactivity content by liquid scintillation counting as well as for the individual profiling of components by reversed phase HPLC with radiodetection. The soil extracts were concentrated prior to HPLC analysis. During the anaerobic incubation phase, soil and water layer were separated by decanting prior to soil extraction. The water phase was analysed directly (without a concentration step). Characterisation and identification of propoxycarbazone-sodium and its metabolites were achieved by HPLC co-chromatography as well as by spectroscopic methods (HPLC-MS, HPLC-MS/MS and accurate mass determination).

Mean material balances ranged from 95.1 to 97.5% AR for label A and from 90.8 to 97.7% AR for label B. During the aerobic phase, the maximum amount of $^{14}CO_2$ was 7.6% of the applied radioactivity (AR) for label A and 13.3% of the AR for label B. Formation of volatile radioactivity during the anaerobic phase was insignificant (up 0.3% AR carbon dioxide, 0.0% AR organic volatiles).

In the aerobic incubation phase, non-extractable residues (NER) in soil increased from 1.2 / 1.3% of the AR to 20.5 / 22.5% of the AR (label A / label B, mean). The level of NER stayed at about this level also during the anaerobic (flooded) incubation period (maximum 25.5% of the AR). Following fractionation of soil organic matter about 1/3 of the RA each was attributed to the humic acid fraction, the fulvic acid fraction and the humin substance fraction, respectively.

Within the aerobic phase of the study (14 days) the amount of the test item propoxycarbazone-sodium in the entire test systems decreased rapidly from 95.3 / 96.1% of the AR to 43.2 / 42.8% of the AR for label A / B, respectively. During the following anaerobic incubation period (i.e. flooded state) a further decrease was observed to about 15.3 / 15.1% AR until the end of the study (label A / B).

Four main metabolites were formed during the study, N-methyl propoxy triazolinone (up to 54.1% AR), saccharin (up to 35.5% AR), 4-hydroxy saccharin (up to 15.7% AR) and 4-methoxy saccharin (up to 17.1% AR). All metabolites were known from former soil, except 4-methoxy saccharin. 4-Methoxy saccharin occurred first at DAT-21 (DASF-7) in the anaerobic part of the study with a

percentage in the entire system of 5.5% of the AR, increased to 17.1% of the AR at DAT-28 and decreased to 12.2% of the AR at DAT-55. However, during the period of occurrence, the system showed no strictly anaerobic conditions, thus 4-methoxy saccharin is not safe to say an anaerobic metabolite of propoxycarbazone-sodium. The total unidentified RA in the entire systems reached values not higher than 4.6% of the AR for both labels.

I. MATERIALS AND METHODS

A. MATERIALS

1. Test material (radiolabelled)	[triazolinone-3-^{14}C]propoxycarbazone-sodium (Label A)
Batch #:	KATH 6716
Reference Synthesis #:	C-723
Specific Activity:	5.13 MBq/mg
Radiochemical Purity:	> 99% (HPLC), > 98% (TLC)
Chemical Purity:	> 99% (HPLC)
Common Name:	Propoxycarbazone-sodium
CAS No.:	181274-15-7
Stability of test compound:	The radiochemical purity was verified in the stock solution by HPLC. In addition, the test item was identified within the study in the stock solution by HPLC-MS, HPLC-MS/MS (ESI positive and ESI negative) and accurate mass determination (FT-Orbitrap-MS).
2. Test material (radiolabelled)	[phenyl-UL-^{14}C]propoxycarbazone-sodium (Label B)
Batch #:	KATH 6715
Reference Synthesis #:	THS 5024
Specific Activity:	3.82 MBq/mg
Radiochemical Purity:	> 99% (HPLC), > 99% (TLC)
Chemical Purity:	> 99% (HPLC)
Common Name:	Propoxycarbazone-sodium
CAS No.:	181274-15-7
Stability of test compound:	The radiochemical purity was verified in the stock solution by HPLC. In addition, the test item was identified within the study in the stock solution by HPLC-MS, HPLC-MS/MS (ESI positive and ESI negative) and accurate mass determination (FT-Orbitrap-MS).
3. Reference material (non-labelled)	MKH 6561
Common Name:	Propoxycarbazone-sodium
Description:	Solid
Batch #:	A0298618

Expiry Date:	May 5, 2014 if stored at -15°C

4. Reference material (non-labelled)

	Saccharin
Chemical Name:	1,2-Benzisothiazol-2(2H)-one 1,1-dioxide
Description:	Solid (white crystals)
Batch #:	AE F159737 00 1B99 0002 (certificate ID: AZ 15893)
CAS No.:	81-07-2
Expiry Date:	May 29, 2016 if stored at +5±5°C

5. Reference material (non-labelled)

	4-Hydroxy saccharin
Chemical Name:	4-Hydroxy-1,2-benzisothiazol-3(2H)-one 1,1-dioxide
Description:	Solid (beige powder)
Batch #:	AE 1364277-PU-01 (certificate ID: AZ 13382)
Expiry Date:	May 3, 2010 if stored at +5±5°C

6. Reference material (non-labelled)

	4-Methoxy saccharin
Chemical Name:	Not available
Description:	Solid (white powder)
Sample ID:	AE629622 (spectroscopy serial no.: 13898)
CAS No.:	Not available
Expiry Date:	January 2015 if stored at -15°C

7. Reference material (non-labelled)

	N-methyl propoxy triazolinone
Chemical Name:	4-Methyl-5-propoxy-2,4-dihydro-3H-1,2,4-triazol-3-one
Description:	Not available
Batch #:	AE 1364263-PU-01 (certificate ID: AZ 14042)
CAS No.:	145027-96-9
Expiry Date:	Not available

8. Soil

One soil (refer to Table 7.1-8) was used for the study. The freshly collected soil was passed through a 2 mm sieve, mixed thoroughly for optimal batch homogeneity and pre-equilibrated at 20°C for a period of 6 days.

Table 7.1-8 Soil physicochemical properties

Soil	[redacted] 4a
Location	[redacted]
Country	Germany
Batch	20090422
Soil type[1)]	Loam
Sand (%)	35
Silt (%)	46
Clay (%)	19
Organic carbon (%)	2.5
pH ($CaCl_2$)	6.7
CEC (meq/100 g)	14.4
WHCmax (g/100g)	67.6
Microbial biomass at test start (mg c_{mic}/kg soil)	1210
Microbial biomass at DAT-14 (mg c_{mic}/kg soil)	Untreated soil: 1005 Application solvent control: 983
Anaerobic Bacteria in Anaerobic Incubation Phase (CFU /g soil)	Untreated Soil: 3970-30000 (Dilutions 10^{-2}–10^{-4}) Application solvent control: 4130-17000 (Dilutions 10^{-2} – 10^{-4})

1) According to USDA

B. STUDY DESIGN

1. Experimental conditions

The study was performed in static incubation test systems using glass Erlenmeyer flasks of 300 mL volume. The test systems were maintained in the dark at a temperature of 20 ± 2°C in an incubation chamber.

A loam soil was chosen as a representative agricultural soil of European origin ([redacted] 4a, pH 6.7 in $CaCl_2$, 2.5% organic carbon). The soil was freshly collected from the field, sieved through a 2 mm sieve.

The soil moisture was adjusted to and maintained at 55% maximum water holding capacity during the aerobic incubation period. The amount of radiolabeled propoxycarbazone-sodium for the treatment of the test systems in the study was based on the highest recommended single field use rate of 70 g/ha. Therefore, a nominal amount of about 19 µg propoxycarbazone-sodium per 100 g of dry soil was applied, respectively, equivalent to 0.19 mg propoxycarbazone-sodium per kg of dry soil. Soil treatment with the two test items was carried out by means of application solutions which contained the test items in a mixture of methanol and water (1/1; v/v). Treatment was made as small droplets applied directly onto the soil surface using a micropipette. Biomass and anaerobic bacteria determination test systems were either left untreated (untreated soil) or dosed with test item-free application solvent (application solvent controls).

After application, the test systems were fitted with trap attachments containing soda lime and a polyurethane (PUF) foam plug as trapping media for carbon dioxide and organic volatile compounds, respectively. Aerobic conditions were maintained by passive diffusion of atmospheric oxygen. After 14 days of aerobic incubation, the trap attachments were removed and the soil of each flask was flooded with about 150 mL of oxygen-depleted de-ionized water leading to a water layer of approx. 3 cm above soil. The flasks were then equipped with

sealable double-valve glass stoppers and connected to plastic gas sampling bags which had been flushed with nitrogen gas. The valves were set to connect flask headspace and gas sampling bag, but closing the system from the outer atmosphere. To ensure maintenance of fully oxygen-free conditions, the test systems were placed in box within the incubation chamber which was flooded first with argon and then with nitrogen. The test systems were incubated under anaerobic conditions for 150 days.

2. Sampling

Duplicate test flasks incubated under aerobic conditions were collected for analysis at 0, 3 and 14 days after treatment (DAT). Each two flasks incubated under anaerobic conditions were collected for analysis at days 14, 21, 28, 35, 55, 76, 104, 134 and 164, corresponding to 0, 7, 14, 21, 41, 62, 90, 120 and 150 days after soil flooding (DASF).

Soil samples were immediately extracted and soil extracts and decanted water layers were subjected to a first chromatography profiling usually within one day. No storage stability experiments were therefore conducted. Samples were stored in a freezer (≤ 10°C) in the dark.

Test systems used for microbial biomass determinations were sampled at DAT-0 and DAT-14. Test systems used for anaerobic bacteria determinations were sampled at study end (DAT-164).

3. Description of analytical procedures

After collection of the respective test systems from the incubation chamber during the aerobic incubation phase, flask and volatile traps were separated. The soil was extracted three times at room temperature with 80 mL aqueous organic solvent (acetonitrile/water (1/1, v/v) containing 0.025% aqueous NH_3 (ambient organic extract)) and by a microwave extraction step at about 70°C using the same extraction solvent (aggressive extract). Ambient and aggressive extracts were analysed separately for radioactivity by liquid scintillation counting (LSC) and they were kept separate for individual profiling of components by reversed phase HPLC with radiodetection (primary chromatographic method). Prior to HPLC analysis, sample extracts were concentrated.

The radioactivity trapped in the PU-foam plugs was extracted with 50 mL ethyl acetate by sonication and the extracted radioactivity was determined LSC. Radioactivity absorbed by soda lime (i.e. $^{14}CO_2$) was liberated using 18% aqueous HCl, trapped in scintillation cocktail and measured by LSC as well. The portion of non-extractable radioactivity in soil was determined by combustion of air-dried soil samples. The resulting ^{14}C-CO_2 was trapped in scintillation cocktail and analysed by LSC.

During the anaerobic study phase, the collected test systems were connected to a volatile combustion oven unit. Using nitrogen, volatiles present in the headspace and gas sampling bag were slowly purged over a soda lime trap for absorption of $^{14}CO_2$ and through a catalytic oven for oxidative combustion of organic volatiles with the subsequent trapping of $^{14}CO_2$ for LSC analysis. Next, the test flasks were opened and the oxygen content and pH value of the water layer as well as the redox potential of the water and soil layer were immediately determined by electrode measurements. Thereafter, from each flask an aliquot of 30 mL of the water layer was removed to which 1 mL of 1 M aqueous NaOH was added. The sample was mixed and subjected to analysis of carbon dioxide content by adding aqueous HCl. Carbon dioxide was liberated from the soda lime and the water layer analogously as described for the soda lime in the trap attachments used in the anaerobic phase. The rest of the water layers were separated from the soil layers by careful decanting and centrifuged (about 10 min at ca. 5000 g). Soil extraction and analysis was performed in the same manner as described for the aerobic incubation phase. Radioactivity in the water layer was determined by LSC and the water layer was analysed by HPLC with radiodetection without a concentration step.

The limit of detection (LOD) of the primary chromatographic method was determined for a single peak in a soil sample as 1.02% of the AR. The limit of quantification (LOQ) was calculated by multiplication of the LOD with a factor of 3 (LOQ = 3% AR). The results of the

primary chromatographic method were confirmed for representative extracts using HPTLC as confirmatory method.

The determination of the microbial biomass during the aerobic phase was determined based on the method of substrate-induced initial respiratory response and the determination of anaerobic bacteria present in the soil during the anaerobic incubation phase was based on a plate count assay for colony forming units.

II. RESULTS AND DISCUSSION

The study was performed under the required temperature conditions with a mean temperature of 20.1°C. Redox potential measurements indicated reducing conditions from DASF-41-of the study onwards. The pH values decreased quickly from DASF-0 to DASF-7 from 7.9 to values of around pH 7 and increased again until study end to values around pH 7.6. The oxygen content in the water layer decreased during the study from 3.51 mg/L to about 0.85 mg/L for label A test systems and from 3.84 mg/L to about 0.84 mg/L for label B test systems, demonstrating the shift to anaerobic conditions. All sediments were flushed with argon on 2009-06-15 (DAT-35 = DASF-21) intensively for about 10 minutes in order to maintain anaerobic conditions. The soil was viable throughout the study.

A. DATA

Table 7.1-9 Biotransformation of [triazolinone-3-^{14}C]propoxycarbazone-sodium in entire System (all values expressed as % of applied radioactivity)

Days after Treatment		0	3	14	14	21	28	35	55	76	104	134	164
Days after Soil Flooding		N/A			0	7	14	21	41	62	90	120	150
Propoxycarbazone-sodium	1	96.5	87.7	44.4	43.5	33.9	29.8	29.6	23.0	20.5	12.5	9.1	15.0
	2	94.1	87.7	42.0	41.5	36.1	31.2	27.2	23.2	20.1	12.3	9.5	15.6
	Mean	**95.3**	**87.7**	**43.2**	**42.5**	**35.0**	**30.5**	**28.4**	**23.1**	**20.3**	**12.4**	**9.3**	**15.3**
N-methyl propoxy triazolinone	1	0.0	6.5	21.7	25.4	32.7	37.8	39.1	42.8	43.9	53.0	53.7	43.3
	2	1.8	7.0	23.1	26.0	32.3	34.8	39.7	43.1	43.3	52.9	54.5	45.8
	Mean	**0.9**	**6.7**	**22.4**	**25.7**	**32.5**	**36.3**	**39.4**	**42.9**	**43.6**	**53.0**	**54.1**	**44.5**
Total Unidentified Radioactivity	1	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	5.2
	2	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	4.0
	Mean	**0.0**	**0.0**	**1.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.2**	**0.0**	**0.0**	**4.6**
Total Extractable Residues	1	96.6	94.1	67.8	68.9	66.6	67.7	68.7	65.7	64.9	65.5	62.7	63.4
	2	95.9	94.6	66.6	68.3	68.4	65.9	66.9	66.3	65.3	65.2	64.0	65.4
	Mean	**96.3**	**94.4**	**67.2**	**68.6**	**67.5**	**66.8**	**67.8**	**66.0**	**65.1**	**65.3**	**63.4**	**64.4**
$^{14}CO_2$ (total aerobic + anaerobic)	1	N/A	0.0	7.5	7.7	7.8	7.6	7.6	7.6	7.6	7.7	7.7	7.6
	2	N/A	0.0	7.8	7.5	7.8	7.6	7.6	7.6	7.6	7.7	7.7	7.6
	Mean	**N/A**	**0.0**	**7.6**	**7.6**	**7.8**	**7.6**	**7.6**	**7.6**	**7.6**	**7.7**	**7.7**	**7.6**
Volatile Organics (total aerobic + anaerobic)	1	N/A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2	N/A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Mean	**N/A**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Non-Extractable Residues	1	1.0	1.8	20.4	20.3	20.6	20.8	21.4	22.7	24.5	24.5	25.8	25.7
	2	1.4	1.8	20.6	19.5	20.5	22.3	22.0	20.2	23.1	23.9	25.2	25.3
	Mean	**1.2**	**1.8**	**20.5**	**19.9**	**20.5**	**21.6**	**21.7**	**21.4**	**23.8**	**24.2**	**25.5**	**25.5**
Material Balance	1	97.7	96.2	95.7	96.8	95.1	96.1	97.7	96.0	97.1	97.7	96.2	96.7
	2	97.3	96.8	95.1	95.3	96.7	95.9	96.6	94.1	96.1	96.8	96.9	98.3
	Mean	**97.5**	**96.5**	**95.4**	**96.1**	**95.9**	**96.0**	**97.2**	**95.1**	**96.6**	**97.2**	**96.6**	**97.5**

Table 7.1-10 Biotransformation of [phenyl-UL-[14]C]propoxycarbazone-sodium in entire system (all values expressed as % of applied radioactivity)

Days after Treatment		0	3	14	14	21	28	35	55	76	104	134	164
Days after Soil Flooding		**N/A**			**0**	**7**	**14**	**21**	**41**	**62**	**90**	**120**	**150**
Propoxycarbazone-sodium	1	96.5	85.8	42.1	46.4	34.1	32.0	27.1	22.7	21.3	20.4	15.7	14.0
	2	95.8	92.7	43.5	45.0	33.9	28.0	26.9	22.5	18.4	17.0	16.2	16.3
	Mean	**96.1**	**89.2**	**42.8**	**45.7**	**34.0**	**30.0**	**27.0**	**22.6**	**19.9**	**18.7**	**15.9**	**15.1**
4-Hydroxy Saccharin	1	0.0	0.0	10.5	15.3	13.6	7.5	10.2	10.3	11.3	8.9	9.4	14.5
	2	0.0	0.0	11.4	15.6	11.8	9.9	8.4	9.5	10.3	7.9	10.0	16.0
	Mean	**0.0**	**0.0**	**10.9**	**15.5**	**12.7**	**8.7**	**9.3**	**9.9**	**10.8**	**8.4**	**9.7**	**15.2**
Saccharin	1	0.0	5.4	3.6	0.0	7.0	6.1	14.5	15.8	30.3	33.6	37.0	26.1
	2	0.0	4.8	4.3	0.0	8.9	4.8	11.4	19.5	32.5	35.4	34.1	26.6
	Mean	**0.0**	**5.1**	**4.0**	**0.0**	**7.9**	**5.5**	**12.9**	**17.6**	**31.4**	**34.5**	**35.5**	**26.4**
4-Methoxy Saccharin	1	0.0	0.0	0.0	0.0	5.2	16.1	8.1	13.7	0.0	0.0	0.0	0.0
	2	0.0	0.0	0.0	0.0	5.8	18.0	13.5	10.7	0.0	0.0	0.0	0.0
	Mean	**0.0**	**0.0**	**0.0**	**0.0**	**5.5**	**17.1**	**10.8**	**12.2**	**0.0**	**0.0**	**0.0**	**0.0**
Total Unidentified Radioactivity	1	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	3.4
	2	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3
	Mean	**0.0**	**0.0**	**0.0**	**0.0**	**1.9**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.9**
Total Extractable Residues	1	96.5	92.2	56.9	61.7	61.6	61.6	59.9	62.5	62.9	62.8	62.1	58.0
	2	95.8	97.4	59.1	60.6	62.3	60.8	60.2	62.4	62.5	60.5	60.2	61.3
	Mean	**96.1**	**94.8**	**58.0**	**61.2**	**61.9**	**61.2**	**60.1**	**62.4**	**62.7**	**61.7**	**61.2**	**59.7**
$^{14}CO_2$ (total aerobic + anaerobic)	1	N/A	0.0	13.1	13.5	13.8	13.6	13.6	13.5	13.5	13.5	13.5	13.5
	2	N/A	0.0	13.6	13.8	13.8	13.5	13.5	13.5	13.5	13.5	13.5	13.5
	Mean	**N/A**	**0.0**	**13.3**	**13.7**	**13.8**	**13.5**	**13.5**	**13.5**	**13.5**	**13.5**	**13.5**	**13.5**
Volatile Organics (total aerobic + anaerobic)	1	N/A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2	N/A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Mean	**N/A**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Non-Extractable Residues	1	1.5	1.7	24.0	21.9	19.0	21.7	21.0	19.5	19.0	16.3	20.1	22.6
	2	1.1	1.9	21.0	21.6	18.6	21.4	20.9	19.5	19.6	14.9	20.5	20.5
	Mean	**1.3**	**1.8**	**22.5**	**21.7**	**18.8**	**21.5**	**21.0**	**19.5**	**19.3**	**15.6**	**20.3**	**21.5**
Material Balance	1	98.0	94.7	94.0	97.2	94.3	96.9	94.5	95.6	95.5	92.7	95.7	94.1
	2	96.9	100.1	93.7	96.0	94.7	95.7	94.6	95.3	95.6	88.9	94.4	95.3
	Mean	**97.4**	**97.4**	**93.9**	**96.6**	**94.5**	**96.3**	**94.6**	**95.4**	**95.6**	**90.8**	**95.0**	**94.7**

B. MASS BALANCE

Mean material balances ranged from 95.1 to 97.5% AR for label A and from 90.8 to 97.4% AR for label B. The complete material balance found at all sampling intervals demonstrated that no significant portion of radioactivity dissipated from the flasks or was lost during processing.

C. BOUND AND EXTRACTABLE RESIDUES

The total extractable residues (soil extracts and water layer) for label A / B, respectively, decreased with incubation time from 96.3 / 96.1% AR at DAT-0 to 58.0 / 67.2% AR at DAT-14 and then stayed at about this level until the end of the study.

In the aerobic incubation phase, non-extractable residues in soil increased from 1.2 / 1.3% of the AR to 20.5 / 22.5% of the AR (label A / label B). NER then stayed at about this level throughout the anaerobic (flooded) incubation period with a maximum of 25.5% of the AR (label A, DAT-134 and DAT-164). NER chemical characterisation of the non-extractable residues was performed by organic matter fractionation after disintegration under excessive alkaline conditions. About 1/3 of the RA each was attributed the humic acid fraction, the fulvic acid fraction and the humin substance fraction.

D VOLATILISATION

During the aerobic phase the maximum amount of $^{14}CO_2$ was 7.6% of the AR for label A and 13.3% of the AR for label B. Formation of volatile radioactivity during the anaerobic incubation phase was insignificant (up 0.3%AR carbon dioxide, 0.0% AR organic volatiles).

E. TRANSFORMATION OF PARENT COMPOUND

Within the aerobic phase of the study (14 days) the amount of the test item propoxycarbazone-sodium in the entire test systems decreased rapidly from 95.3 / 96.1% of the AR to 43.2 / 42.8% of the AR for label A / B, respectively. During the following anaerobic incubation period (i.e. flooded state) a further decrease was observed to about 15.3 / 15.1% AR until the end of the study (label A / B).

The amount of the main metabolite N-methyl propoxy triazolinone (label A metabolite) in the entire system increased steadily from DAT-0 to DAT-134 from 0.9% of the AR to 54.1% of the AR and dropped then to 44.5% of the AR until study termination.

The amount of the main metabolite 4-hydroxy saccharin (label B metabolite) in the entire system was 10.9% of the AR at DAT-14, increased to 15.5% of the AR immediately after soil flooding (= DASF-0) and stayed then in the range of 8.4 to 15.2% of the AR until study end.

The amount of the main metabolite saccharin (label B metabolite) in the entire system increased from DAT-3 to DAT-134 from 5.1% of the AR to 35.5% of the AR and dropped then to 26.4% of the AR until study termination.

The main metabolite 4-methoxy saccharin (label B metabolite) occurred first at DAT-21 (DASF-7) in the anaerobic part of the study with a percentage in the entire system of 5.5% of the AR, increased to 17.1% of the AR towards DAT-28 and decreased then to 12.2% of the AR at DAT-55 and further to 0.0% AR at DAT-76. However, during the period of occurrence, the system showed no strictly anaerobic conditions, thus 4-methoxy saccharin is not safe to say an anaerobic metabolite of propoxycarbazone-sodium. The total unidentified RA in the entire systems reached values not higher than 4.6% of the AR for both labels.

III. CONCLUSIONS

In the soil [redacted] 4a, the amounts of propoxycarbazone-sodium declined rapidly during the aerobic phase (14 days) and within the first two weeks of the anaerobic phase to about 30% of the AR. As soon as the transition of the system to reducing conditions was more or less completed the degradation of residual propoxycarbazone-sodium was slowed down.

Four main metabolites were formed during the study, N-methyl propoxy triazolinone, saccharin, 4-hydroxy saccharin and 4-methoxy saccharin. All metabolites were known from former soil metabolism studies (refer to CA 7.1.1.1), except 4-methoxy saccharin. 4-Methoxy saccharin occurred

first at DAT-21 (DASF-7) in the anaerobic part of the study with a percentage in the entire system of 5.5% of the AR, increased to 17.1% of the AR at DAT-28 and decreased then to 12.2% of the AR at DAT-55 and further to 0.0% AR at DAT-76. However, during the period of occurrence the system showed no strictly anaerobic conditions, thus 4-methoxy saccharin is not safe to say an anaerobic metabolite of propoxycarbazone-sodium.

Volatiles, i.e. CO_2, were formed in the aerobic phase up to 13.3% of the AR. The portion of non-extractable residues reached levels of up to about 25.5% of the AR. About 1/3 of the RA each was attributed to the humic acid fraction, the fulvic acid fraction and the humin substance fraction.

The part concerning the kinetic evaluation following current FOCUS guidance is summarised in CA 7.1.2.1.3/01 and also discussed in CA 7.1.2.1.4/01.

CA 7.1.1.3 Soil photolysis

The route of degradation of propoxycarbazone-sodium in soil under photolytic conditions in the laboratory was investigated in two soil photolytic studies and was evaluated during the Annex I inclusion using two radiolabel positions, [phenyl-U-^{14}C] and [triazolinone-3-^{14}C], and was accepted by the European Commission (SANCO/4067/2001-Final, 30 September 2003).

Annex point	Author(s)	Year	Edition No.
KCA 7.1.1.3/01	[redacted], B. and [redacted], H.-E.	1999, amended 2002	M-012271-02-1
KCA 7.1.1.3/02	[redacted], B. and [redacted], H.-E.	1999, amended 2002	M-012267-02-1

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph.

No additional studies are submitted within this Supplemental Dossier for propoxycarbazone-sodium renewal of approval. A detailed overview of the soil photolysis studies is shown in Table 7.1-3. A summary of the overall route of degradation of propoxycarbazone-sodium in soil is given in CA 7.1.1 and Figure 7.1-1.

CA 7.1.2 Rate of degradation in soil

The aerobic soil degradation of propoxycarbazone-sodium was investigated in four soil degradation studies under laboratory conditions including eight independent data sets. Propoxycarbazone-sodium was applied as test substance using [phenyl-U-^{14}C]- and [triazolinone-3-^{14}C]propoxycarbazone-sodium. Additional studies in which the soil metabolites were applied as test substance were conducted for M05, M07, M08, M09, M10 and M11, respectively. Revised rates of degradation for propoxycarbazone-sodium and its major metabolites in soil under laboratory conditions were calculated (CA 7.1.2.1.2/10) according to current FOCUS kinetics guidance (2006[2], 2011[3]) in order to derive kinetic parameters suitable for environmental risk assessment and modelling purposes.
The newly calculated $DegT_{50}$ values used for modelling purpose and trigger evaluation (best-fit) as well as formation fractions for major degradation products are summarised in the tables below.

Table 7.1-11 Persistence and modelling endpoints for propoxycarbazone-sodium and its soil metabolites

	Persistence endpoints				Modelling endpoints			
	$DegT_{50}$ (d)		$DegT_{90}$ (d)		Non-normalised $DegT_{50}$ (d)		Normalised $DegT_{50}$ (d) (20°C, pF2)	
	Range	Geomean (n)	Range	Geomean (n)	Range	Geomean (n)	Range	Geomean (n)
MKH6561[1)]	7.2 – 215.5	42.7 (8)	28.0 – 745.8	151.2 (8)	7.8 – 215.5	44.1 (8)	4.9 – 179.7	32.5 (8)
M05	2.8 – 17.4	5.5 (6)	9.3 – 57.8	19.6 (6)	2.8 – 17.4	5.6 (6)	1.8 – 14.5	4.3 (6)
M07	4.6 – 39.8	16.1 (3)	15.2 – 132.2	53.3 (3)	4.4 – 39.8	15.9 (3)	2.8 – 33.2	11.6 (3)
M08	8.5 – >1000	145.0[2)] (7)	152.9 - >1000	484.2[2)] (7)	32.3 – 496.7	112.3 (5)	29.5 – 312.9	84.2 (5)
M09	13.4 – 385.7	62.7 (4)	283.3 – >1000	551.2[2)] (4)	85.3 – 385.3	145.4 (4)	71.1 – 231.2	108.0 (4)
M10	5.9 – 275.4	80.0 (7)	405.1 – 915.0	542.8 (6)	58.8 – 140.2	108.5 (5)	43.2 – 109.3	81.2 (5)
M11	5.4 – 26.2	12.2 (4)	18.0 - 87.1	40.5 (4)	5.4 – 26.2	12.2 (4)	4.6 – 20.8	9.1 (4)

1) MKH6561 = propoxycarbazone-sodium
2) values >1000 d set as 1000 d for geomean calculation

Table 7.1-12 Overview of formation fractions of M05, M07, M08, M09, M10 and M11

	Formation fraction persistence endpoints		Formation fraction modelling endpoints	
	Arithmetic mean	Worst case	Arithmetic mean	Worst case
MKH6561[1)] → M05	0.87 (n = 3)	1.00	0.87 (n = 3)	1.00
M05 → M07	1.00 (n = 2)	1.00	1.00 (n = 2)	1.00
M07 → M08	0.52 (n = 3)	1.00	0.52 (n = 3)	1.00
M08 → M11	-[2)]	-[2)]	-[2)]	-[2)]
MKH6561[1)] → M09	0.22 (n = 2)	0.22	0.22 (n = 2)	0.22
MKH6561[1)] → M10	0.60 (n = 4)	0.73	0.69 (n = 3)	0.78
M09 → M10	0.74 (n = 4)	1.00	0.82 (n = 2)	0.84

1) MKH6561 = propoxycarbazone-sodium
2) Formation fractions could not be estimated.

A new anaerobic soil degradation study was performed which was requested by France to support propoxycarbazone-sodium autumn use and which was not submitted and evaluated during the Annex I inclusion. The calculated $DegT_{50}$ value of propoxycarbazone-sodium in the entire system for the anaerobic phase was 45 days for the triazolinone-label and 39 days for the phenyl-label. The corresponding $DegT_{90}$ values are 769 and > 1000 days, respectively. The anaerobic degradation rate was calculated directly within the study.

[2] FOCUS (2006): Guidance Document on Estimating Persistence and Degradation Kinetics from Environmental Fate Studies on Pesticides in EU Registration. Report of the Work Group on Degradation Kinetics of FOCUS. EC Document Reference SANCO/10058/2005 version 2.0, June 2006.
[3] FOCUS (2011): Generic Guidance for Estimating Persistence and Degradation Kinetics from Environmental Fate Studies on Pesticides in EU Registration, version 1.0.

The anaerobic degradation rates of the four major metabolites observed in the study (M07, M08, M10 and M11) were not calculated, because no reasonable evaluation was possible, despite a long anaerobic incubation phase. The metabolites M07, M08 and M10 were also observed as major metabolites in aerobic soil metabolism studies (KCA 7.1.1.1.1/01 - 04) and a kinetic evaluation of their aerobic degradation behaviour was conducted (CA 7.1.2.1.2/10) based on the studies performed with the parent compound propoxycarbazone-sodium (KCA 7.1.2.1.1/01 – 04) as well as based on studies performed with the metabolites themselves (KCA 7.1.2.1.2/01, 02, 04 and CA 7.1.2.1.2/08). For M11 the corresponding $DegT_{50}$ value can be estimated to be < 30 days. This estimated degradation rate is in the range of the calculated $DegT_{50}$ values of the aerobic degradation study of M11 (CA 7.1.2.1.2/09) with best-fit values between 5 and 26 days (CA 7.1.2.1.2/10).

The required field studies were performed with unlabelled propoxycarbazone-sodium on seven EU trial sites (5 in Northern and 2 in Southern Europe). The best-fit half-lives calculated in the study KCA 7.1.2.2.1/01 were in the range from 7 to 21 days. The range of DT_{90} values was calculated to be between 22 and 101 days. A new kinetic evaluation of the field data was conducted according to the current EFSA guidance for evaluation field dissipation studies (2010)[4] for modelling purpose. The resulting normalised $DegT_{50}$ *matrix* values for propoxycarbazone-sodium ranged from 3.4 to 103 days. In addition the results of the seven trials clearly demonstrate that the translocation of traces of propoxycarbazone-sodium and M07 into deeper soil layers than 20-30 cm can be excluded down to a concentration of 1 µg/kg corresponding to less than 2% of the initial concentration of the applied propoxycarbazone-sodium. The translocation of traces of M05, M06 and M10 into deeper soil layers than 10-20 cm, as well as the translocation of traces of M09 and M08 into deeper soil layers than 0-10 cm can be excluded down to a concentration of 1 µg/kg corresponding to less than 2% of the initial concentration of the propoxycarbazone-sodium. M04 could not be detected in any soil layer.

In summary propoxycarbazone-sodium was moderately fast to slowly degraded in soil under aerobic and anaerobic conditions in the laboratory as well as under field conditions. The kinetic models and revised $DegT_{50}$ values of propoxycarbazone-sodium and its major degradation products in soil are summarised in Table 7.1-13 to Table 7.1-21. The calculated values were used for modelling purpose and trigger evaluation (best-fit).

[4] EFSA (2010): Guidance for evaluating laboratory and field dissipation studies to obtain $DegT_{50}$ values of plant protection products in soil. EFSA Journal 8(12):1936, 1-67.

Table 7.1-13 Overview of the laboratory aerobic rate of degradation studies for the active substance propoxycarbazone-sodium

Reference		Guideline(s)	Appli-cation rate (µg/g)	Temp (°C)	Duration of test (days)	Moisture (%WHC)	Soil characteristics				Persistence endpoints[1]			Modelling endpoints[1]		
							Soil origin	Soil type	pH	OC (%)	Kinetic model	$DegT_{50}$ (days)	$DegT_{90}$ (days)	Kinetic model	Non normalised $DegT_{50}$ (d)	Normalised $DegT_{50}$ (d) (20°C, pF2)
KCA 7.1.2.1.1/01	[redacted] et al. 1999	EPA Ref: Subdivision N, 162-1	0.031[2]	20	361	104.9[3]	[redacted]	loamy sand	6.4[4]	0.81	FOMC	70.2	277.2	SFO	75.5	57.3
KCA 7.1.2.1.1/02	[redacted] et al. 1999	EPA Ref: Subdivision N, 162-1	0.035[5]	20	365	75[3]	[redacted]	loamy sand	6.4[4]	0.86	SFO	101.1	335.8	SFO	101.1	60.7
KCA 7.1.2.1.1/03	[redacted] et al., 1999	SETAC-Europe (1995) Offical Journal of the European Communities No L172, 95/36/EC EPA Ref: Subdivision N, 162-1 OECD Guidelines for the Testing of Chemical, Proposal (1997)	0.093[2]	20	184	40-45	[redacted]	silt	7.2	2.62	DFOP	7.2	28.0	SFO	7.8	4.9
			0.093[2]	20	183	40-45	[redacted]	loamy sand	6.4	1.80	SFO	45.7	151.8	SFO	45.7	38.1
			0.093[2]	20	183	40-45	BBA 2.2	loamy sand	6.1	2.48	SFO	215.5	715.8	SFO	215.5	179.7
KCA 7.1.2.1.1/04	[redacted] et al., 1999		0.095[5]	20	182	45-48	[redacted]	silt	7.1	2.62	DFOP	18.1	67.4	SFO	19.6	12.3
			0.095[5]	20	182	45-48	[redacted]	loamy sand	6.4	1.80	DFOP	15.0	52.6	SFO	15.3	12.7
			0.095[5]	20	182	45-48	BBA 2.2	loamy sand	6.3	2.48	SFO	81.9	272.0	SFO	81.9	68.3

1) Calculated according to current FOCUS kinetics guidance (refer to CA 7.1.2.1.1/05)
2) [phenyl –UL-^{14}C] label
3) at 1/3 bar
4) pH in H_2O
5) [triazolinone-3-^{14}C] label

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

Table 7.1-14 Overview of the laboratory aerobic rate of degradation studies for the metabolite M05

Reference		Guideline(s)	Applied (µg/g)	Temp (°C)	Duration of test (days)	Moisture (%WHC)	Soil characteristics				Persistence endpoints[1]			Modelling endpoints[1]		
							Soil origin	Soil type	pH	OC (%)	Kinetic model	$DegT_{50}$ (days)	$DegT_{90}$ (days)	Kinetic model	Non normalised $DegT_{50}$ (d)	Normalised $DegT_{50}$ (d) (20°C, pF2)
KCA 7.1.2.1.1/01	[redacted] et al. 1999	EPA Ref: Subdivision N, 162-1	parent 0.031	20	361	104.9[2]	[redacted]	loamy sand	6.4[3]	0.81	SFO[4]	2.8	9.3	SFO[7]	3.1	2.3
KCA 7.1.2.1.1/03	[redacted] et al., 1999	SETAC-Europe (1995) Offical Journal of the European Communities No L172, 95/36/EC EPA Ref: Subdivision N, 162-1 OECD Guidelines for the Testing of Chemical, Proposal (1997)	parent 0.093	20	184	40-45	[redacted]	silt	7.2	2.62	SFO[6]	3.0	10.1	SFO[6]	2.8	1.8
				20	183	40-45	[redacted]	loamy sand	6.4	1.80	SFO[6]	17.4	57.8	SFO[6]	17.4	14.5
				20	184	40-45	BBA 2.2	loamy sand	6.3	2.48	-[8]	-[8]	-[8]	-[8]	-[8]	-[8]
CA 7.1.2.1.2/07	[redacted], 2012	OECD 307 (2002) Commission Directive 2004/73/EC, Method C.23, 2004	M05 0.25	20	91	50.02	LUFA 2.2	loamy sand	5.5	1.87	FOMC	5.9	30.1	SFO	6.4	5.8
				20	91	52.06	LUFA 2.3	sandy loam	6.8	0.94	SFO	8.4	27.9	SFO	8.4	6.8
				20	37	53.10	LUFA 6S	clay	7.1	1.64	SFO	3.8	12.6	SFO	3.8	2.6

1) Calculated according to current FOCUS kinetics guidance (refer to CA 7.1.2.1.2/10)
2) at 1/3 bar
3) pH in H_2O
4) Pathway fit (parent: FOMC; M05, M08: SFO)
5) Pathway fit (parent: SFO; M05: SFO; without M08)
6) Pathway fit (parent: DFOP; M05, M07, M08: SFO; without M11)
7) Pathway fit (parent: SFO; M05, M07, M08: SFO, without M11)
8) Pathway fit not acceptable, decline fit not possible

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

Table 7.1-15 Overview of the laboratory aerobic rate of degradation studies for the metabolite M07

Reference		Guideline(s)	Applied (µg/g)	Temp (°C)	Duration of test (days)		Soil characteristics				Persistence endpoints[1]			Modelling endpoints[1]		
						Moisture (%WHC)	Soil origin	Soil type	pH	OC (%)	Kinetic model	$DegT_{50}$ (days)	$DegT_{90}$ (days)	Kinetic model	Non normalised $DegT_{50}$ (d)	Normalised $DegT_{50}$ (d) (20°C, pF2)
KCA 7.1.2.1.1/01	[redacted] et al. 1999	EPA Ref: Subdivision N, 162-1	parent 0.031	20	361	104.9[2]	[redacted]	loamy sand	6.4[3]	0.81	- [4]	- [7]	- [4]	- [4]	- [4]	- [4]
KCA 7.1.2.1.1/03	[redacted] et al., 1999	SETAC-Europe (1995) Offical Journal of the European Communities No L172, 95/36/EC EPA Ref: Subdivision N, 162-1 OECD, Proposal (1997)	parent 0.093	20	184	40-45	[redacted]	silt	7.2	2.62	SFO[5]	4.6	15.2	SFO[6]	4.4	2.8
				20	183	40-45	[redacted]	loamy sand	6.4	1.80	SFO[5]	39.8	132.2	SFO[6]	39.8	33.2
				20	184	40-45	BBA 2.2	loamy sand	6.3	2.48	- [7]	- [7]	- [7]	- [7]	- [7]	- [7]
KCA 7.1.2.1.2/01	[redacted] & [redacted], 1999	SETAC-Europe (1995) Offical Journal of the European Communities No L172, 95/36/EC EPA Ref: Subdivision N, 162-1 OECD, Proposal (1997)	M07 0.043	20	121	100[2]	[redacted]	loamy sand	6.4[3]	0.47[8]	SFO	22.7	75.4	SFO	22.7	16.7
KCA 7.1.2.1.2/02	[redacted] & [redacted], 1999		M08 0.046-0.049	20	123	40-50	[redacted]	silt	7.8[3]	2.62	- [9]	- [9]	- [9]	- [9]	- [9]	- [9]
				20	123	40-50	[redacted]	loamy sand	7.0[3]	1.80	- [9]	- [9]	- [9]	- [9]	- [9]	- [9]
				20	123	100[2]	[redacted]	loamy sand	6.4[3]	0.47	- [9]	- [9]	- [9]	- [9]	- [9]	- [9]

1) Calculated according to current FOCUS kinetics guidance (refer to CA 7.1.3.1.2/10)
2) at 1/3 bar
3) pH in H2O
4) Not detected in relevant amounts (all values below LOD)
5) Pathway fit (parent: DFOP; M05, M07, M08: SFO; without M11)
6) Pathway fit (parent: SFO; M05, M07, M08: SFO, without M11)
7) Pathway fit not acceptable; decline fit not possible
8) OC was not given in the original study report and was therefore calculated as OC (%) = OM (%) / 1.724.
9) M07 was detected in the original study, but since the formation of M07 from M08 seems chemically unusual and due to the likelihood of analytical confusion with M11, the values were not considered for the kinetic evaluation.

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

Table 7.1-16 Overview of the laboratory aerobic rate of degradation studies for the metabolite M08

Reference		Guideline(s)	Applied (µg/g)	Temp (°C)	Duration of test (days)	Moisture (%WHC)	Soil characteristics				Persistence endpoints[1]			Modelling endpoints[1]		
							Soil origin	Soil type	pH	OC (%)	Kinetic model	$DegT_{50}$ (days)	$DegT_{90}$ (days)	Kinetic model	Non normalised $DegT_{50}$ (d)	Normalised $DegT_{50}$ (d) (20°C, pF2)
KCA 7.1.2.1.1/01	[redacted] et al. 1999	EPA Ref: Subdivision N, 162-1	parent 0.031	20	361	104.9[2]	[redacted]	loamy sand	6.4[3]	0.81	SFO[4]	>1000	>1000	- [5]	- [5]	- [5]
KCA 7.1.2.1.1/03	[redacted] et al., 1999	SETAC-Europe (1995) Offical Journal of the European Communities No L172, 95/36/EC EPA Ref: Subdiv. N, 162-1 OECD, Proposal	parent 0.093	20	184	40-45	[redacted]	silt	7.2	2.62	SFO[6]	432.1	>1000	SFO[7]	496.7	312.9
				20	183	40-45	[redacted]	loamy sand	6.4	1.80	SFO[7]	75.0	249.1	SFO[7]	75.0	62.5
				20	184	40-45	BBA 2.2	loamy sand	6.3	2.48	- [8]	- [8]	- [8]	- [8]	- [8]	- [8]
CA 7.1.2.1.2/0	[redacted] & [redacted], 1999	EC Comission Directive 95/36/EC, 1995 EPA Ref: Subdivision N, 162-1 SETAC, 1995	M07 0.043	20	121	100[2]	[redacted]	loamy sand	6.4[3]	0.47[9]	- [10]	- [10]	- [10]	- [10]	- [10]	- [10]
KCA 7.1.2.1.2/02	[redacted] & [redacted], 1999		M08 0.046-0.049	20	123	40-50	[redacted]	silt	7.8[3]	2.62	SFO	167.2	555.4	SFO	167.2	105.3
				20	123	40-50	[redacted]	loamy sand	7.0[3]	1.80	FOMC	328.6	>1000	- [10]	- [10]	- [10]
				20	123	100[2]	[redacted]	loamy sand	6.4[3]	0.47	- [10]	- [10]	- [10]	- [10]	- [10]	- [10]
CA 7.1.2.1.2/08	[redacted], 2013	OECD 307 (2002) Commission Directive 2004/73/EC, Method C.23, 2004	M08 0.25	20	120	51.25	LUFA 2.2	loamy sand	5.5	1.77	FOMC	8.5	152.9	DFOP	32.3[11]	29.5[11]
				20	120	49.78	LUFA 2.3	sandy loam	6.8	0.94	SFO	88.8	294.8	SFO	88.8	69.7
				20	120	48.97	LUFA 6S	clay	7.1	1.64	- [10]	- [10]	- [10]	- [10]	- [10]	- [10]

1) Calculated according to current FOCUS kinetics guidance (refer to CA 7.1.2.1.2/10)
2) at 1/3 bar
3) pH in H_2O
4) Pathway fit (parent: FOMC; M05, M08: SFO)
5) k-rate not significant, decline fit not possible
6) Pathway fit (parent: DFOP; M05, M07, M08: SFO; without M11)
7) Pathway fit (parent: SFO; M05, M07, M08: SFO, without M11)
8) Pathway fit not acceptable; decline fit not possible
9) OC was not given in the original study report and was therefore calculated as OC (%) = OM (%) / 1.724.
10) No aceeptable fit
11) calculated from slower k-rate

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

Table 7.1-17 Overview of the laboratory aerobic rate of degradation studies for the metabolite M09

Reference		Guideline(s)	Applied (µg/g)	Temp (°C)	Duration of test (days)	Moisture (%WHC)	Soil characteristics				Persistence endpoints[1]			Modelling endpoints[1]		
							Soil origin	Soil type	pH	OC (%)	Kinetic model	$DegT_{50}$ (days)	$DegT_{90}$ (days)	Kinetic model	Non-normalised $DegT_{50}$ (d)	Normalised $DegT_{50}$ (d) (20°C, pF2)
KCA 7.1.2.1.1/02	[redacted] et al. 1999	EPA Ref: Subdivision N, 162-1	parent 0.035	20	365	75[2]	[redacted]	loamy sand	6.4[3]	0.86	SFO[4]	385.7	>1000	SFO[5]	385.3	231.2
KCA 7.1.2.1.1/04	[redacted] et al., 1999	SETAC-Europe (1995) Offical Journal of the European Communities No L172, 95/36/EC EPA Ref: Subdivision N, 162-1 OECD, Prop. (1997)	parent 0.095	20	182	45-48	[redacted]	silt	7.2	2.62	- [6]	- [6]	- [6]	- [6]	- [6]	- [6]
				20	182	45-48	[redacted]	loamy sand	6.4	1.80	- [6]	- [6]	- [6]	- [6]	- [6]	- [6]
				20	182	45-48	BBA 2.2	loamy sand	6.3	2.48	SFO[5]	85.3	283.3	SFO[5]	85.3	71.1
KCA 7.1.2.1.2/03	[redacted] & [redacted], 1999	SETAC-Europe (1995) Offical Journal of the European Communities No L172, 95/36/EC EPA Ref: Subdivision N, 162-1 OECD Proposal (1997)	M09 0.042 to 0.045	20	120	40-50	[redacted]	silt	7.8[3]	2.62	DFOP	35.1	325.8	DFOP	125.2[7]	84.9[7]
				20	120	40-50	[redacted]	loamy sand	7.0[3]	1.8	FOMC	13.4	>1000	DFOP	108.5[7]	97.4[7]
				20	120	100[2]	[redacted], Set 1	loamy sand	6.4[3]	0.47	- [8]	- [8]	- [8]	- [8]	- [8]	- [8]
				20	120	100[2]	[redacted], Set 2	loamy sand	6.4[3]	0.47	- [8]	- [8]	- [8]	- [8]	- [8]	- [8]

1) Calculated according to current FOCUS kinetics guidance (refer to CA 7.1.2.1.2/10)
2) at 1/3 bar
3) pH in H_2O
4) Pathway fit (parent:SFO; M09 and M10: SFO)
5) Pathway fit without M10 (parent and M09: SFO)
6) M09 not detected in relevant amounts above LOD
7) Calculated from slower k-rate of DFOP model
8) No acceptable fit

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

Table 7.1-18 Overview of the laboratory aerobic rate of degradation studies for the metabolite M10

Reference		Guideline(s)	Applied (µg/g)	Temp (°C)	Duration of test (days)	Moisture (%WHC)	Soil characteristics				Persistence endpoints[1]			Modelling endpoints[1]		
							Soil origin	Soil type	pH	OC (%)	Kinetic model	$DegT_{50}$ (days)	$DegT_{90}$ (days)	Kinetic model	Non-normalised $DegT_{50}$ (d)	Normalised $DegT_{50}$ (d) (20°C, pF2)
KCA 7.1.2.1.1/02	[redacted] et al., 1999	EPA Ref: Subdivision N, 162-1	parent 0.035	20	365	75[2]	[redacted]	loamy sand	6.4[3]	0.86	SFO[4]	275.4	915.0	- [5]	- [5]	- [5]
KCA 7.1.2.1.1/04	[redacted] et al., 1999	SETAC-Europe (1995) Offical Journal of the European Communities No L172, 95/36/EC EPA Ref: Subdivision N, 162-1 OECD, Prop. (1997)	parent 0.095	20	182	45-48	[redacted]	silt	7.2	2.62	SFO[6]	122.0	405.1	SFO[6]	122.0	76.8
				20	182	45-48	[redacted]	loamy sand	6.4	1.80	SFO[6]	131.1	435.5	SFO[6]	131.1	109.3
				20	182	45-48	BBA 2.2	loamy sand	6.3	2.48	- [7]	- [7]	- [7]	- [7]	- [7]	- [7]
KCA 7.1.2.1.2/03	[redacted] & [redacted], 1999	SETAC-Europe (1995) Offical Journal of the European Communities No L172, 95/36/EC EPA Ref: Subdivision N, 162-1 OECD Proposal (1997)	M09 0.042 to 0.045	20	120	40-50	[redacted]	silt	7.8[3]	2.62	SFO	140.2	465.8	SFO	140.2	95.1
				20	120	40-50	[redacted]	loamy sand	7.0[3]	1.8	SFO	134.7	447.6	SFO	114.2	102.5
				20	120	100[2]	[redacted], Set 1	loamy sand	6.4[3]	0.47	- [8]	- [8]	- [8]	- [8]	- [8]	- [8]
				20	120	100[2]	[redacted], Set 2	loamy sand	6.4[3]	0.47	DFOP[9]	5.9	n.a.[10]	- [11]	- [11]	- [11]
KCA 7.1.2.1.2/03	[redacted] & [redacted], 1999		M10 0.037	20	121	100[2]	Quincy [redacted]	loamy sand	6.4[3]	0.47[12]	FOMC	42.9	760.0	SFO	58.8	43.2

1) Calculated according to current FOCUS kinetics guidance (refer to CA 7.1.2.1.2/10)
2) at 1/3 bar
3) pH in H_2O
4) Pathway fit (parent:SFO; M09 and M10: SFO)
5) No significant k-rate, decline fit for M10 not possible
6) Decline fit (but formation fraction could be obtained from pathway fit)
7) No acceptable fit for M10 (but formation fraction could be obtained from pathway fit)
8) No acceptable fit, decline fit not possible (only 2 data points after maximum)
9) Decline fit
10) DT_{90} estimated by FOCUS DegKin Tool: >1000 d
11) No acceptable fit
12) OC was not given in the original study report and was therefore calculated as OC (%) = OM (%) / 1.724.

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

Table 7.1-19 Overview of the laboratory aerobic rate of degradation studies for the metabolite M11

Reference		Guideline(s)	Applied (µg/g)	Temp (°C)	Moisture (%WHC)	Duration of test (days)	Soil characteristics				Persistence endpoints[1]			Modelling endpoints[1]		
							Soil origin	Soil type	pH	OC (%)	Kinetic model	$DegT_{50}$ (days)	$DegT_{90}$ (days)	Kinetic model	Non-normalised $DegT_{50}$ (d)	Normalised $DegT_{50}$ (d) (20°C, pF2)
KCA 7.1.2.1.1/01	[redacted] et al. 1999	EPA Ref: Subdivision N, 162-1	parent 0.031	20	104.9[2]	361	[redacted]	loamy sand	6.4[3]	0.81	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]
KCA 7.1.2.1.1/03	[redacted] et al., 1999	SETAC-Europe (1995) Offical Journal of the European Communities No L172, 95/36/EC EPA Ref: Subdiv. N, 162-1 OECD, Proposal (1997)	parent 0.093	20	40-45	184	[redacted]	silt	7.2	2.62	FOMC[5]	7.2	24.1	FOMC[5]	7.3[6]	4.6[6]
				20	40-45	183	[redacted]	loamy sand	6.4	1.80	- [7]	- [7]	- [7]	- [7]	- [7]	- [7]
				20	40-45	184	BBA 2.2	loamy sand	6.3	2.48	- [7]	- [7]	- [7]	- [7]	- [7]	- [7]
CA 7.1.2.1.2/09	[redacted], 2013	OECD 307 (2002) Commission Directive 2004/73/EC, Method C.23, 2004	M11 0.25	20	52.43	120	LUFA 2.2	loamy sand	5.5	1.77	SFO	5.4	18.0	SFO	5.4	5.0
				20	50.47	120	LUFA 2.3	sandy loam	6.8	0.94	SFO	26.2	87.1	SFO	26.2	20.8
				20	49.94	120	LUFA 6S	clay	7.1	1.64	SFO	21.5	71.3	SFO	21.5	14.1

1) Calculated according to current FOCUS kinetics guidance (refer to CA 7.1.2.1.2/10)
2) at 1/3 bar
3) pH in H_2O
4) M07 / M11 not detected in relevant amounts
5) Decline fit using residues of "M07" from original study report
6) DT_{50} calculated from DT_{90} of FOMC model: $DT_{50} = DT_{90} / 3.32$
7) Pathway fit not acceptable for M11, decline fit not possible

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

Table 7.1-20 Overview of the laboratory anaerobic rate of degradation study for the active substance propoxycarbazone-sodium

Reference		Guideline(s)	Application rate (µg/g)	Temp (°C)	Duration of test (days)	Soil characteristics				Persistence endpoints[1]		
						Soil origin	Soil type	pH	OC (%)	Kinetic model	$DegT_{50}$ (days)	$DegT_{90}$ (days)
CA 7.1.2.1.3/01	[redacted], O. 2010	OECD 307, 2002 Commission Directive 95/36/EC amending Council Directive 91/414/EEC, 1995 US EPA Pesticide Assessment Guidelines, Subdivision N, Environmental Fate, Section § 162-2	0.19	20	150 (anaerobic)	[redacted]	loam	6.7	2.5	FOMC	45[2] / 139[3]	769[2] / > 1000[3]

1) Calculated according to current FOCUS kinetics guidance within this study (refer to CA 7.1.2.1.3/01)
2) [triazolinone-3-^{14}C] label
3) [phenyl –UL-^{14}C] label

Table 7.1-21 Overview of the field dissipation studies for the active substance propoxycarbazone-sodium

References		Guideline(s)	Appli-cation rate (g/ha)	Duration (days)	Site, country	Characteristics upper soil layer						Persistence endpoints[1]			Modeling endpoints[2]	
						Soil type	Sand (%)	Silt (%)	Clay (%)	OC (%)	pH	ρ_{bulk}[3] (g/cm³)	Kinetic model[2]	DT_{50} (days)	DT_{90} (days)	Kinetic model	$DegT_{50}$ *matrix*
KCA 7.1.2.2.1/01	[redacted], O. 1999 amended 2001	Commission Directive 95/36/EC of 14 July 1995 BBA Guideline IV-4.1 (1986)	100	281	[redacted] (UK)	sandy clay loam	52.8	17.2	30.0	1.40	7.39	1.38	1st	20.3	67.4	SFO [4]	9.6
			100	280	[redacted] (Southern France)	silt loam	28.7	54.5	16.8	0.60	7.51	1.52	1st	21.2	70.5	NS [5]	10.8
			100	285	[redacted] (Northern France)	silt loam	27.6	60.6	11.8	1.07	5.48	1.43	Sqrt 1st	2.7	30.0	- [6]	- [6]
			100	270	[redacted] (Germany)	sandy loam	68.1	21.0	10.9	0.96	6.47	1.45	1st	6.6	21.9	SFO [4]	3.4
			100	271	[redacted] (Germany)	silt loam	8.2	73.3	18.5	0.89	6.47	1.46	1st	12.0	39.8	SFO [4]	4.8
			100	359	[redacted] (Southern France)	silt loam	13.8	74.2	12.0	0.80	7.40	1.48	Sqrt 1st	9.1	100.8	- [6]	- [6]
			100	284	[redacted] (UK)	sandy loam	71.6	15.2	13.2	0.69	6.77	1.50	Sqrt 1st	4.9	54.2	- [6]	- [6]

1) After Timme and Frehse using best fit option (refer to KCA 7.1.2.2.1/01)
2) Calculated according to current FOCUS kinetics and EFSA guidance (refer to CA 7.1.2.2.1/02)
3) Calculated with a continuous pedotransfer function (Bolten et al., 1995)
4) Data points before cumulative rainfall reached 10 mm were excluded
5) Breakpoint was fixed to the time when rain > 10 mm and slow phase (klow) was used for DegT50 determination
6) No acceptable fit

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

CA 7.1.2.1 Laboratory studies

The aerobic degradation rates of propoxycarbazone-sodium and its major degradation products in soil were performed using both radiolabel positions, [phenyl-U-^{14}C] and [triazolinone-3-^{14}C], as well as unlabelled compounds. The studies have been performed in different soils in the dark in the laboratory at a temperature of 20 °C at different soil moistures.
A new kinetic evaluation of the degradation behaviour of propoxycarbazone-sodium and its metabolites in soil has been performed according to current FOCUS kinetics guidance to derive kinetic parameters suitable for modelling purpose and environmental risk assessment. The evaluation was based on residue data from 11 independent aerobic soil degradation studies, including 26 independent data sets. Propoxycarbazone-sodium was applied as test substance, on eight of these data sets. Additional studies in which the metabolites were applied as test substance were conducted for M05, M07, M08, M09 and M10 and M11, respectively.
The kinetic models and DegT$_{50}$ values used for modelling purpose and trigger evaluation (best-fit) as well as formation fractions for major degradation products are summarised in CA 7.1.2.

In addition a new anaerobic soil degradation study was performed (CA 7.1.1.2/01) submitted in this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval using two different radiolabel positions, [phenyl-U-^{14}C] and [triazolinone-3-^{14}C]. In order to derive DegT$_{50}$ and DegT$_{90}$ values as trigger endpoints, the degradation behaviour of propoxycarbazone-sodium in the entire systems during the anaerobic phase of the study was evaluated according to the current FOCUS guidance document on degradation kinetics. The evaluation was performed within the study. The results of the kinetic evaluation are summarised in Table 7.1-20.

CA 7.1.2.1.1 Aerobic degradation of the active substance

The degradation rate of propoxycarbazone-sodium in soil under aerobic conditions in the dark in the laboratory was investigated in four soil degradation studies and was evaluated during the Annex I inclusion using two radiolabel positions, [phenyl-U-^{14}C] and [triazolinone-3-^{14}C], and was accepted by the European Commission (SANCO/4067/2001-Final, 30 September 2003).

Annex point	Author(s)	Year	Edition No.
KCA 7.1.2.1.1/01 also filed under KCA 7.1.1.1/01	[redacted] et al.	1999	M-012902-01-1
KCA 7.1.2.1.1/02 also filed under KCA 7.1.1.1/02	[redacted] et al.	1999	M-012867-01-1
KCA 7.1.2.1.1/03 also filed under KCA 7.1.1.1/03	[redacted] et al.	1999	M-012912-01-1
KCA 7.1.2.1.1/04 also filed under KCA 7.1.1.1/04	[redacted] et al.	1999	M-012933-02-1

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph.

No additional studies are submitted within this Supplemental Dossier for propoxycarbazone-sodium renewal of approval. However, updated kinetic evaluations of the degradation behaviour of propoxy-carbazone-sodium in soil under aerobic conditions in the dark in the laboratory have been performed according to current FOCUS kinetics guidance to derive kinetic parameters suitable for modelling purpose and environmental risk assessment and is summarised in CA 7.1.2.1.1/05. A summary of the degradation

rates of propoxycarbazone-sodium and its major degradation products in soil in the laboratory is given in CA 7.1.2.

Report:	[redacted] • ;[redacted];[redacted];2014;M-487131-01
Title:	Kinetic modelling analysis of the degradation behaviour of propoxycarbazone-sodium and its major soil metabolites from aerobic laboratory soil degradation studies
Report No:	358525-1
Document No:	M-487131-01-1
Guidelines:	**not applicable**
Deviations:	not applicable
GLP/GEP:	**no**

Executive Summary

The aim of this evaluation was to conduct a kinetic modelling analysis for propoxycarbazone-sodium and its major soil metabolites from laboratory soil degradation studies in order to derive

- persistence endpoints that can be used for simple PEC_{soil} calculations and as a trigger for higher-tier environmental fate studies and
- modelling endpoints for use in environmental fate models for calculation of predicted environmental concentrations (PEC).

Only the results for propoxycarbazone-sodium are described here.

Propoxycarbazone-sodium was applied as test substance in four studies (eight of the evaluated soils) using

- [phenyl-U-^{14}C]propoxycarbazone-sodium:
  [redacted] et al., 1999; KCA 7.1.2.1.1/01 and KCA 7.1.1.1/01
  [redacted] et al., 1999; KCA 7.1.2.1.1/03 and KCA 7.1.1.1/03
- [triazolinone-3-^{14}C]propoxycarbazone-sodium
  [redacted] et al., 1999; KCA 7.1.2.1.1/02 and KCA 7.1.1.1/02
  [redacted] et al., 1999; KCA 7.1.2.1.1/04 and KCA 7.1.1.1/04

Persistence endpoints could be obtained out of all 8 independent data sets for propoxycarbazone-sodium with $DegT_{50}$ and $DegT_{90}$ values ranged from 7.2 to 215.5 days and from 28.0 to 715.8 days, respectively. The normalised modelling endpoints could be obtained for 8 out of 8 independent data sets for propoxy-carbazone-sodium and were given with $DegT_{50}$ values from 4.9 to 179.7 days.

I. MATERIALS AND METHODS

The evaluation followed the recommendations of the FOCUS working group on degradation kinetics FOCUS, 2006 & 2011). All datasets were initially evaluated by comparing single first-order (SFO) and first-order multi-compartment (FOMC) kinetic models. Bi-phasic kinetics such as double first-order in parallel (DFOP) and/or hockey-stick (HS) models were also considered, where appropriate. Degradation rates of the compounds to be used as persistence endpoints were evaluated using best-fit kinetics. A set of different rules of acceptance were followed for determining modelling endpoints since the models usually rely on SFO kinetics to describe degradation rates in soil. The modelling endpoints were corrected to the reference soil moisture content at field capacity (pF2). A correction to the reference temperature (20°C) was not necessary because all studies were conducted at 20°C.

The procedures recommended by FOCUS (2006, 2011) were followed with an assessment of the goodness-of-fit based on visual and statistical evaluations. Residue data were adjusted for the kinetic modelling as follows:

- The parent value at time 0 was set to the value of the total mass balance at this time point.

- Values between LOQ and LOD were set to the measured value. Values below LOD were replaced by half the LOD. If the concentrations of the applied substance in soil decline to values below LOD, the curve was cut off after the first value below LOD, unless detections above LOQ were made later in the experiment.
- Sampling points for which the overall recovery was < 90% or > 110% AR for labelled studies and < 70% or > 110% AR for unlabelled studies were excluded following recommendations of OECD 307 (2002)[5].

The kinetic analysis of the parent compound was conducted using the software package KinGUI (version 2.2012.320.1629) for parameter fitting ([redacted] et al., 2007[6]; Schmitt et al., 2011[7]). Optimisations were carried out for the initial soil residue (M_0), degradation rate constants (k), (g) or breakpoint (t_b), depending on the kinetic model. The parameters are optimised by minimising the sum of squared differences between measured and calculated data using Iteratively Reweighted Least Square (IRLS) routines. The error tolerance and the number of iterations were set to the default values of 1×10^{-3} and 10, respectively. The initial estimates for the parameters were calculated as proposed in [redacted] & [redacted] (2006)[8]. Data were not weighted and the initial concentration was not constrained in any of the fits.

II. RESULTS AND DISCUSSION

Summaries of the obtained parent persistence and modelling endpoints for propoxycarbazone-sodium are provided in Table 7.1-22.

Table 7.1-22 Persistence and modelling endpoints of propoxycarbazone-sodium

Study	Soil	Temp. (°C)	Persistence endpoints			Modelling endpoints		
			Model	DegT$_{50}$ (d)	DegT$_{90}$ (d)	Model	Non-normalised DegT$_{50}$ (d)	Normalised DegT$_{50}$ (d) (20°C, pF2)
Propoxycarbazone-sodium (MKH6561)								
[redacted] et al. (1999) KCA 7.1.2.1.1/01	[redacted]	20	FOMC	70.2	277.2	SFO	75.5	57.3
[redacted] et al. (1999) KCA 7.1.2.1.1/02	[redacted]	20	SFO	101.1	335.8	SFO	101.1	60.7
[redacted] et al. (1999) KCA 7.1.2.1.1/03	[redacted]	20	DFOP	7.2	28.0	SFO	7.8	4.9
	[redacted]	20	SFO	45.7	151.8	SFO	45.7	38.1
	BBA 2.2	20	SFO	215.5	715.8	SFO	215.5	179.7
[redacted] et al. (1999) KCA 7.1.2.1.1/04	[redacted]	20	DFOP	18.1	67.4	SFO	19.6	12.3
	[redacted]	20	DFOP	15.0	52.6	SFO	15.3	12.7
	BBA 2.2	20	SFO	81.9	272.0	SFO	81.9	68.3
			n	**8**	**8**		**8**	**8**
			Minimum	**7.2**	**28.0**		**7.8**	**4.9**
			Maximum	**215.5**	**715.8**		**215.5**	**179.7**
			Geometric mean	**42.7**	**151.2**		**44.1**	**32.5**

[5] OECD (2002): Guideline for the Testing of Chemicals. Aerobic and anaerobic transformation in soil. OECD 307.
[6] Schäfer, D., Mikolasch, M., Rainbird, P., Harvey, B. (2007): KinGUI: A new kinetic software tool for evaluations according to FOCUS Degradation Kinetics. In: Del Re, A.A.M. et al. (Eds.): Proceedings of the XIII Symposium on Pesticide Chemistry, Piacenza, 2007, p. 916-923.
[7] Schmitt, W., Gao, Z., Meyer, H. (2011): KinGUI2, version 2.2012.320.1629. Bayer CropScience AG.
[8] Schäfer, D. & Mikolasch, B. (2006): Kinetic Evaluation with MATLAB: Introduction to the Use of KINGUI Version 1.1. Bayer CropScience AG.

III. CONCLUSIONS

The best-fit $DegT_{50}$ and $DegT_{90}$ values ranged from 7.2 to 215.5 days and from 28.0 to 715.8 days, respectively. The normalised modelling endpoints were given with $DegT_{50}$ values from 4.9 to 179.7 days.

CA 7.1.2.1.2 Aerobic degradation of metabolites, breakdown and reaction products

The degradation rates of the major degradation products M07, M08, M09 and M10 in soil under aerobic conditions in the dark in the laboratory were evaluated during the Annex I inclusion using two radiolabel positions, [phenyl-U-^{14}C] for M07 and M08 as well as [triazolinone-3-^{14}C] for M09 and M10, and were accepted by the European Commission (SANCO/4067/2001-Final, 30 September 2003). For a further major degradation product M05 only pathway studies were evaluated during the Annex I inclusion.

Annex point	Author(s)	Year	Applied	Edition No.
KCA 7.1.2.1.2/01 also filed under KCA 7.1.1.1/05	[redacted] & [redacted]	1999	M07	M-006647-01-1
KCA 7.1.2.1.2/02 also filed under KCA 7.1.1.1/06	[redacted] & [redacted]	1999	M08	M-012923-01-1
KCA 7.1.2.1.2/03 also filed under KCA 7.1.1.1/07	[redacted] & [redacted]	1999	M09	M-012887-01-1
KCA 7.1.2.1.2/04 also filed under KCA 7.1.1.1/08	[redacted] & [redacted]	1999	M10	M-006638-01-1

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph.

Two kinetic reports (KCA 7.1.2.1.2/05 and KCA 7.1.2.1.2/06) evaluated during the Annex I inclusion are not considered relevant for this Supplemental Dossier for the renewal of approval and are replaced by a new kinetic evaluation (CA 7.1.2.1.2/10) according to current FOCUS guidance.

Three additional studies are submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval. The test items were unlabelled M05 (CA 7.1.2.1.2/07), [phenyl-U-^{14}C] labelled M08 (CA 7.1.2.1.2/08) and unlabelled M11 (CA 7.1.2.1.2/09). During the Annex I inclusion calculated half-lives for M05 were accepted that seemed to be artificial, due to conservative decline fit evaluation. Therefore, an additional laboratory aerobic soil degradation study of metabolite M05 was performed to refine risk assessment endpoints. In addition, one of the calculated DT_{50} values for M08 was not representative evaluated in the first EU review, probably due to low microbial biomass in soil. Therefore, a new aerobic soil degradation study of M08 was performed to refine risk assessment endpoints. Furthermore, the aerobic transformation of M08 and the formation of the possible transformation products M07 and M11 were investigated in this new degradation study. The study was used to further elucidate the degradation pathway of the parent compound propoxycarbazone-sodium (refer to CA 7.1.1.1). The presence of M11 was confirmed and the new metabolite M11 was included into the pathway (refer to Figure 7.1-1) and newly addressed.

Furthermore, a new kinetic evaluation of the degradation behaviour of major degradation products in soil under aerobic conditions in the dark in the laboratory was performed according to current FOCUS kinetics guidance to derive kinetic parameters suitable for modelling purpose and environmental risk assessment. The study is summarised in CA 7.1.2.1.2/10. A summary of the degradation rates of the major degradation products in soil in the laboratory is given in CA 7.1.2.

Report:	[redacted]y; [redacted];2013;M-474425-01
Title:	Aerobic transformation of MKH 6561-4-hydroxy-saccharin in soil [OECD 307]
Report No:	70434173
Document No:	M-474425-01-1
Guidelines:	**GLP compliant study based on the Commission Directive 2004/73/EC, Method C.23, Aerobic and Anaerobic Transformation in Soil (EEC Publication No. L 152, 2004); OECD Guideline for Testing of Chemicals No. 307: Aerobic and Anaerobic Transformation in Soil, adopted April 24, 2002**
Deviations:	none
GLP/GEP:	**yes**

Executive Summary

The present laboratory study investigated the degradation of MKH 6561-sulfonamide (M05) in three different soil types under aerobic and semi-static incubation conditions at 20 ± 2°C for a maximum period of 91 days. The used soils were a loamy sand (LUFA 2.2, pH 5.5, organic carbon of 1.87%), a sandy loam (LUFA 2.3, pH 6.8, organic carbon of 0.94%) and a clay soil (LUFA 6S, pH 7.1, organic carbon of 1.64%). The test item was applied at a nominal treatment rate of about 250 µg/kg dry soil. This worst case scenario (1.3 fold recommended field use rate of parent propoxycarbazone-sodium) was chosen to overcome matrix effects during MS-analysis. The soil moisture was maintained between 49 and 55% of the soils´ respective maximum water holding capacity for the duration of the study.

For all three soils, a mixture of methanol and pure water (50/50 v/v) with 0.1% acetic acid was chosen as extraction mixture. Fortified samples spanning a concentration range from nominal treatment rate to the 5%-level, confirmed linear extraction recoveries for all three soils.

The test item disappeared rather fast from the soil extracts. In case of the clay (LUFA 6S), the amount of the test item declined below 10% already after 14 days of incubation. In case of loamy sand (LUFA 2.2) and sandy loam (LUFA 2.3) the test item declined below 10% of applied amount after 37 days.

I. MATERIALS AND METHODS

A. MATERIALS

1. Test material (non-radiolabelled)

Chemical Name:	MKH 6561-sulfonamide (M05)
Description:	Methyl 2-sulfamoylbenzoate
Batch #:	Solid, white
Origin Batch #:	AE F073550-01-01
CAS No.:	BCOO 5771-1-1
Purity:	57683-71-3
Storage:	99.4%
Expiry Date:	At +10 to +30°C under dark and dry conditions
	March 14, 2013

Stability of test compound: Analysis of stored soil extracts obtained from fortified samples confirmed sufficient storage stability over a period of 49 and 50 days. The concentration of test item in the extracts analysed after 49 and 50 days was 90% to 107% related to the concentration determined immediately after preparation.

2. Soils

Three different soils (refer to Table 7.1-23) were used for the study. The soils were freshly collected from the field and were passed through a 2 mm sieve prior to use to ensure uniform particle size. Soils were stored at room temperature (approx. 20°C) in the dark for less than 3 months until use. The soil was pre-incubated for a period of 18 days at temperature and moisture conditions approximating those of the test.

Table 7.1-23 Soil physicochemical properties

Soil	LUFA 2.2	LUFA 2.3	LUFA 6S
Location	[redacted]	[redacted]	[redacted]
Country	Germany	Germany	Germany
Batch	F2.21912	F2.31912	F6S2012
Soil type[1)]	Loamy sand	Sandy loam	Clay
Sand (%)	80.6 ± 2.6	63.7 ± 4.4	22.2 ±1.8
Silt (%)	12.6 ± 1.7	27.6 ± 3.8	36.8 ± 2.0
Clay (%)	6.8 ± 1.3	8.7 ± 1.7	41.0 ± 1.9
Organic carbon (%)	1.87 ± 0.20	0.94 ± 0.10	1.64 ± 0.12
pH (0.01 $CaCl_2$)	5.5 ± 0.2	6.8 ± 0.2	7.1 ± 0.1
CEC (meq/100 g)	9.9 ± 0.7	10.7 ± 1.4	23.7 ± 7.0
Moisture (g/100g)	44.4 ± 6.0	35.6 ± 3.0	38.9 ± 4.6
C_{mic} of C_{org} (%) at test start	1.5	2.1	2.5
C_{mic} of C_{org} (%) at test end	1.0	1.4	2.4

1) According to USDA

B. STUDY DESIGN

1. Experimental conditions

The test systems were maintained in the dark or diffuse light at a temperature of 20 ± 2°C in an air-conditioned room.

250 mL wide-neck bottles with their lid loosely positioned on top to allow permanent air exchange were used as test systems. Aerobic incubation conditions were maintained by a permanent passive air exchange with ambient air.

Three soils representing a range of relevant soil properties were used: a loamy sand (LUFA 2.2, pH 5.5, organic carbon of 1.87%), a sandy loam (LUFA 2.3, pH 6.8, organic carbon of 0.94%) and a clay soil (LUFA 6S, pH 7.1, organic carbon of 1.64%). The soils were freshly collected from the field, sieved through a 2 mm sieve and pre-incubated for a period of 18 days at temperature and moisture conditions approximating those of the test.

The soil moisture was adjusted to and maintained at 48.52 to 54.66% of the soils´ respective maximum water holding capacity during the incubation period. Water losses were compensated by addition of water (sterile filtered tap water).

The treatment rate based on the highest recommended single field use rate of the parent propoxycarbazone-sodium of 70 g/ha would be 190 µg/kg dry soil. To overcome matrix effects

during MS-analysis despite matrix adapted analysis, a conservative application rate of 250 µg/kg dry soil was chosen. The test item was added to the soil using quartz sand as a carrier. A corresponding amount of an acetone stock solution of the test item was added to the quartz sand and the solvent was evaporated overnight at room temperature. The quartz sand was then added to the soil followed by 5 min mixing using an electrical hand-mixer. After application, about 63-85 g of the soil (wet weight basis equivalent to 52-69 g dry weight) was placed into each incubation flask. Each sampling point was measured in duplicate. For the four untreated control samples per soil approximately 150 g were filled in identical incubation flasks.

For each soil two sterile controls were prepared which were sampled together with the last soil samples. The soil was heated for 15 min to 121°C on three consecutive days (wet sterilisation using an autoclave).

The experiment was terminated after a maximum of 91 days, because the concentration of the test item was ≤ 3% of applied amount in all soils.

2. Sampling

At least duplicate incubation flasks were sampled and sacrificed at days 1, 2, 4, 7, 9, 14 and 37 for all soils. For LUFA 2.2 and 2.3 an additional sampling point at day 91 was investigated.

For the determination of the test item content in the soil approximately 10 g aliquots of soil were taken from each sample. The first aliquot was taken immediately after the end of mixing the test item, the second after half of the incubation flasks had been filled, and the third at the end of the entire application process to verify uniform distribution of the test item in the soil.

3. Description of analytical procedures

In all cases the extraction liquid was methanol-water 50/50 v/v containing 0.1% acetic acid. Acidic conditions were chosen to avoid saponification of the ester group. In all cases extracts were filtered over disposable 0.45 µm PTFE syringe filter.

The soil aliquots were treated for 10 min in an ultrasonic bath, followed by vigorous shaking on a reciprocal shaker. The soil was extracted 3 times with 15 mL of the above described mixture. Phase separation was accomplished by centrifugation (3000 rpm; 10 min; 4 °C) and supernatants from the three extraction steps were combined and the final volume adjusted to 50 mL using the extraction mixture.

The following soil extracts were concentrated by rotary evaporation as overall concentrations of the test item fell below 10% nominal:

LUFA 2.2: From day 37 onwards and sterile controls

LUFA 2.3: From day 37 onwards and sterile controls

LUFA 6S: From day 7 onwards

8 mL soil extract were evaporated to dryness and re-dissolved in 2 mL extraction liquid. Resulting concentration factor was 4. Depending on the overall amount required, 20 mL were reduced to a final volume of 5 mL and 40 mL to a final volume of 10 mL. Fortified samples spanning a concentration range from nominal treatment rate to the 5%-level confirmed linear extraction recoveries for all three soils. However, recoveries of the 5%-level were slightly below the required 70% limit for soil LUFA 2.2.

All soil extracts were analysed undiluted, but filtered over 0.45 µm disposable PTFE-syringe filters.

All soil extracts obtained were quantitatively analysed by test item specific LC-MS/MS (Agilent 1200 and API 3200, Eluent: HPLC grade water with 5 mM ammonia acetate and pure ACN with 5 mM ammonia acetate).

The mean LOD of 0.61 µg/L equivalent to 3.053 µg/kg of soil is equivalent to 1.2% of the average nominal treatment rate.

The limit of quantification (LOQ) was hence determined to be at least 12.5 µg/kg soil (5% of average nominal treatment rate). Fortified samples spanning a concentration range from nominal treatment rate to the 5%-level confirmed linear extraction recoveries for all three soils.

The pH was determined according to DIN 19684 ($CaCl_2$).

The microbial biomass was determined according to the DIN guideline 14240. The soil was supplemented with glucose and the respiration rates of the soil microflora were measured.

II. RESULTS AND DISCUSSION

A. DATA

Table 7.1-24 Quantification of test item (M05) in LUFA 2.2 soil with a nominal treatment rate of 254.5 µg/kg soil at 20°C

Incubation time (d)	Concentration of M05 (µg/kg)	M05 nominal (%)	mean conc. of M05 (µg/kg)	mean M05 nominal (%)
0	245	96	239	94
0	234	92		
0	238	94		
1	203	80	203	80
1	203	80		
2	177	70	187	74
2	197	78		
4	150	59	150	59
4	149	59		
7	95	37	103	40
7	110	43		
9	78	31	82	32
9	85	33		
14	69	27	69	27
14	68	27		
37	16	6	15	6
37	15	6		
91	4	2	4	2
91	4	2		
91[1)]	209	84	218	87
91[1)]	226	91		

1) Sterile control

Table 7.1-25 Quantification of test item (M05) in LUFA 2.3 soil with a nominal treatment rate of 257.2 µg/kg soil at 20°C

Incubation time (d)	Concentration of M05 (µg/kg)	M05 nominal (%)	mean conc. of M05 (µg/kg)	mean M05 nominal (%)
0	233	91	238	92
0	246	95		
0	234	91		
1	194	75	197	76
1	200	78		
2	192	74	195	76
2	198	77		
4	185	72	187	73
4	189	73		
7	118	46	125	48
7	131	51		
9	100	39	99	38
9	98	38		
14	71	28	74	29
14	78	30		
37	23	9	22	9
37	21	8		
91	7	3	8	3
91	9	3		
91[1)]	17	7	17	7
91[1)]	17	7		

1) Sterile control

Table 7.1-26 Quantification of test item (M05) in LUFA 6S soil with a nominal treatment rate of 261.9 µg/kg soil at 20°C

Incubation time (d)	Concentration of M05 (µg/kg)	M05 nominal (%)	mean conc. of M05 (µg/kg)	mean M05 nominal (%)
0	238	91	236	90
0	249	95		
0	222	85		
1	189	72	170	65
1	151	58		
2	148	56	160	61
2	173	66		
4	130	50	130	50
4	129	49		
7	49	19	55	21
7	61	23		
9	44	17	40	15
9	36	14		
14	24	9	20	8
14	16	6		
37	n.d.	n.a.	n.d.	n.a.
37	n.d.	n.a.		
44[1)]	38	15	35	14
44[1)]	32	13		

1) Sterile control
n.d. not detectable, value below LOD
n.a. not applicable

B. MASS BALANCE

The test item specific method (LC-MS/MS) yielded recovery rates of 94%, 92%, 90% of applied amount at test start for the soils LUFA 2.2, 2.3 and 6S, respectively. Removal of the test item at test start confirmed validity of the study as recovery rates fell in the required range of 70 – 110% nominal. Recovery rates at later stages could not be given due to the use of unlabelled test item. However, fortified samples over a concentration range from nominal treatment rate to the 5%-level confirmed linear extraction recoveries for all three soils. Only for LUFA 2.2 recoveries of the 5%-level were slightly below the required 70% limit.

C. BOUND AND EXTRACTABLE RESIDUES

Bound and extractable residues could not be measured due to the use of unlabelled test item.

D VOLATILISATION

Volatilisation could not be measured due to the use of unlabelled test item.

E. TRANSFORMATION OF PARENT COMPOUND

The test item concentrations constantly decreased in the soil extracts.

In case of the clay (LUFA 6S), the amount of the test item declined below 10% already after 14 days of incubation. In case of loamy sand (LUFA 2.2) and sandy loam (LUFA 2.3) the test item declined below 10% of applied amount after 37 days. The incubation of the treated soils was stopped after 91 days in case of LUFA 2.2 and 2.3 and after 37 days in case of LUFA 6S.

No test item was any longer detectable at the end of the incubation period in case of LUFA 6S, neither by direct analysis of the soil extracts nor after concentration of the soil extracts. In case of LUFA 2.2 and 2.3, 2% and 3% of applied amount were detected after 91 days, respectively.

Detailed values obtained for each sampling point can be found in Table 7.1-24 to Table 7.1-26.

In sterile controls 87% and 7% of applied amount were detected after 91 days in case of LUFA 2.2 and 2.3, respectively. In case of LUFA 6S, 14% of applied amount was measured after 44 days of incubation. The low recoveries in case of the clay soils (LUFA 2.3 and 6S) might point to a certain abiotic decay, however, considering the high recovery in case of LUFA 2.2, it was considered likely that wet sterilisation of the clay soil types was not complete. A mainly biotic decay was also supported by the fact that fastest decline of MKH 6561-sulfonamide (M05) was observed in clay, the soil with the highest biological activity after disturbing the soil matrix by the application process.

Screening for transformation products was not conducted.

III. CONCLUSIONS

It was found that MKH 6561-sulfonamide (M05) degrades rapidly under aerobic conditions in all three soils types investigated. Fastest degradation was observed in clay. As the extraction from soil matrix was satisfactory linear from nominal treatment rate to at least the 5%-level, data was considered valid for the calculation of disappearance times.

A kinetic evaluation following current FOCUS guidance was conducted and is summarised in CA 7.1.2.1.2/10. The best-fit $DegT_{50}$ and $DegT_{90}$ values ranged from 3.8 to 8.4 days and from 12.6 to 30.1 days, respectively. The normalised modelling endpoints were given with $DegT_{50}$ values from 2.6 to 6.8 days. An overall summary of the degradation rates of the major degradation products in soil in the laboratory is given in CA 7.1.2.

Report:	[redacted];2012;M-474418-01
Title:	Aerobic transformation of MKH 6561-sulfonamide in soil [OECD 307]
Report No:	70414173
Document No:	M-474418-01-1
Guidelines:	**Commission Directive 2004/73/EC, Method C.23, Aerobic and Anaerobic Transformation in Soil (EEC Publication No. L 152, 2004); OECD Guideline for Testing of Chemicals No. 307: Aerobic and Anaerobic Transformation in Soil, adopted April 24, 2002**
Deviations:	none
GLP/GEP:	**yes**

This study is completely summarised in CA 7.1.1.1/09. A kinetic evaluation following current FOCUS guidance was conducted and is summarised in CA 7.1.2.1.2/10. The best-fit $DegT_{50}$ and $DegT_{90}$ values ranged from 8.5 to 88.8 days and from 152.9 to 294.8 days, respectively. The normalised modelling endpoints were given with $DegT_{50}$ values from 29.5 to 69.7 days. An overall summary of the degradation rates of the major degradation products in soil in the laboratory is given in CA 7.1.2.

Report:	[redacted]ö; [redacted];2013;M-474427-01
Title:	Aerobic transformation of MKH 6561-4-methoxy-saccharin in soil [OECD 307]
Report No:	70469173
Document No:	M-474427-01-1
Guidelines:	**Commission Directive 2004/73/EC, Method C.23, Aerobic and Anaerobic Transformation in Soil (EEC Publication No. L 152, 2004); OECD Guideline for Testing of Chemicals No. 307: Aerobic and Anaerobic Transformation in Soil, adopted April 24, 2002**
Deviations:	none
GLP/GEP:	**yes**

Executive Summary

The present laboratory investigated the degradation of MKH 6561-4-methoxy-saccharin in three different soil types under aerobic conditions at 20 ± 2°C for a period of 120 days in the dark or under diffuse light. The used soils were a loamy sand (LUFA 2.2, pH 5.5, organic carbon of 1.17%), a sandy loam (LUFA 2.3, pH 6.8, organic carbon of 0.94%) and a clay soil (LUFA 6S, pH 7.1, organic carbon of 1.64%). The soil moisture was maintained between 47 and 53% of the soils' respective maximum water holding capacity for the duration of the study.

The test item was applied at a nominal treatment rate of 250 µg/kg dry soil. This worst case scenario (1.3 fold recommended field use rate of parent propoxycarbazone-sodium) was chosen to overcome matrix effects during MS-analysis. For all three soils, an extraction solvent consisting of acetonitrile and 50 mM $CaCl_2$ with 10 mM NH_4OH (50/50, v/v) was chosen and all soil extracts obtained were quantitatively analysed by test item specific LC-MS/MS.

The test item disappeared rather fast from the soil extracts. The amounts declined from 98% at day 0 to 0.5% at day 37 in the loamy sand (LUFA 2.2), from 98% at day 0 to 2% at day 77 in the sandy loam (LUFA 2.3) and from 106% at day 0 to 0.5% at day 77 in the clay (LUFA 6S). After 120 days of incubation, 0.3-2% of the initially applied amount of test item was detected in the soil extracts.

I. MATERIALS AND METHODS

A. MATERIALS

1. Test material (non-radiolabelled)

Chemical Name:	4-methoxy-1,2-benzothiazol-3(2H)-one 1,1-dioxide
Description:	Light yellow powder
Batch #:	BCS-AG71018-01-01
Origin Batch #:	BCOO 6413-13-5
Purity:	99.7%
Storage:	At +10 to +30°C, under dark and dry conditions
Expiry Date:	June 19, 2013
Stability of test compound:	Storage stability after 53 days was investigated for concentrated (5%-level) and untreated soil extracts (nominal treatment level) by specific LC-MS/MS-analysis and no loss was observed.

2. Soils

Three different soils (refer to Table 7.1-27) were used for the study. The soils were freshly collected from the field and were passed through a 2 mm sieve prior to use to ensure uniform particle size. Soils were

stored at room temperature (approx. 20°C) in the dark for less than 3 months until use. The soil was pre-incubated for a period of 24 days in case of untreated control samples and 25 days in case of treated soil samples at temperature and moisture conditions approximating those of the test.

Table 7.1-27 Soil physicochemical properties

Soil	LUFA 2.2	LUFA 2.3	LUFA 6S
Location	[redacted]	[redacted]	[redacted]
Country	Germany	Germany	Germany
Batch	F2.21912	F2.31912	F6S2012
Soil type[1)]	Loamy sand	Sandy loam	Clay
Sand (%)	78.9 ± 3.5	63.1 ± 5.0	24.5 ± 3.5
Silt (%)	13.8 ± 2.7	28.4 ± 4.5	35.0 ± 2.9
Clay (%)	7.3 ± 1.2	8.5 ± 1.7	40.5 ± 2.1
Organic carbon (%)	1.77 ± 0.20	0.94 ± 0.10	1.64 ± 0.12
pH (0.01 $CaCl_2$)	5.5 ± 0.2	6.8 ± 0.2	7.1 ± 0.1
CEC (meq/100 g)	10.1 ± 0.5	10.9 ± 1.1	27.2 ± 1.4
Moisture (g/100g)	41.8 ± 3.0	37.3 ± 1.8	40.5 ± 1.8
C_{mic} of C_{org} (%) at test start	1.6	3.0	2.6
C_{mic} of C_{org} (%) at test end	2.7	10.1	6.7

1) According to USDA

B. STUDY DESIGN

1. Experimental conditions

Wide neck bottles with their lid loosely positioned on top to allow permanent air exchange were used as test systems. No further traps were fitted. The test systems were incubated in the dark or in diffuse light at a temperature of 20 ± 2°C in an air-conditioned room. Aerobic incubation conditions were maintained by a permanent passive air exchange with the surrounding atmosphere.

Three soils representing a range of relevant soil properties were used: a loamy sand (LUFA 2.2, pH 5.5, organic carbon of 1.77%), a sandy loam (LUFA 2.3, pH 6.8, organic carbon of 0.94%) and a clay soil (LUFA 6S, pH 7.1, organic carbon of 1.64%). The soils were freshly collected from the field (storage period shorter than 3 months), sieved through a 2 mm sieve and pre-incubated for a period of 24 days (untreated control samples) and 25 days (treated soil samples) at temperature and moisture conditions approximating those of the test.

The soil moisture was adjusted prior to application and it was maintained at 46.6 to 53.4% of the soils´ respective maximum water holding capacity during the entire incubation period. Water losses were compensated by the addition of water (sterile filtered tap water).

The treatment rate based on the highest recommended single field use rate of the parent propoxycarbazone-sodium of 70 g/ha would be 190 µg/kg dry soil. To overcome matrix effects during MS-analysis despite matrix adapted analysis, a conservative application rate of 250 µg/kg dry soil was chosen. The test item was added to the soil using quartz sand as a carrier. An appropriate amount of an ethanol stock solution of the test item was added to the quartz sand and the solvent was evaporated overnight at room temperature. The quartz sand was then added to the soil followed by 5 minutes of mixing. After application, about 65-80 g of the soil (wet weight basis equivalent to 53-67 g dry weight) was placed into each incubation flask. Each sampling point was measured in duplicate. For the four untreated control samples per soil (applied analogously with the stock solution solvent ethanol, used for microbial biomass determinations) approximately 150-155 g wet weight soil were filled in identical incubation flasks.

Furthermore, for each soil two sterile controls were prepared which were sampled together with the last soil samples taken. For sterilisation, the soil was heated for 15 min to 121°C on three consecutive days (wet sterilisation using an autoclave). For application of these samples, the ethanol stock solution was diluted by a factor of 10 to obtain an application solution which was directly applied to the sterilised soil samples.

The experiment was terminated after 120 days of incubation.

2. Sampling

To verify an uniform distribution of the test item in the soil, a 10 g aliquot of soil was taken from each application batch three times: immediately after the end of mixing the test item, when the second after half of the incubation flasks had been filled and at the end of the entire application process. Furthermore, at least duplicate incubation flasks were sampled at days 1, 2, 3, 6, 9, 14, 37, 77 and 120 for all soils. At day 37, sub-samples of approximately 10 g were taken out of the test unit with the remaining soil being further incubated until the next sampling point at day 77. The total amount remaining in the test unit was ≥ 50 g dry soil.

Sterile samples were collected at DAT-120. Untreated control samples used for microbial biomass determinations were sampled at DAT-49 and DAT-122. The soil aliquots used to determine the microbial biomass prior to test start and at DAT-0 were taken out of the large soil batches adjusted to approx. 50% of the maximum water holding capacity and after the solvent application, respectively.

3. Description of analytical procedures

In all cases the extraction liquid consisted of acetonitrile and 50 mM $CaCl_2$ with 10 mM NH_4OH (50/50, v/v). 10 mL of this mixture were added to approximately 10 g of soil. The samples were treated for 10 min in an ultrasonic bath, followed by vigorous shaking on an overhead shaker. The soil was extracted 4 times. Phase separation was accomplished by centrifugation (3000 rpm; 10 min; 4 °C) and supernatants from the three extraction steps were decanted and combined. The final volume was adjusted to 50 mL using the extraction mixture.

The following soil extracts originating from the degradation study were concentrated by rotary evaporation as overall concentrations of the test item fell below 10% nominal:

LUFA 2.2: From day 37 onwards, control test middle and end, sterile controls
LUFA 2.3: From day 77 onwards, control test end, and sterile controls
LUFA 6S: From day 77 onwards, control test end, and sterile controls

20 mL of the respective extract was concentrated by removal of the organic phase at 25 mbar and 40°C by rotary evaporator. The residual volume was recorded.

Untreated soil extracts were filtered through 0.2 µm PTFE-syringe filters, concentrated soil extracts – after removal of the organic solvent – were filtered through 0.2 µm cellulose acetate syringe filters.

All soil extracts obtained were quantitatively analysed by test item specific LC-MS/MS (Agilent 1200 and API 3200, Eluent: HPLC grade water with 0.1% formic acid and pure methanol containing 0.1% formic acid). Reference solutions spanning a concentration range from 1 µg/L to 100 mg/L were prepared by appropriate dilution using respective soil control matrix. The soil control matrix was obtained by extraction of the untreated control samples.

Validation of the analytical methodology including verification of extractability of the test item from soil matrix as well as stability of the test item in soil extracts was accomplished as part of IBACON Study 70434173 (CA 7.1.2.1.2/08). Linearity of calibration curves for untreated and concentrated soil control matrix was at least 0.9974 (r) during the main test.

The limit of detection and quantification was also determined as part of IBACON Study 70434173 (CA 7.1.2.1.2/08) as accounted for: LOD = 0.24 µg/kg for untreated soil extracts (0.06 µg/kg for concentrated extracts) and LOQ = 12.5 µg/kg as determined by fortified samples.

The pH was determined according to DIN 19684 ($CaCl_2$).

The microbial biomass was determined according to the DIN guideline 14240. The soil was supplemented with glucose and the respiration rates of the soil microflora were measured.

II. RESULTS AND DISCUSSION

A. DATA

Table 7.1-28 Quantification of MKH 6561-4-methoxy-saccharin in LUFA 2.2 soil with a treatment rate of 252.36 µg/kg soil at 20°C

Incubation time (d)	Concentration of MKH 6561-4-methoxy-saccharin (µg/kg)	MKH 6561-4-methoxy-saccharin recovery (%)	Mean conc. of MKH 6561-4-methoxy-saccharin (µg/kg)	Mean MKH 6561-4-methoxy-saccharin recovery (%)
0	244	97	248	98
0	248	98		
0	251	99		
1	232	92	231	92
1	231	92		
2	218	86	217	86
2	216	86		
3	188	74	192	76
3	197	78		
6	113	45	107	42
6	102	40		
9	72	29	75	30
9	77	31		
14	41	16	41	16
14	40	16		
37	1	1	1	0.5
37	1[2)]	0.4[2)]		
77	0[2)]	0.0[2)]	0[2)]	0.1[2)]
77	0[2)]	0.1[2)]		
120	1[2)]	0.4[2)]	1[2)]	0.3[2)]
120	1[2)]	0.2[2)]		
120[1)]	206	82	205	82
120[1)]	205	82		

1) Sterile control
2) Values detected below lowest calibration standard

Table 7.1-29 Quantification of MKH 6561-4-methoxy-saccharin in LUFA 2.3 soil with a treatment rate of 249.82 µg/kg soil at 20°C

Incubation time (d)	Concentration of MKH 6561-4-methoxy-saccharin (µg/kg)	MKH 6561-4-methoxy-saccharin recovery (%)	Mean conc. of MKH 6561-4-methoxy-saccharin (µg/kg)	Mean MKH 6561-4-methoxy-saccharin recovery (%)
0	245	98	246	98
0	251	101		
0	240	96		
1	245	98	243	97
1	241	96		
2	237	95	241	97
2	246	99		
3	235	94	239	96
3	243	97		
6	223	89	216	86
6	208	83		
9	213	85	212	85
9	211	84		
14	189	76	186	74
14	183	73		
37	105	42	106	42
37	107	43		
77	4	2	5	2
77	6	2		
120	5	2	4	2
120	4	1		
120[1)]	232	93	240	96
120[1)]	247	99		

1) Sterile control

Table 7.1-30 Quantification of MKH 6561-4-methoxy-saccharin in LUFA 6S soil with a treatment rate of 250.58 µg/kg soil at 20°C

Incubation time (d)	Concentration of MKH 6561-4-methoxy-saccharin (µg/kg)	MKH 6561-4-methoxy-saccharin recovery (%)	Mean conc. of MKH 6561-4-methoxy-saccharin (µg/kg)	Mean MKH 6561-4-methoxy-saccharin recovery (%)
0	228	91	266	106
0	302	120		
0	268	107		
1	211	84	215	86
1	219	87		
2	220	88	224	89
2	229	91		
3	207	83	206	82
3	205	82		
6	191	76	197	79
6	204	81		
9	167	67	179	72
9	192	76		
14	157	63	159	64
14	162	65		
37	79	31	76	30
37	72	29		
77	1	0.4[2)]	1	0[2)]
77	1[2)]	1[2)]		
120	9	3	6	2
120	1[2)]	1[2)]		
120[1)]	253	101	265	106
120[1)]	276	111		

1) Sterile control
2) Values detected below lowest calibration standard

B. MASS BALANCE

The dosage of the test item was verified by analysing 3 aliquots of the treated soil taken immediately after application (immediately after end of mixing the test item, after half of the incubation flask had been filled and at the end of the entire application process) and homogenous distribution could be confirmed. Recovery rates determined at test start (DAT-0) were 98 ± 1%, 98 ± 2%, and 106 ± 15% for soils LUFA 2.2, 2.3 and 6S, respectively. Recovery rates at later stages could not be given due to the use of unlabelled test item. As extraction from soil matrix was satisfactory linear from nominal treatment rate to at least the 5%-level (refer to IBACON Study 7043173, CA 7.1.2.1.2/08), data was considered valid for calculation of disappearance times.

C. BOUND AND EXTRACTABLE RESIDUES

Bound and extractable residues were not measured due to the use of unlabelled test item.

D VOLATILISATION

Volatilisation was not measured due to the use of unlabelled test item.

E. TRANSFORMATION OF PARENT COMPOUND

The test item concentrations constantly decreased in the soil extracts.

In case of the loamy sand (LUFA 2.2), overall test item concentrations fell below 10% after 37 days of incubation. In case of the sandy loam (LUFA 2.3) and the clay (LUFA 6S) concentrations fell below 10% at DAT-77. The incubation of the treated soils was stopped after 120 days.

The test item amounts declined from 98% at day 0 to 0.5% at day 37 in the loamy sand (LUFA 2.2), from 98% at day 0 to 2% at day 77 in the sandy loam (LUFA 2.3) and from 106% at day 0 to 0% at day 77 in the clay (LUFA 6S). After 120 days of incubation, 0.3-2% of the initially applied test item was detected in the soil extracts.

Detailed values obtained for each sampling point can be found in Table 7.1-28 to Table 7.1-30.

In sterile controls 82% to 106% of the applied test item was detected after 120 days, hence no significant abiotic decay contributed to the decay observed in the biologically active soils.

A screening for transformation products was not conducted.

III. CONCLUSIONS

It was found that MKH 6561-4-methoxy-saccharin disappeared rather fast from the soil extracts. Fastest degradation was observed in the loamy sand. Results obtained confirmed that MKH 6561-4-methoxy-saccharin was mainly subjected to a biological degradation under aerobic conditions at ambient temperature.

A kinetic evaluation following current FOCUS guidance was conducted and is summarised in CA 7.1.2.1.2/10. The best-fit $DegT_{50}$ and $DegT_{90}$ values ranged from 5.4 to 26.2 days and from 18.0 to 87.1 days, respectively. The normalised modelling endpoints were given with $DegT_{50}$ values from 5.0 to 20.8 days. An overall summary of the degradation rates of the major degradation products in soil in the laboratory is given in CA 7.1.2.

Report:	[redacted]p; [redacted]; [redacted]2014;M-487131-01
Title:	Kinetic modelling analysis of the degradation behaviour of propoxycarbazone-sodium and its major soil metabolites from aerobic laboratory soil degradation studies
Report No:	358525-1
Document No:	M-487131-01-1
Guidelines:	**FOCUS (1997): Soil persistence models and EU Registration. The final report of the work of the Soil Modelling Work group of FOCUS. February 1997. FOCUS (2006): Guidance Document on Estimating Persistence and Degradation Kinetics from Environmental Fate Studies on Pesticides in EU Registration. Report of the Work Group on Degradation Kinetics of FOCUS. EC Document Reference SANCO/10058/2005 version 2.0, June 2006. FOCUS (2011): Generic Guidance for Estimating Persistence and Degradation Kinetics from Environmental Fate Studies on Pesticides in EU Registration, version 1.0. FOCUS (2012): Generic Guidance for Tier 1 FOCUS Ground Water Assessments, version 2.1**
Deviations:	**.** none
GLP/GEP:	**no**

Executive Summary

The aim of this evaluation was to conduct a kinetic modelling analysis for propoxycarbazone-sodium and its major soil metabolites from laboratory soil degradation studies in order to derive

- persistence endpoints that can be used for simple PEC_{soil} calculations and as a trigger for higher-tier environmental fate studies and
- modelling endpoints for use in environmental fate models for calculation of predicted environmental concentrations (PEC).

Only the results for the metabolites of propoxycarbazone-sodium are described here.

The evaluation was based on residue data from 11 independent aerobic soil degradation studies, including 26 independent data sets. Propoxycarbazone-sodium was applied as test substance in four studies (eight of the evaluated soils) using

- [phenyl-U-^{14}C]propoxycarbazone-sodium:
  [redacted] et al., 1999a - KCA 7.1.2.1.1/01 and KCA 7.1.1.1/01
  [redacted] et al., 1999a - KCA 7.1.2.1.1/03 and KCA 7.1.1.1/03
- [triazolinone-3-^{14}C]propoxycarbazone-sodium
  [redacted] et al., 1999b - KCA 7.1.2.1.1/02 and KCA 7.1.1.1/02
  [redacted] et al., 1999b - KCA 7.1.2.1.1/04 and KCA 7.1.1.1/04

Additional studies in which the major soil metabolites were applied as test substance were conducted for

- M05 ([redacted], 2012 - CA 7.1.2.1.2/07),
- M07 ([redacted] & [redacted], 1999 - KCA 7.1.2.1.2/01 and KCA 7.1.1.1/05),
- M08 ([redacted] & [redacted], 1999 - KCA 7.1.2.1.2/02 and KCA 7.1.1.1/06;
  [redacted], 2013 - CA 7.1.2.1.2/08 and CA 7.1.1.1/09),
- M09 ([redacted] & [redacted], 1999 - KCA 7.1.2.1.2/03 02 and KCA 7.1.1.1/07),
- M10 ([redacted] & [redacted], 1999 - KCA 7.1.2.1.2/04 02 and KCA 7.1.1.1/08) and
- M11 ([redacted], 2013b - CA 7.1.2.1.2/09).

An overview of the obtained persistence and modelling endpoints for the major soil metabolites of propoxycarbazone-sodium: M05, M07, M08, M09, M10 and M11 is provided below.

Table 7.1-31 Persistence and modelling endpoints for the soil metabolites of propoxycarbazone-sodium

	Persistence endpoints				**Modelling endpoints**			
	$DegT_{50}$ (d)		**$DegT_{90}$ (d)**		**Non-normalised $DegT_{50}$ (d)**		**Normalised $DegT_{50}$ (d) (20°C, pF2)**	
	Range	Geomean (n)	Range	Geomean (n)	Range	Geomean (n)	Range	Geomean (n)
M05	2.8 – 17.4	5.5 (6)	9.3 - 57.8	19.6 (6)	2.8 – 17.4	5.6 (6)	1.8 – 14.5	4.3 (6)
M07	4.6 – 39.8	16.1 (3)	15.2 – 132.2	53.3 (3)	4.4 – 39.8	15.9 (3)	2.8 – 33.2	11.6 (3)
M08	8.5 – >1000	145.0[1)] (7)	152.9 – >1000	484.2[1)] (7)	32.3 –496.7	112.3 (5)	29.5 – 312.9	84.2 (5)
M09	13.4 – 385.7	62.7 (4)	283.3 – >1000	551.2[1)] (4)	85.3 – 385.3	145.4 (4)	71.1 – 231.2	108.0 (4)
M10	5.9 – 275.4	80.0 (7)	405.1 – 915.0	542.8 (6)	58.8 – 140.2	108.5 (5)	43.2 – 109.3	81.2 (5)
M11	5.4 – 26.2	12.2 (4)	18.0 – 87.1	40.5 (4)	5.4 – 26.2	12.2 (4)	4.6 – 20.8	9.1 (4)

1) values >1000 d set as 1000 d for geomean calculation

I. MATERIALS AND METHODS

The evaluation followed the recommendations of the FOCUS working group on degradation kinetics FOCUS, 2006 & 2011). All datasets were initially evaluated by comparing single first-order (SFO) and first-order multi-compartment (FOMC) kinetic models. Bi-phasic kinetics such as double first-order in parallel (DFOP) and/or hockey-stick (HS) models were also considered, where appropriate. Degradation rates of the compounds to be used as persistence endpoints were evaluated using best-fit kinetics. A set of different rules of acceptance were followed for determining modelling endpoints since the models usually rely on SFO kinetics to describe degradation rates in soil. The modelling endpoints were corrected to the

reference soil moisture content at field capacity (pF2). A correction to the reference temperature (20°C) was not necessary because all studies were conducted at 20°C.

The procedures recommended by FOCUS (2006, 2011) were followed with an assessment of the goodness-of-fit based on visual and statistical evaluations. Residue data were adjusted for the kinetic modelling as follows:

- The parent value at time 0 was set to the value of the total mass balance at this time point.
- The time-zero concentration for metabolites was set to 0% of the total applied radioactivity (AR).
- Values between LOQ and LOD were set to the measured value. Values below LOD were replaced by half the LOD. If the concentrations of the applied substance in soil decline to values below LOD, the curve was cut off after the first value below LOD, unless detections above LOQ were made later in the experiment.
- Sampling points for which the overall recovery was < 90% or > 110% AR for labelled studies and < 70% or > 110% AR for unlabelled studies were excluded following recommendations of OECD 307 (2002)[9].

The kinetic analysis of the parent compound was conducted using the software package KinGUI (version 2.2012.320.1629) for parameter fitting ([redacted] et al., 2007[10]; Schmitt et al., 2011[11]). Optimisations were carried out for the initial soil residue (M_0), degradation rate constants (k), (g) or breakpoint (t_b), depending on the kinetic model. The parameters are optimised by minimising the sum of squared differences between measured and calculated data using Iteratively Reweighted Least Square (IRLS) routines. The error tolerance and the number of iterations were set to the default values of $1x10^{-3}$ and 10, respectively. The initial estimates for the parameters were calculated as proposed in [redacted] & [redacted] (2006)[12]. Data were not weighted and the initial concentration was not constrained in any of the fits.

If an appropriate kinetic model for the parent substance was achieved in parent only runs, a pathway fit including the metabolite(s) was performed. The pathway fit was run with the SFO model for the metabolites together with the respective model selected for the modelling and trigger endpoint determination of the parent substance. If the pathway fit did not provide acceptable results, the fitting procedure was repeated using the decline phase of the metabolite only. Formation fractions for the metabolites were derived from the pathway fits.

II. RESULTS AND DISCUSSION

Summaries of the obtained parent persistence and modelling endpoints for the soil metabolites of propoxycarbazone-sodium are provided in Table 7.1-32 to Table 7.1-37. Formation fractions for metabolites M05, M07, M08, M09, M10 and M11 derived from pathway fits are summarised in Table 7.1-38.

[9] OECD (2002): Guideline for the Testing of Chemicals. Aerobic and anaerobic transformation in soil. OECD 307.

[10] Schäfer, D, Mikolasch, M, Rainbird, P., Harvey, B. (2007): KinGUI: A new kinetic software tool for evaluations according to FOCUS Degradation Kinetics. In: Del Re, A.A.M. et al. (Eds.): Proceedings of the XIII Symposium on Pesticide Chemistry, Piacenza, 2007, p. 916-923.

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Table 7.1-32 Persistence and modelling endpoints of M05 (sulfonamide methyl ester)

Study	Soil	Temp. (°C)	Applied	Persistence endpoints			Modelling endpoints		
				Model	DegT50 (d)	DegT90 (d)	Model	Non-normalised DegT50 (d)	Normalised DegT50 (d) (20°C, pF2)
M05 (Sulfonamide methyl ester)									
[redacted] et al. (1999) KCA 7.1.2.1.1/01	[redacted]	20	parent	SFO[1]	2.8	9.3	SFO[2]	3.1	2.3
[redacted] et al. (1999) KCA 7.1.2.1.1/03	[redacted]	20	parent	SFO[3]	3.0	10.1	SFO[4]	2.8	1.8
	[redacted]	20		SFO[4]	17.4	57.8	SFO[4]	17.4	14.5
	BBA 2.2	20		- [5]	- [5]	- [5]	- [5]	- [5]	- [5]
[redacted] (2012) CA 7.1.2.1.2/07	LUFA 2.2	20	M05	FOMC	5.9	30.1	SFO	6.4	5.8
	LUFA 2.3	20	M05	SFO	8.4	27.9	SFO	8.4	6.8
	LUFA 6S	20	M05	SFO	3.8	12.6	SFO	3.8	2.6
				n	**6**	**6**		**6**	**6**
				Minimum	**2.8**	**9.3**		**2.8**	**1.8**
				Maximum	**17.4**	**57.8**		**17.4**	**14.5**
				Geometric mean	**5.5**	**19.6**		**5.6**	**4.3**

1) Pathway fit (parent: FOMC; M05, M08: SFO)
2) Pathway fit (parent: SFO; M05: SFO; without M08)
3) Pathway fit (parent: DFOP; M05, M07, M08: SFO; without M11)
4) Pathway fit (parent: SFO; M05, M07, M08: SFO, without M11)
5) Pathway fit not acceptable, decline fit not possible

Table 7.1-33 Persistence and modelling endpoints of M07 (saccharin)

Study	Soil	Temp. (°C)	Applied	Persistence endpoints			Modelling endpoints		
				Model	DegT50 (d)	DegT90 (d)	Model	Non-normalised DegT50 (d)	Normalised DegT50 (d) (20°C, pF2)
M07 (saccharin)									
[redacted] et al. (1999) KCA 7.1.2.1.1/01	[redacted]	20	parent	- [1]	- [1]	- [1]	- [1]	- [1]	- [1]
[redacted] et al. (1999) KCA 7.1.2.1.1/03	[redacted]	20	parent	SFO[2]	4.6	15.2	SFO[3]	4.4	2.8
	[redacted]	20		SFO[3]	39.8	132.2	SFO[3]	39.8	33.2
	BBA 2.2	20		- [4]	- [4]	- [4]	- [4]	- [4]	- [4]
[redacted] & [redacted] (1999) KCA 7.1.2.1.2/01	[redacted]	20	M07	SFO	22.7	75.4	SFO	22.7	16.7
[redacted] & [redacted] (1999) KCA 7.1.2.1.2/02	[redacted]	20	M08	- [5]	- [5]	- [5]	- [5]	- [5]	- [5]
	[redacted]	20		- [5]	- [5]	- [5]	- [5]	- [5]	- [5]
	[redacted]	20		- [5]	- [5]	- [5]	- [5]	- [5]	- [5]
				n	**3**	**3**		**3**	**3**
				Minimum	**4.6**	**15.2**		**4.4**	**2.8**
				Maximum	**39.8**	**132.2**		**39.8**	**33.2**
				Geometric mean	**16.1**	**53.3**		**15.9**	**11.6**

1) Not detected in relevant amounts (all values below LOD)
2) Pathway fit (parent: DFOP; M05, M07, M08: SFO; without M11)
3) Pathway fit (parent: SFO; M05, M07, M08: SFO, without M11)
4) Pathway fit not acceptable, decline fit not possible
5) M07 was detected in the original study, but since the formation of M07 from M08 seems chemically unusual and due to the likelihood of analytical confusion with M11, the values were not considered for the kinetic evaluation.

Table 7.1-34 Persistence and modelling endpoints of M08 (4-hydroxy saccharin)

Study	Soil	Temp. (°C)	Applied	Persistence endpoints			Modelling endpoints		
				Model	$DegT_{50}$ (d)	$DegT_{90}$ (d)	Model	Non-normalised $DegT_{50}$ (d)	Normalised $DegT_{50}$ (d) (20°C, pF2)
M08 (4-hydroxy saccharin)									
[redacted] et al. (1999) KCA 7.1.2.1.1/01	[redacted]	20	parent	SFO[1]	>1000	>1000	- [2]	- [2]	- [2]
[redacted] et al. (1999) KCA 7.1.2.1.1/03	[redacted]	20	parent	SFO[3]	432.1	>1000	SFO[4]	496.7	312.9
	[redacted]	20		SFO[4]	75.0	249.1	SFO[4]	75.0	62.5
	BBA 2.2	20		- [5]	- [5]	- [5]	- [5]	- [5]	- [5]
[redacted] & [redacted] (1999) KCA 7.1.2.1.2/01	[redacted]	20	M07	- [6]	- [6]	- [6]	- [6]	- [6]	- [6]
[redacted] & [redacted] (1999) KCA 7.1.2.1.2/02	[redacted]	20	M08	SFO	167.2	555.4	SFO	167.2	105.3
	[redacted]	20		FOMC	328.6	>1000	- [6]	- [6]	- [6]
	[redacted]	20		- [6]	- [6]	- [6]	- [6]	- [6]	- [6]
[redacted] (2013) CA 7.1.2.1.2/08	LUFA 2.2	20	M08	FOMC	8.5	152.9	DFOP	32.3[7]	29.5[7]
	LUFA 2.3	20		SFO	88.8	294.8	SFO	88.8	69.7
	LUFA 6S	20		- [6]	- [6]	- [6]	- [6]	- [6]	- [6]
			n	**7**		**7**		**5**	**5**
			Minimum	**8.5**		**152.9**		**32.3**	**29.5**
			Maximum	**>1000**		**>1000**		**496.7**	**312.9**
			Geometric mean	**145.0[8]**		**484.2[8]**		**112.3**	**84.2**

1) Pathway fit (parent: FOMC; M05, M08: SFO)
2) k-rate not significant, decline fit not possible
3) Pathway fit (parent: DFOP; M05, M07, M08: SFO; without M11)
4) Pathway fit (parent: SFO; M05, M07, M08: SFO, without M11)
5) Pathway fit not acceptable; decline fit not possible
6) No acceptable fit
7) calculated from slower k-rate
8) values >1000 d set as 1000 d for geomean calculation

Table 7.1-35 Persistence and modelling endpoints of M09 (N-methyl propoxy triazolinone amide)

Study	Soil	Temp. (°C)	Applied	Persistence endpoints			Modelling endpoints		
				Model	$DegT_{50}$ (d)	$DegT_{90}$ (d)	Model	Non-normalised $DegT_{50}$ (d)	Normalised $DegT_{50}$ (d) (20°C, pF2)
M09 (N-methyl propoxy triazolinone amide)									
[redacted] et al. (1999) KCA 7.1.2.1.1/02	[redacted]	20	parent	SFO[1)]	385.7	>1000	SFO[2)]	385.3	231.2
[redacted] et al. (1999) KCA 7.1.2.1.1/04	[redacted]	20	parent	- [3)]	- [3)]	- [3)]	- [3)]	- [3)]	- [3)]
	[redacted]	20		- [3)]	- [3)]	- [3)]	- [3)]	- [3)]	- [3)]
	BBA 2.2	20		SFO[2)]	85.3	283.3	SFO[2)]	85.3	71.1
[redacted] & [redacted] (1999) KCA 7.1.2.1.2/03	[redacted]	20	M09	DFOP	35.1	325.8	DFOP	125.2[4)]	84.9[4)]
	[redacted]	20		FOMC	13.4	>1000	DFOP	108.5[4)]	97.4[4)]
	[redacted], set 1	20		- [5)]	- [5)]	- [5)]	- [5)]	- [5)]	- [5)]
	[redacted], set 2	20		- [5)]	- [5)]	- [5)]	- [5)]	- [5)]	- [5)]
			n	**4**		**4**		**4**	**4**
			Minimum	**13.4**		**283.3**		**85.3**	**71.1**
			Maximum	**385.7**		**>1000**		**385.3**	**231.2**
			Geometric mean	**62.7**		**551.2[6)]**		**145.4**	**108.0**

1) Pathway fit (parent:SFO; M09 and M10: SFO)
2) Pathway fit without M10 (parent and M09: SFO)
3) M09 not detected in relevant amounts above LOD
4) Calculated from slower k-rate of DFOP model
5) No acceptable fit
6) values >1000 d set as 1000 d for geomean calculation

Table 7.1-36 Persistence and modelling endpoints of M10 (N-methyl propoxy triazolinone)

Study	Soil	Temp. (°C)	Applied	Persistence endpoints			Modelling endpoints		
				Model	DegT50 (d)	DegT90 (d)	Model	Non-normalised DegT50 (d)	Normalised DegT50 (d) (20°C, pF2)
M10 (N-methyl propoxy triazolinone)									
[redacted] et al. (1999) KCA 7.1.2.1.1/02	[redacted]	20	parent	SFO[1]	275.4	915.0	- [2]	- [2]	- [2]
[redacted] et al. (1999) KCA 7.1.2.1.1/04	[redacted]	20	parent	SFO[3]	122.0	405.1	SFO[3]	122.0	76.8
	[redacted]	20		SFO[3]	131.1	435.5	SFO[3]	131.1	109.3
	BBA 2.2	20		- [4]	- [4]	- [4]	- [4]	- [4]	- [4]
[redacted] & [redacted] (1999) KCA 7.1.2.1.2/03	[redacted]	20	M09	SFO	140.2	465.8	SFO	140.2	95.1
	[redacted]	20		SFO	134.7	447.6	SFO	114.2	102.5
	[redacted], set 1	20		- [5]	- [5]	- [5]	- [5]	- [5]	- [5]
	[redacted], set 2	20		DFOP[7]	5.9	n.a. [6]	- [8]	- [8]	- [8]
[redacted] & [redacted] (1999) KCA 7.1.2.1.2/04	[redacted]	20	M10	FOMC	42.9	760.0	SFO	58.8	43.2
				n	**7**	**6**		**5**	**5**
				Minimum	**5.9**	**405.1**		**58.8**	**43.2**
				Maximum	**275.4**	**915.0**		**140.2**	**109.3**
				Geometric mean	**80.0**	**542.8**		**108.5**	**81.2**

1) Pathway fit (parent: SFO; M09 and M10: SFO)
2) No significant k-rate, decline fit for M10 not possible
3) Decline fit (but formation fraction could be obtained from pathway fit)
4) No acceptable fit for M10 (but formation fraction could be obtained from pathway fit)
5) No acceptable fit, decline fit not possible (only 2 data points after maximum)
6) DT_{90} estimated by FOCUS DegKin Tool: > 1000 d
7) Decline fit
8) No acceptable fit

Table 7.1-37 Persistence and modelling endpoints of M11 (4-methoxy saccharin)

Study	Soil	Temp. (°C)	Applied	Persistence endpoints			Modelling endpoints		
				Model	DegT50 (d)	DegT90 (d)	Model	Non-normalised DegT50 (d)	Normalised DegT50 (d) (20°C, pF2)
M11 (4-methoxy saccharin)									
[redacted] et al.(1999) KCA 7.1.2.1.1/01	[redacted]	20	parent	- 1)	- 1)	- 1)	- 1)	- 1)	- 1)
[redacted] et al. (1999) KCA 7.1.2.1.1/03	[redacted]	20	parent	FOMC 2)	7.2	24.1	FOMC 2),3)	7.3 3)	4.6
	[redacted]	20		- 4)	- 4)	- 4)	- 4)	- 4)	- 4)
	BBA 2.2	20		- 4)	- 4)	- 4)	- 4)	- 4)	- 4)
[redacted] (2013) CA 7.1.2.1.2/09	LUFA 2.2	20	M11	SFO	5.4	18.0	SFO	5.4	5.0
	LUFA 2.3	20	M11	SFO	26.2	87.1	SFO	26.2	20.8
	LUFA 6S	20	M11	SFO	21.5	71.3	SFO	21.5	14.1
n					**4**	**4**		**4**	**4**
Minimum					**5.4**	**18.0**		**5.4**	**4.6**
Maximum					**26.2**	**87.1**		**26.2**	**20.8**
Geometric mean					**12.2**	**40.5**		**12.2**	**9.1**

1) M07 / M11 not detected in relevant amounts
2) Decline fit using residues of "M07" from original study report
3) DT_{50} calculated from DT_{90} of FOMC model: $DT_{50} = DT_{90}/3.32$
4) Pathway fit not acceptable for M11, decline fit not possible

Table 7.1-38 Overview of formation fractions of M05, M07, M08, M09, M10 and M11

	Formation fraction persistence endpoints		Formation fraction modelling endpoints	
	Arithmetic mean	Worst case	Arithmetic mean	Worst case
MKH6561 1) → M05	0.87 (n = 3)	1.00	0.87 (n = 3)	1.00
M05 → M07	1.00 (n = 2)	1.00	1.00 (n = 2)	1.00
M07 → M08	0.52 (n = 3)	1.00	0.52 (n = 3)	1.00
M08 → M11	- 2)	- 2)	- 2)	- 2)
MKH6561 1) → M09	0.22 (n = 2)	0.22	0.22 (n = 2)	0.22
MKH6561 1) → M10	0.60 (n = 4)	0.79	0.69 (n = 3)	0.78
M09 → M10	0.74 (n = 4)	1.00	0.82 (n = 2)	0.84

1) MKH6561 = propoxycarbazone-sodium
1) Formation fractions could not be estimated

III. CONCLUSIONS

Persistence endpoints for the metabolites could be obtained as follows: 6 out of 7 independent data sets for M05 ($DegT_{50}$ 2.8 – 17.4 d; $DegT_{90}$ 9.3 - 57.8 d), 3 out of 8 independent data sets for M07 ($DegT_{50}$ 4.6 – 39.8 d; $DegT_{90}$ 15.2- 132.2 d), 7 out of 11 independent data sets for M08 ($DegT_{50}$ 8.5 – >1000 d; $DegT_{90}$ 152.9 - >1000 d), 4 out of 8 independent data sets for M09 ($DegT_{50}$ 13.4 – 385.7 d; $DegT_{90}$ 283.3 – >1000 d), 7 ($DegT_{50}$) and 6 ($DegT_{90}$) out of 9 independent data sets for M10 ($DegT_{50}$ 5.9 – 275.4 d; $DegT_{90}$ 405.1 – 915.0 d) and 4 out of 7 independent data sets for M11 ($DegT_{50}$ 5.4 – 26.2 d; $DegT_{90}$ 18.0 - 87.1 d), respectively.

Modelling endpoints (normalised) for the metabolites were obtained as follows: 6 out of 7 independent data sets for M05 ($DegT_{50}$ 1.8 – 14.5 d), 3 out of 8 independent data sets for M07 ($DegT_{50}$ 2.8 – 33.2 d), 5 out of 11 independent data sets for M08 ($DegT_{50}$ 29.5 – 312.9 d), 4 out of 8 independent data sets for M09 ($DegT_{50}$ 71.1 – 231.2 d), 5 out of 9 independent data sets for M10 ($DegT_{50}$ 43.2 – 109.3 d) and 4 out of 7 independent data sets for M11 ($DegT_{50}$ 4.6 – 20.8 d), respectively.

CA 7.1.2.1.3 Anaerobic degradation of the active substance

An anaerobic soil degradation study was performed using two radiolabel positions, [phenyl-U-^{14}C] and [triazolinone-3-^{14}C], which was requested by France to support propoxycarbazone-sodium autumn use and which was not submitted and evaluated during the Annex I inclusion. The study is submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval (CA 7.1.1.2/01) and includes the kinetic evaluation of the degradation of propoxycarbazone-sodium in soil under anaerobic conditions in the dark in the laboratory according to current FOCUS kinetic guidance to derive kinetic parameters suitable for environmental risk assessment. The kinetic evaluation is summarised below. A summary of the degradation rates of propoxycarbazone-sodium in soil under anaerobic conditions is given in CA 7.1.2.

Report:	[redacted]4; [redacted];2010;M-378046-01
Title:	[Triazolinone-3-14C]- and [phenyl-UL-14C]propoxycarbazone-sodium: Anaerobic soil metabolism
Report No:	MEF-09/221
Document No:	M-378046-01-1
Guidelines:	**OECD 307; EU 95/36/EC amended 91/414; US EPA, Subdivision N, Paragraph 162-2**
Deviations:	none
GLP/GEP:	**yes**

This study is completely summarised in CA 7.1.1.2/01 and the kinetic evaluation of the metabolites of propoxycarbazone-sodium is discussed in CA 7.1.2.1.4/01.

Executive Summary

The route and rate of degradation of the herbicide propoxycarbazone-sodium in soil under initially aerobic and then anaerobic flooded conditions were investigated by [redacted] (2010) (CA 7.1.1.2/01). In order to derive DT_{50} and DT_{90} values as trigger endpoints, the degradation behaviour of the test items [triazolinone-3-^{14}C]- and [phenyl-UL-^{14}C]propoxycarbazone-sodium in the entire systems during the anaerobic phase of the study was evaluated according to the FOCUS guidance document on degradation kinetics.

The degradation was best described using a first order multi compartment model (FOMC), resulting in a DT_{50} value of 45 days for [triazolinone-3-^{14}C]propoxycarbazone-sodium and a DT_{50} value of 39 days for [phenyl-UL-^{14}C]propoxycarbazone-sodium with chi-square (χ^2) errors of 7.7 and 1.2%, respectively. The corresponding DT_{90} values are 769 and > 1000 days, respectively.

I. MATERIALS AND METHODS

The route and rate of degradation of the herbicide propoxycarbazone-sodium were investigated in a European soil (loam, pH 6.7 in $CaCl_2$, 2.5% organic carbon; origin: [redacted] 4a, [redacted], Germany) under flooded anaerobic conditions following an aerobic incubation phase (CA 7.1.1.2/01). DT_{50} and DT_{90} values were determined for the degradation of the test items [triazolinone-3-^{14}C]- and [phenyl-UL-^{14}C]propoxycarbazone-sodium within the anaerobic phase. The determination of the kinetic values followed the recommendations of the FOCUS rules according to the FOCUS guidance document on degradation kinetics. Model input datasets for the entire system were the individual replicate values of residual propoxycarbazone-sodium. All data-points were weighed equally. For optimal goodness of fit, the initial value was also allowed to be estimated by the model. The kinetic evaluations and the statistical calculations for the quality checks were conducted with software KinGUI v1.1. The following kinetic models were tested in order to determine the best-fit kinetic model: single-first order model (SFO), first order multi-compartment model (FOMC), double first order in parallel kinetic model (DFOP).

The best-fit kinetic model was selected on the basis of the χ^2-error criterion and on the basis of a visual assessment of the goodness of the fits (diagrams of measured and calculated values vs. time, diagrams of residuals vs. time).

II. RESULTS AND DISCUSSION

A summary of the obtained trigger endpoints for propoxycarbazone-sodium in the entire systems is provided in Table 7.1-39. The degradation parameters refer to a temperature of 20°C.

Table 7.1-39 Summary of DT_{50} and DT_{90} values for Propoxycarbazone-sodium calculated for the entire systems in the anaerobic incubation phase

Soil	Kinetic Model	Propoxycarbazone-sodium (Label A / Label B)		
		DT_{50} (d)	**DT_{90} (d)**	**χ^2-error (%)**
[redacted] 4a	SFO	66 / 85	220 / 283	10.8 / 12.7
	FOMC	**45 / 39**	**769 / > 1000**	**7.7 / 1.2**
	DFOP	46 / 40	> 1000 / 454	8.1 / 2.0

The Best Fit Model is highlighted in bold

III. CONCLUSIONS

The degradation of propoxycarbazone-sodium during the anaerobic study phase was best described using a first order multi compartment model (FOMC), resulting in a DT_{50} value of 45 days for [triazolinone-3-^{14}C]propoxycarbazone-sodium and a DT_{50} value of 39 days for [phenyl-UL-^{14}C]propoxycarbazone-sodium with χ^2-errors of 7.7 and 1.2%, respectively. The corresponding DT_{90} values are 769 and > 1000 days, respectively.

CA 7.1.2.1.4 Anaerobic degradation of metabolites, breakdown and reaction products

An anaerobic soil degradation study was performed using two radiolabel positions, [phenyl-U-^{14}C] and [triazolinone-3-^{14}C], which was not submitted and evaluated during the Annex I inclusion. This study is submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval (CA 7.1.1.2/01). The degradation rates of the major degradation products in soil under anaerobic conditions in the laboratory are discussed below.

Report:	[redacted];2010;M-378046-01
Title:	[Triazolinone-3-14C]- and [phenyl-UL-14C]propoxycarbazone-sodium: Anaerobic soil metabolism
Report No:	MEF-09/221
Document No:	M-378046-01-1
Guidelines:	**OECD 307; EU 95/36/EC amended 91/414; US EPA, Subdivision N, Paragraph 162-2**
Deviations:	none
GLP/GEP:	**yes**

This study is completely summarised in CA 7.1.1.2/01 and the kinetic evaluation of the parent propoxycarbazone-sodium is given in CA 7.1.2.1.3/01.

The anaerobic degradation rate of the four major metabolites observed in the study (M07, M08, M10 and M11) was not calculated. Three of them (M07, M08 and M10) were also observed as major metabolites in aerobic soil metabolism studies (KCA 7.1.1.1.1/01 - 04) for which a kinetic evaluation was conducted (CA 7.1.2.1.2/10). Since the amounts of M07, M08 and M10 in this study remained either constant or declined not until the last sampling interval (150 days after soil flooding), a reasonable evaluation of the degradation behaviour was not possible. The major metabolite M11 occurred first in the anaerobic part of the study with a percentage in the entire system of 5.5% AR at day after treatment (DAT)-21 (day after

soil flooding DASF-7), increased to 17.1% AR at DAT-28 (DASF-14) and decreased then to 12.2% AR towards DAT-55 (DASF-41) and further to 0.0% AR at DAT-76 (DASF-62). For the kinetic evaluation of the decline, 4 data points could be used (3 points after maximum); however, due to the limited number of data points and a slight increase of the amounts from DAT-35 to DAT-55, the statistical parameters are not expected to be reliable. Based on the data presented in Table 7.1-10 (CA 7.1.1.2/01), the $DegT_{50}$ value can be estimated to be < 30 days. This estimated degradation rate is in the range of the calculated $DegT_{50}$ values of the aerobic degradation study of M11 (CA 7.1.2.1.2/09) with best-fit values between 5 and 26 days (CA 7.1.2.1.2/10).

CA 7.1.2.2 Field Studies

The dissipation and degradation of propoxycarbazone-sodium after application on bare soil under field conditions were studied at seven sites, two in Germany, two in United Kingdom, one in Northern France and two in Southern France using unlabelled propoxycarbazone-sodium formulated as WG 70.
The kinetic models and $DegT_{50}$ values used for modelling purpose (normalised to 20 °C and field capacity) and best-fit evaluation are summarised in Table 7.1-21 in CA 7.1.2.

CA 7.1.2.2.1 Soil dissipation studies

The dissipation and degradation of propoxycarbazone-sodium in soil under field conditions were evaluated during the Annex I inclusion using unlabelled propoxycarbazone-sodium formulated as WG 70, and were accepted by the European Commission (SANCO/4067/2001-Final, 30 September 2003).

Annex point	Author(s)	Year	Edition No.
KCA 7.1.2.2.1/01	[redacted]	1999, amended 2001	M-015671-03-1

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph.

One additional kinetic evaluation has been performed for propoxycarbazone-sodium and is submitted within this Supplemental Dossier for the renewal of approval for propoxycarbazone-sodium, because the existing kinetic field dissipation evaluation does not fulfill the current EFSA requirements to obtain $DegT_{50}$ values in soil for modelling purpose. The best-fit evaluation to obtain DT_{50} values for risk assessment was part of the original study (KCA 7.1.2.2.1/01). No new evaluation for environmental risk assessment was performed, because a visual check confirmed that DT_{90} values were clearly below one year.

Report:	[redacted]; [redacted]; 2014; M-484630-01
Title:	Kinetic modelling analysis of the degradation behaviour of propoxycarbazone-sodium (MKH6561) in field soil dissipation studies under European conditions
Report No:	358525-2
Document No:	M-484630-01-1
Guidelines:	**FOCUS (2006): Guidance Document on Estimating Persistence and Degradation Kinetics from Environmental Fate Studies on Pesticides in EU Registration. Report of the Work Group on Degradation Kinetics of FOCUS. EC Document Reference SANCO/10058/2005 version 2.0, June 2006. FOCUS (2011): Generic Guidance for Estimating Persistence and Degradation Kinetics from Environmental Fate Studies on Pesticides in EU Registration, version 1.0. EFSA (2010): Guidance for evaluating laboratory and field dissipation studies to obtain DegT50 values of plant protection products in soil. EFSA Journal 8(12):1936, 1-67.**
Deviations:	none
GLP/GEP:	**no**

Executive Summary

The aim of this evaluation was to conduct a kinetic modelling analysis for propoxycarbazone-sodium (MKH 6561) from field soil dissipation studies reported by [redacted] (1999) (KCA 7.1.2.2.1/01) in order to derive $DegT_{50}$ *matrix* values as parent modelling endpoints. These endpoints can be used in environmental fate models for calculation of predicted environmental concentrations (PEC).

The evaluation was based on residue data from seven independent field soil dissipation studies of propoxycarbazone-sodium in France, Germany and Great Britain. Only the trial sites [redacted] (UK), [redacted] (France), [redacted] (Germany) and [redacted] (Germany) were appropriate for derivation of modelling endpoints according to FOCUS (2006, 2011) and EFSA (2010) guidances. The resulting normalised $DegT_{50}$ *matrix* values for propoxycarbazone-sodium ranged from 3.4 to 10.8 days.

I. MATERIALS AND METHODS

The evaluation followed the recommendations of the FOCUS working group on degradation kinetics (FOCUS 2006, 2011) and the EFSA guidance (2010). At first all experimental residue data were adjusted following standard procedures recommended by FOCUS (2011) for kinetic modelling. Then the kinetic evaluation started with a time-step normalisation to standard reference conditions for soil temperature (20°C) and soil moisture (100 % field capacity). Daily temperature and soil moisture data for each site

were determined by model calculations with PEARL 4.4.4, using site-specific soil and weather data. After normalisation, all kinetic datasets were checked whether the field decline curve can be described well with the single first-order (SFO) model using procedures proposed by FOCUS. Bi-phasic kinetics such as double first-order in parallel (DFOP) with a semi-empirical breakpoint check and/or hockey-stick (HS) models were also considered, where appropriate. It is a step-wise approach following flow charts for evaluating normalised decline curves recommended by EFSA (2010) with an assessment of the goodness-of-fit based on visual and statistical evaluations. To guarantee that the residues describe the degradation in the soil matrix rather than loss processes from the soil surface only the slow phase of a bi-phasic decline for estimating half-lives or data points for SFO kinetics after at least 10 mm of rain has fallen were taken.

The kinetic analysis of the parent compound was conducted using the software package KinGUI (version 2.2012.320.1629) for parameter fitting ([redacted] et al., 2007[13]; Schmitt et al., 2011[14]). Optimisations were carried out for the initial soil residue (M_0), degradation rate constants (k), (g) or breakpoint (t_b), depending on the kinetic model. The parameters are optimised by minimising the sum of squared differences between measured and calculated data using Iteratively Reweighted Least Square (IRLS) routines. The error tolerance and the number of iterations were set to the default values of $1x10^{-3}$ and 10, respectively. The initial estimates for the parameters were calculated as proposed in [redacted] & [redacted] (2006)[15]. Data were not weighted and the initial concentration was not constrained in any of the fits.

II. RESULTS AND DISCUSSION

A summary of the obtained parent modelling endpoints for propoxycarbazone-sodium in the soil matrix is provided in Table 7.1-40. The degradation parameters refer to reference conditions of 20°C and field capacity (pF2) for proper use in environmental fate models.

Table 7.1-40 Modelling endpoints for propoxycarbazone-sodium in the soil matrix ($DegT_{50}$ *matrix*)

Trial	Location	Soil type[1)]	Model	$DegT_{50}$ *matrix* (d)
R701033	[redacted] (UK)	Sandy clay loam	SFO [2)]	9.6
R701041	[redacted] (France)	Silt loam	HS [3)]	10.8
R701068	[redacted] (France)	Silt loam	- [4)]	- [4)]
R701076	[redacted] (Germany)	Sandy loam	SFO [2)]	3.4
R702986	[redacted] (Germany)	Silt loam	SFO [2)]	4.8
R702994	[redacted] (France)	Silt loam	- [4)]	- [4)]
R703079	[redacted] (UK)	Sandy loam	- [4)]	- [4)]
			Minimum	**3.4**
			Maximum	**10.8**
			Geometric mean	**6.4**

1) Upper soil layer according to USDA
2) Data points before cumulative rainfall reached 10 mm were excluded
3) Breakpoint was fixed to the time when rain > 10 mm and slow phase (k_{slow}) was used for $DegT_{50}$ determination
4) No acceptable fit

[13] Schäfer, D., Mikolasch, M., Rainbird, P., Harvey, B. (2007): KinGUI: A new kinetic software tool for evaluations according to FOCUS Degradation Kinetics. In: Del Re, A.A.M. et al. (Eds.): Proceedings of the XIII Symposium on Pesticide Chemistry, Piacenza, 2007, p. 916-923.
[14] Schmitt, W., Gao, Z., Meyer, H. (2011): KinGUI2, version 2.2012.320.1629. Bayer CropScience AG.
[15] Schäfer, D. & Mikolasch, B. (2006): Kinetic Evaluation with MATLAB: Introduction to the Use of KINGUI Version 1.1. Bayer CropScience AG.

III. CONCLUSIONS

Only the trial sites [redacted] (UK), [redacted] (France), [redacted] (Germany) and [redacted] (Germany) were appropriate for derivation of modelling endpoints according to FOCUS (2006, 2011) and EFSA (2010). The resulting normalised $DegT_{50}$ *matrix* values for propoxycarbazone-sodium ranged from 3.4 to 10.8 days.

CA 7.1.2.2.2 Soil accumulation studies

Soil accumulation testing is not necessary in accordance with Commission Regulation (EU) No 283/2013 since DT_{90} of the total residue under field conditions is less than one year (refer to CA 7.1.2.2.1).

As $DegT_{50}$ values used for calculation of PEC in soil are >100 days for the active substance propoxycarbazone-sodium and its metabolites M08, M09 and M10, the potential for soil accumulation was assessed for these compounds. For a detailed description and the results of the accumulation assessment, please refer to M-CP, section 9, point 9.1.3.

CA 7.1.3 Adsorption and desorption in soil

The adsorption/desorption behaviour of propoxycarbazone-sodium and its major soil metabolites was investigated in batch equilibrium experiments using radiolabelled or non-radiolabelled compounds. Adsorption and desorption isotherms according to the Freundlich equation were calculated by linear regression analysis of the adsorption data. The results are summarised in Table 7.1-41 to Table 7.1-47.
For the active substance propoxycarbazone-sodium, the adsorption/desorption behaviour was investigated in two studies using [phenyl-UL-^{14}C]propoxycarbazone-sodium. The studies include a total of seven soils covering a relevant range of soil properties. Freundlich coefficients K_f were in the range of 0.19 – 1.71 mL/g with corresponding organic carbon normalised K_{foc} values in the range of 12.9 to 106.2 mL/g (arithmetic mean K_{foc}: 40.7 mL/g). The mobility of propoxycarbazone-sodium is classified as high according to McCall [16].
For the major soil metabolite M05 an adsorption/desorption study was provided in the former Annex I inclusion dossier, but due to the instability of the metabolite in slightly alkaline aqueous solutions no reliable K_{oc} values could be obtained. A new adsorption/desorption study with M05 was conducted with four soils to close a potential data gap. While instability of M05 was observed for one soil (pH 7.1), reliable adsorption coefficients were obtained for three soils having acid to slightly acid pH values (pH 3.1 to 5.7). For these soils Freundlich coefficients K_f were in the range of 0.10 – 2.65 mL/g with corresponding K_{foc} values ranging between 16.8 to 70.7 mL/g (arithmetic mean K_{foc}: 44.0 mL/g). This range is in agreement with the empirical K_{oc} value of 71.1 mL/g calculated with PCKOCWIN, a soil adsorption coefficient program (refer to KCA 7.1.3.1.2 /03), and a K_{oc} value of 35 mL/g based on a single column leaching study (refer to Section CA 7.1.4) submitted within the former Annex I inclusion dossier. The mobility of M05 in soil is classified as very high to high according to McCall [16].
The adsorption/desorption behaviour of the metabolites M07, M08, M09 and M10 was investigated in five soils respectively. Freundlich coefficients K_f of M07 were in the range of 0.02 – 0.25 mL/g with corresponding K_{foc} values in the range of 4.6 to 15.5 mL/g (arithmetic mean K_{foc}: 7.4 mL/g). M07 can be classified as very high mobile in soil according to McCall [16]. K_f values of M08 were in the range of 7.5–46.3 mL/g with corresponding K_{foc} values in the range of 456.9 to 2872.7 mL/g (arithmetic mean K_{foc}: 1711.0 mL/g). M08 is classified as low to slightly mobile in soil according to McCall [16]. K_f values of M09 were in the range of 0.26 – 3.90 mL/g with corresponding K_{foc} values in the range of 10.4 to 551.5 mL/g (arithmetic mean K_{foc}: 193.4 mL/g). M09 can be classified as high to medium mobile in soil according to McCall [16]. K_f values of M10 were in the range of 0.18 – 1.22 mL/g with corresponding K_{foc} values in the

[16] McCall (1980): Estimation of Chemical Mobility in Soil from Liquid Chromatographic Retention Times. Bull. Environm. Contam. Toxicol.24,190-195.

range of 8.9 to 75.5 mL/g (arithmetic mean K_{foc}: 37.9 mL/g). The mobility of M10 in soil can be classified as very high to high according to McCall [16].

As a new relevant soil metabolite M11 was found in the anaerobic soil degradation study (CA 7.1.1.2/01) a new adsorption/desorption study of metabolite M11 according to the OECD guideline 106 was conducted. The adsorption/desorption behaviour of M11 was investigated in four soils. K_f values were in the range of 0.05 – 1.02 L/g with corresponding K_{foc} values in the range of 2.7 to 17.4 mL/g (arithmetic mean K_{foc}: 12.3 mL/g). The mobility of M11 in soil can be classified as very high according to McCall [16].

The mobility of propoxycarbazone-sodium and its major soil metabolites is not pH dependent.

Table 7.1-41 Overview of the adsorption studies for the active substance propoxycarbazone-sodium

Reference		Guidelines	Soil origin	Soil type	OC (%)	Clay (%)	Silt (%)	Sand (%)	CEC (meq/100g)	pH (-)	K_f (mL/g)	K_{foc} (mL/g)	1/n (-)
KCA 7.1.3.1.1/01	[redacted], G., [redacted], I., 1997	EPA Ref: Subdivison N, § 163-1 (1982), OECD 106 (1981) EC, Commission Directive 95/36/EC (1995)	BBA 2.2	loamy sand [1]	2.48	7.2	12.3	80.5	10.0	6.1 [2]	0.1191	12.9	0.954
			[redacted]	silt [1]	2.66	10.2	81.3	8.5	15.0	7.8 [2]	0.6353	23.9	0.942
			A2	silt loam [1]	0.86	12.0	51.1	36.9	8.0	8.1 [2]	0.2479	28.8	0.941
			[redacted]	loamy sand [1]	0.37	3.6	17.6	78.8	6.7	6.8 [2]	0.2188	59.1	0.905
			[redacted]	silty clay loam [1]	1.61	30.4	57.2	12.4	15.0	6.7 [2]	1.7098	106.2	0.920
KCA 7.1.3.1.1/02	[redacted], M. 2002	EPA Ref: Subdivison N, § 163-1 (1982) OECD 106 (2000) EC, Commission Directive 95/36/EC (1995)	[redacted]	sand [3]	1.1	3.4	8.6	88.3	- [5]	5.5 - 5.6 [4]	0.1938	17.2	0.957
			[redacted]	loamy sand [3]	0.9	6.5	37.4	56.1	- [5]	6.4 – 6.6 [4]	0.3233	36.7	0.925

arithmetic mean	**0.5211**	**40.7**	**0.935**
geometric mean	0.3816	32.1	0.935
max	1.7098	106.2	0.957
min	0.1938	12.9	0.905

1) Texture according to USDA
2) pH in H2O
3) Texture according to DIN
4) pH values were determined in soil slurries after equilibration
5) Not reported

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

Table 7.1-42 Overview of the adsorption study for the metabolite M05

Reference		Guidelines	Soil origin	Soil type	OC (%)	Clay (%)	Silt (%)	Sand (%)	CEC (meq/100g)	pH (-)	K_f (mL/g)	K_{foc} (mL/g)	1/n (-)
KCA 7.1.3.1.2/09	[redacted] P., [redacted], S., 2014	OECD 106 (2000) Commission Directive 2001/59 EC, Method C.18 (2001)	Lufa 2.1	sand [1]	0.62	2.7	10.1	87.3	3.8	5.1	0.104	16.8	0.903
			Eurosoil 1	clay [2]	3.27	75.0	21.9	3.3	- [3]	5.7	2.310	70.7	0.935
			Eurosoil 5	loamy sand [2]	5.96	6.0	12.2	81.6	- [3]	3.1	2.647	44.4	0.840
			LUFA 6S	Clay [1]	1.64	41.0	36.8	22.2	23.7	7.1	- [4]	- [4]	- [4]
									arithmetic mean		1.687	44.0	0.893
									geometric mean		0.860	37.5	0.892
									max		2.647	70.7	0.935
									min		0.104	16.8	0.840

1) Texture according to USDA classification,
2) Texture according to Gawlik et al. (1999), The Science of the Total Environment, 229 (1999) 99-107; (clay: < 0.0002 mm, silt: 0.0002 - 0.063 mm, sand: 0.063 - > 0.2 mm)
3) Not reported
4) Not determined due to instability of the test item

Table 7.1-43 Overview of the adsorption study for the metabolite M07

Reference		Guidelines	Soil origin	Soil type	OC (%)	Clay [1] (%)	Silt [1] (%)	Sand [1] (%)	CEC (meq/100g)	pH [2] (-)	K_f (mL/g)	K_{foc} (mL/g)	1/n (-)
KCA 7.1.3.1.2/05	[redacted], G., [redacted], I., 1997	EPA Ref: Subdivison N, § 163-1 (1982) OECD 106 (1981) EC, Commission Directive 95/36/EC (1995)	BBA 2.3	loamy sand	2.48	7.2	12.3	80.5	10.0	6.1	0.13	5.2	0.951
			[redacted] A2	silt	2.66	10.2	81.3	8.5	15.0	7.8	0.12	4.6	0.937
				silt loam	0.86	12.0	51.1	36.9	8.0	8.1	0.04	5.2	0.966
			[redacted]	loamy sand	0.37	3.6	17.6	78.8	6.7	6.8	0.02	6.7	0.954
			[redacted]	silty clay loam	1.61	30.4	57.2	12.4	15.0	6.7	0.25	15.5	0.925
									arithmetic mean		**0.11**	**7.4**	**0.947**
									geometric mean		0.08	6.6	0.946
									max		0.25	15.5	0.966
									min		0.02	4.6	0.925

1) Texture according to USDA in H_2O
2) in H_2O
Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

Table 7.1-44 Overview of the adsorption study for the metabolite M08

Reference		Guidelines	Soil origin	Soil type	OC (%)	Clay [1)] (%)	Silt [1)] (%)	Sand [1)] (%)	CEC (meq/100g)	pH [2)] (-)	K_f (mL/g)	K_{foc} (mL/g)	1/n (-)
KCA 7.1.3.1.2/06	[redacted], W., [redacted] [redacted], C.E., 1999	EPA Ref: Subdivison N, § 163-1 (1982) OECD 106 (1981) EC, Commission Directive 95/36/EC (1995)	BBA 2.2	loamy sand	2.48	7.2	12.3	80.5	10.0	6.1	11.3	456.9	0.894
			[redacted]	silt	2.14	10.2	81.3	8.5	15.0	7.1	18.6	867.5	0.871
			[redacted] AIII	silt loam	0.86	12.0	51.1	36.9	8.0	8.1	20.0	2324.3	0.834
			[redacted]	loamy sand	0.37	3.6	17.6	78.8	6.7	6.8	7.53	2033.8	0.837
			[redacted]	silty clay loam	1.61	30.4	57.2	12.4	15.0	6.7	46.3	2872.7	0.821
										arithmetic mean	20.7	1711.0	0.851
										geometric mean	17.1	1400.2	0.851
										max	46.3	2872.7	0.894
										min	7.5	456.9	0.821

1) Texture according to USDA
2) in H_2O
Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

Table 7.1-45 Overview of the adsorption study for the metabolite M09

Reference		Guidelines	Soil origin	Soil type	OC (%)	Clay [1)] (%)	Silt [1)] (%)	Sand [1)] (%)	CEC (meq/100g)	pH [2)] (-)	K_f (mL/g)	K_{foc} (mL/g)	1/n (-)
KCA 7.1.3.1.2/07	[redacted], W., [redacted], C.E., 1999	EPA Ref: Subdivison N, § 163-1 (1982) OECD 106 (1981) EC, Commission Directive 95/36/EC (1995)	BBA 2.2	loamy sand	2.48	7.2	12.3	80.5	10.0	6.1	0.26	10.4	0.968
			[redacted]	silt	2.14	10.2	81.3	8.5	15.0	7.8	1.35	63.1	0.924
			[redacted] AIII	silt loam	0.86	12.0	51.1	36.9	8.0	8.1	0.86	99.9	0.945
			[redacted]	loamy sand	0.37	3.6	17.6	78.8	6.7	6.8	2.04	551.5	0.947
			[redacted]	silty clay loam	1.61	30.4	57.2	12.4	15.0	6.7	3.90	242.1	0.909
										arithmetic mean	**1.68**	**193.4**	**0.939**
										geometric mean	1.19	97.4	0.939
										max	3.90	551.5	0.968

1) Texture according to USDA
2) in H_2O
Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

min	0.26	10.4	0.909

Table 7.1-46 Overview of the adsorption study for the metabolite M10

Reference		Guidelines	Soil origin	Soil type	OC (%)	Clay [1] (%)	Silt [1] (%)	Sand [1] (%)	CEC (meq/100g)	pH [2] (-)	K_f (mL/g)	K_{foc} (mL/g)	1/n (-)
KCA 7.1.3.1.2/08	[redacted], G., [redacted], I., 1997	EPA Ref: Subdivison N, § 163-1 (1982) OECD 106 (1981) EC, Commission Directive 95/36/EC (1995)	BBA 2.2	loamy sand	2.48	7.2	12.3	80.5	10.0	6.1	0.22	8.9	0.945
			[redacted]	silt	2.66	10.2	81.3	8.5	15.0	7.8	0.39	14.5	0.931
			A2	silt loam	0.86	12.0	51.1	36.9	8.0	8.1	0.18	20.6	0.964
			[redacted]	loamy sand	0.37	3.6	17.6	78.8	6.7	6.8	0.26	69.9	0.949
			[redacted]	silty clay loam	1.61	30.4	57.2	12.4	15.0	6.7	1.22	75.5	0.908
										arithmetic mean	**0.45**	**37.9**	**0.939**
										geometric mean	0.35	26.9	0.939
										max	1.22	75.5	0.964
										min	0.18	8.9	0.908

1) Texture according to USDA
2) in H_2O
Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium

Table 7.1-47 Overview of the adsorption study for the metabolite M11

Reference		Guidelines	Soil origin	Soil type	OC (%)	Clay (%)	Silt (%)	Sand (%)	CEC (meq/100g)	pH (-)	K_f (mL/g)	K_{foc} (mL/g)	1/n (-)
KCA 7.1.3.1.2/10	[redacted] P., [redacted], S., 2014	OECD 106 (2000) Commission Directive 2001/59 EC Method C.18 (2001)	Lufa 2.1	sand [1]	0.66	4.8 [1]	10.5 [1]	86.7 [1]	4.1	5.2	0.079	11.9	1.011
			Lufa 6S	clay [1]	1.66	40.7 [1]	34.5 [1]	24.8 [1]	26.9	7.1	0.045	2.7	0.690
			Labsoil F	silt loam [1]	4.91	25.6 [1]	57.3 [1]	17.1 [1]	18.5	4.4	0.852	17.4	0.781
			Eurosoil 5	loamy sand [2]	3.96	6.0 [2]	12.7 [2]	71.6 [2]	- [3]	3.1	1.018	17.1	0.933
										arithmetic mean	**0.499**	**12.3**	**0.854**
										geometric mean	0.236	9.9	0.844
										max	1.018	17.4	1.011
										min	0.045	2.7	0.690

1) Texture according to USDA classification, only the soil characteristics for the soil batch used in the isotherm experiments are presented
2) Texture according to Gawlik et al. (1999), The Science of the Total Environment, 229 (1999) 99-107; (clay: < 0.0002 mm, silt: 0.0002 – 0.063 mm, sand: 0.063 - > 0.2 mm)
3) Not reported

CA 7.1.3.1 Adsorption and desorption

CA 7.1.3.1.1 Adsorption and desorption of the active substance

The adsorption and desorption behaviour of propoxycarbazone-sodium in soil in batch equilibrium experiments was evaluated during the Annex I inclusion using one radiolabel position, [phenyl-UL-^{14}C], and was accepted by the European Commission (SANCO/4067/2001-Final, 30 September 2003; Addendum 1 to the Monograph, December 2002).

Annex point	Author(s)	Year	Edition No.
KCA 7.1.3.1.1/01	[redacted], G. and [redacted], I.	1997	M-001619-01-1
KCA 7.1.3.1.1/02	[redacted], M.	2002	M-066601-01-1

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to the corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph. A summary of the relevant data is given in section CA 7.1.3.

No additional studies are submitted within this Supplemental Dossier for propoxycarbazone-sodium renewal of approval.

CA 7.1.3.1.2 Adsorption and desorption of metabolites, breakdown and reaction products

The adsorption and desorption behaviour of the metabolites M04, M05, M06, M07, M08, M09 and M10 in soil in batch equilibrium experiments was evaluated during the Annex I inclusion using two radiolabel positions, [phenyl-UL-^{14}C] for M04, M05 M06, M07 and M08 and [triazolinone-3-^{14}C] for M09 and M10. The data were accepted by the European Commission (SANCO/4067/2001-Final, 30 September 2003).

Annex point	Author(s)	Year	Edition No.
KCA 7.1.3.1.2/01	[redacted], G. and [redacted], I.	1997	M-001640-01-1
KCA 7.1.3.1.2/02	[redacted], G. and [redacted], I.	1997	M-001644-01-1
KCA 7.1.3.1.2/03	[redacted], E.	1999	M-013339-01-1
KCA 7.1.3.1.2/04	[redacted], G.; [redacted], I.	1997	M-001642-01-1
KCA 7.1.3.1.2/05	[redacted], G.; [redacted], I	1997	M-012973-01-1
KCA 7.1.3.1.2/06	[redacted], W. and [redacted], C.E.	1999	M-012968-01-1
KCA 7.1.3.1.2/07	[redacted], W. and [redacted], C.E.	1999	M-012896-01-1
KCA 7.1.3.1.2/08	[redacted], G. and [redacted], I.	1997	M-001639-01-1

Four studies evaluated during the Annex I inclusion are not considered relevant for this Supplemental Dossier for the renewal of approval. Two of the studies were performed with the minor soil metabolites M04 (KCA 7.1.3.1.2/01) and M06 (KCA 7.1.3.1.2/04). Adsorption and desorption data for minor metabolites are not required. The third study was performed with the major degradation product M05 (KCA 7.1.3.1.2/02), but could not be used for the determination of reliable K_{foc} values (due to the instability of the test item in the application solution). The fourth study including the empirical calculation of the K_{oc} value for M05 (KCA 7.1.3.1.2/03) could be replaced by a new study in which three reliable adsorption constants for M05 were obtained.

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium please refer to the corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph. A summary of the relevant data is given in section CA 7.1.3.

Two new studies have been performed for the major degradation products M05 and M11 and are submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval using unlabelled M05 (CA 7.1.3.1.2/09) and unlabelled M11 (CA 7.1.3.1.2/10). Regarding the metabolite M05 a new adsorption/desorption study was conducted to close a potential data gap. As in the new anaerobic soil degradation study the major metabolite M11 was found a new adsorption/desorption study of metabolite M11 according to the OECD guideline 106 was conducted.
A summary of the adsorption and desorption behaviour of the major degradation products in soil is given in section CA 7.1.3.

Report:	[redacted]ü;[redacted];[redacted];2014;M-485911-01
Title:	Determination of the adsorption / desorption behaviour of MKH 6561-sulfonamide
Report No:	70413195
Document No:	M-485911-01-1
Guidelines:	**OECD Guideline for Testing of Chemicals, No. 106, Adsorption/Desorption, adopted January 21, 2000** **Commission Directive 2001/59/EC, Method C.18, Adsorption/Desorption Using a Batch Equilibrium Method (EEC Publication No. L 225, 2001)**
Deviations:	none
GLP/GEP:	**yes**

Executive Summary

The adsorption/desorption behaviour of MKH 6561-sulfonamide was investigated in a batch equilibrium experiment using 3 soil types varying in clay content, organic carbon content and pH value (Lufa 2.1: pH 5.1, 0.62% organic carbon; Eurosoil 1: pH 5.7, 3.27% organic carbon and Eurosoil 5: pH 3.1, 5.96% organic carbon). One further soil (Lufa 6S) was used in the preliminary test but, due to the instability of the test item in presence of this soil, excluded from all further experiments.

The experiments were performed at 20 ± 2°C in the dark using glass vessels and 0.01 M $CaCl_2$ solution as aqueous phase. The analytical methods for the determination of the test item amounts in aqueous supernatants and soil extracts are based on UPLC-UV detection (nominal test item concentration of 20 and 40 mg/L) and LC-MS/MS (nominal test item concentrations of 0.4 to 4 mg/L). The methods were validated in the course of the study.

Preliminary tests were performed to determine the appropriate soil/solution ratios as well as the equilibration times for adsorption and desorption. During these tests it was confirmed, that the test item was stable in 0.01 M $CaCl_2$ solution as well as in soil matrix for a period of 48 h. The test item did not adsorb to the surface of the test vessels. Parental mass balances were established for all three soils and varied between 89% and 100% of the nominal amount applied.

For the determination of the adsorption and desorption isotherms, the adsorption phase of the study was carried out using pre-conditioned soil aliquots treated with non-radiolabelled MKH 6561-sulfonamide at nominal concentrations of 0.4, 2, 4, 20 and 40 mg/L. A soil/solution ratio of 1/1 was used for soil Lufa 2.1 (20 g air-dried soil and 20 mL solution) and a soil/solution ratio of 1/5 was used for Eurosoils 1 and 5 (2 g air-dried soil and 10 mL solution). During the adsorption phase, the samples were shaken for 24 h on a horizontal shaker. Thereafter, the solid and liquid phases were separated by centrifugation and the decanted volume of the aqueous supernatant was replaced by an equal volume of fresh 0.01 M $CaCl_2$ solution. Then, the samples were again shaken for 24 hours. Thereafter, solid and liquid phases were separated and the aqueous phases after adsorption and desorption were analysed for test item content.

Adsorption ranged between 5.8% and 14.1% for soil Lufa 2.1, between 21.7% and 38.0% for Eurosoil 1 and between 23.3% and 37.8% for Eurosoil 5. Desorption ranged between 27.1% and 98.4% for soil Lufa 2.1, between 45.2% and 65.8% for Eurosoil 1 and between 42.3% and 76.7% for Eurosoil 5.

Adsorption and desorption were slightly non-linear with Freundlich exponents in the range of 0.840 to 0.935. Adsorption coefficients (K_f^{ads}) ranged from 0.104 to 2.647 mL/g with corresponding organic carbon normalised adsorption constants (K_{foc}^{ads} values) ranging from 16.794 to 70.651 mL/g for the three test soils (arithmetic mean: 43.950 mL/g).

Desorption coefficients (K_f^{des}) were 2.662 mL/g for Eurosoil 1 and 1.862 mL/g for Eurosoil 5 with corresponding organic carbon normalised desorption constants (K_{foc}^{des} values) of 81.415 and 31.238 mL/g, respectively (arithmetic mean: 56.326 mL/g). For soil Lufa 2.1 no desorption isotherms were calculated since no linear desorption pattern was observed.

I. MATERIALS AND METHODS

A. MATERIALS

1. Test material (non-radiolabelled)

Test material (non-radiolabelled)	MKH 6561-sulfonamide (M05)
Chemical Name:	Methyl 2-sulfamoylbenzoate
Batch Code:	AE F073550-01-01
Origin Batch No.:	BCOO 5771-1-1
Physical Appearance/Colour:	Solid, white
Chemical Purity:	99.4% w/w
Expiry Date:	March 14, 2015
Storage:	At 10-30°C, under dark conditions

2. Soils

Four different soils (refer to Table 7.1-48) representative for the West-European area were used for the study. The soils were air-dried, passed through a 2 mm sieve prior to use and stored at room temperature. One of the soils (Lufa 6S) was used in the preliminary test, but due to the instability of the test item, excluded from all further experiments.

Table 7.1-48 Soil physicochemical properties

Soil	Lufa 2.1	Eurosoil 1	Eurosoil 5	Lufa 6S
Location	Rhineland-Palatinate ([redacted])	Sicily	Schleswig-Holstein	Rhineland-Palatinate ([redacted])
Country	Germany	Italy	Germany	Germany
Depth of Sampling (cm)	20	max. 30	max. 30	20
Soil type	sand[1)]	clay[2)]	loamy sand[2)]	clay[1)]
Sand (%)	87.3 [1)]	3.3[2)]	71.6[2)]	22.2[1)]
Silt (%)	10.1[1)]	21.9[2)]	12.7[2)]	36.8[1)]
Clay (%)	2.7[1)]	75.0[2)]	6.0[2)]	41.0[1)]
Organic carbon (%)	0.62	3.27	5.96	1.64
pH (0.01 $CaCl_2$)	5.1	5.7	3.1	7.1
CEC (meq/100 g)	3.8	Not reported	Not reported	23.7

1) According to USDA classification clay: < 0.002 mm, silt: 0.002 – 0.05 mm, sand: 0.05 – 2 mm
2) Data were taken from Gawlik et al. (1999), The Science of the Total Environment, 229 (1999) 99-107 (clay: < 0.0002 mm, silt: 0.0002 – 0.063 mm, sand: 0.063 - > 0.2 mm) = DIN

B. STUDY DESIGN

1. Experimental conditions

All experimental steps were performed at 20 ± 2°C in the dark using glass vessels and 0.01 M $CaCl_2$ solution as aqueous phase. The stock and application solutions of the test item were prepared in 0.01 M $CaCl_2$ solution. Prior to use in the different experiments, soil aliquots (air-dried) were pre-conditioned by shaking them with an appropriate amount of 0.01 M $CaCl_2$ solution overnight. Then the respective aliquots of application solution were added. After shaking on a horizontal shaker for the appropriate time intervals, phase separation was accomplished by centrifugation (10 min at 3000 rpm, 1800 x g) and removal of the supernatant.

In the preliminary test conducted at a nominal concentration of 40 mg/L with all four soils significant adsorption of the test item was found after 48 h and a soil/solution ratio of 1/5 was chosen for for soils Lufa 2.1 and Eurosoils 1 and 5. The fourth soil (Lufa 6S) was not further used due to the instability of the test item during equilibration (in sterile filtered soil matrix and in contact with soil). During the following adsorption kinetics test, adsorption of soil Lufa 2.1 was lower than in the preliminary test. Therefore, a soil/solution ratio of 1/1 was used in the following test for this soil. For adsorption and desorption kinetic tests samples were taken after 2, 4, 10, 24 and 48 h.

For parental mass balance determinations during the preliminary tests, soil aliquots after adsorption were extracted. For this purpose, the aqueous phase was recovered as much as possible. The soil remnant was suspended with 8 mL extraction mixture MeOH/pure water 50/50 v/v + 0.1% HAc, followed by 10 min sonication and shaking for 20 min using an overhead shaker. Phase separation was accomplished by centrifugation. The extraction procedure was repeated twice. The supernatants were combined and the final volume was adjusted to 25 mL. Soil extracts were stored in the refrigerator unfiltered.

Adsorption and desorption isotherm experiments were performed at five different concentrations of the test item spanning a range of two orders of magnitude (0.4, 2, 4, 20 and 40 mg/L). Three replicates per concentration and soil were used. A soil/solution ratio of 1/1 was used for soil Lufa 2.1 (20 g air-dried soil and 20 mL solution) and a soil/solution ratio of 1/5 was used for Eurosoils 1 and 5 (2 g air-dried soil and 10 mL solution). Adsorption and desorption phases were each performed for 24 hours based on the results obtained from adsorption kinetics and desorption kinetics test.

Control samples without soil were used to determine the stability of the test item in 0.01 M $CaCl_2$ solution as well as in filtered soil matrix and to investigate the adsorption onto the test vessels. Furthermore, blank samples containing soil but no test item were used to investigate interferences with the soil matrix (one replicates per test).

The pH was measured in 0.01 M $CaCl_2$ before and after application and at each sampling point in each test.

2. Description of analytical procedures

Quantification of MKH 6561-sulfonamide in aqueous supernatants and soil extracts was based on UPLC-UV detection (nominal test item concentrations of 20 mg/L and 40 mg/L) and LC-MS/MS (nominal test item concentration of 0.4 mg/L to 4 mg/L). Specificity was ensured by comparing retention of the standard solution with the retention time of the analyte in the sample solution using UPLC-UV detection and by test item specific mass transitions and retention time in case of LC-MS/MS analysis. No interference was found.

Accuracy and precision of the method (UPLC-UV) were determined using the control samples. Mean recovery for the test item concentration was 101% with a relative standard deviation of 3.5% (results filed in the raw data). Both values were in the range of 90-110% (accuracy) and ≤ 20% (precision), respectively.

Regression coefficients (r) for the calibration curves were in the range of 0.9957-1.0000 (UPLC-UV) and 0.9920-0.9999 (LC-MS/MS). The limits of detection (LOD) and quantification (LOQ) for UPLC-UV were 24 and 81 µg/L, respectively, corresponding to 0.1 and 0.4% of the lowest nominal concentration analysed (20 mg/L). LOD and LOQ for LC-MS/MS were 0.9 and 3.0 µg/L, respectively, corresponding to 0.2 and 0.8% of the lowest nominal concentration analysed (0.4 mg/L).

II. RESULTS AND DISCUSSION

A. MASS BALANCE

In the preliminary tests it was demonstrated that the unlabelled test item was stable in 0.01 M $CaCl_2$ solution as well as in contact with the three soils used to determine the adsorption and desorption isotherms. The test item did not adsorb to the surfaces of the test vessels. Recoveries in control samples (0.01 M $CaCl_2$ solution and filtered soil matrix) ranged from 98% to 106% of the nominal applied amount and parental mass balances in presence of soil ranged from 89% to 100% of the nominal applied amount.

In case of soil Lufa 6S neither in the control soil matrix solution nor for one of the three soil/solution ratios tested a recovery of ≥ 90% of the applied amount could be found. Thus, soil Lufa 6S was not used in further tests.

B. DATA

The adsorbed and desorbed amounts of MKH 6561-sulfonamide at each concentration in the adsorption/desorption isotherm experiments are provided in percentage of applied amount in the table below.

Table 7.1-49 Adsorbed and desorbed amounts of MKH 6561-sulfonamide

Soil type	% adsorbed at concentration of				
	0.4 mg/L	2 mg/L	4 mg/L	20 mg/L	40 mg/L
Lufa 2.1	9.2	14.1	11.3	5.8	7.0
Eurosoil 1	34.6	21.7	38.0	27.6	26.1
Eurosoil 5	37.8	35.1	33.8	23.7	23.3
	% desorbed				
Lufa 2.1	80.2	27.1	67.8	96.0	98.4
Eurosoil 1	45.2	65.8	49.1	47.8	55.8
Eurosoil 5	70.7	42.3	73.1	63.6	76.7

Adsorption ranged between 5.8% and 14.1% for soil Lufa 2.1, between 21.7% and 38.0% for Eurosoil 1 and between 23.3% and 37.8% for Eurosoil 5. Desorption ranged between 27.1% and 98.4% for soil Lufa 2.1, between 45.2% and 65.8% for Eurosoil 1 and between 42.3% and 76.7% for Eurosoil 5.

Table 7.1-50 Adsorption and desorption coefficients of MKH 6561-sulfonamide

Soil Type	Adsorption				Desorption			
	K_f [1] (mL/g)	1/n	r^2	K_{foc} [1] (mL/g)	K_f^{des} [1] (mL/g)	1/n	R^2	K_{foc}^{des} [1] (mL/g)
Lufa 2.1	0.104	0.903	0.876	16.794	- [2]	- [2]	- [2]	- [2]
Eurosoil 1	2.310	0.935	0.958	70.651	2.662	0.934	0.961	81.415
Eurosoil 5	2.647	0.840	0.990	44.406	1.862	0.892	0.891	31.238
Mean	**1.687**	**0.893**	**0.938**	**43.950**	**2.262**	**0.913**	**0.926**	**56.326**

1) For a reference concentration of 1 mg/L the unit of the Freundlich coefficients can be expressed as mL/g
2) Desorption coefficients were not calculated for soil Lufa 2.1 since no linear desorption pattern was observed

Adsorption coefficients (K_f^{ads}) ranged from 0.104 to 2.647 mL/g with corresponding organic carbon normalised adsorption constants (K_{foc}^{ads} values) ranging from 16.794 to 70.651 mL/g for the three test soils (arithmetic mean: 43.950 mL/g).

Desorption coefficients (K_f^{des}) were 2.662 mL/g for Eurosoil 1 and 1.862 mL/g for Eurosoil 5 with corresponding organic carbon normalised desorption constants (K_{foc}^{des} values) of 81.415 and 31.238 mL/g, respectively (arithmetic mean: 56.326 mL/g). For soil Lufa 2.1 no desorption isotherms were calculated since no linear desorption pattern was observed. Adsorption and desorption were slightly non-linear with Freundlich exponents in the range of 0.840 to 0.935.

The pH value of the soils was measured in 0.01 M $CaCl_2$ solution. In general, no significant differences were found before and after test item application as well as with increasing contact time during each conducted test.

III. CONCLUSIONS

Adsorption coefficients (K_f) ranged from 0.104 to 2.647 mL/g with corresponding organic carbon normalised adsorption constants (K_{foc}^{ads} values) ranging from 16.794 to 70.651 mL/g for the three test soils (arithmetic mean: 43.950 mL/g). Adsorption was slightly non-linear with Freundlich exponents in the range of 0.840 to 0.935.

Report:	[redacted];[redacted];[redacted];2014;M-485908-01
Title:	Determination of the adsorption / desorption behaviour of MKH 6561-methoxy-saccharin
Report No:	70466195
Document No:	M-485908-01-1
Guidelines:	**OECD Guideline for Testing of Chemicals, No. 106, Adsorption/Desorption, adopted January 21, 2000** **Commission Directive 2001/59/EC, Method C.18, Adsorption/Desorption Using a Batch Equilibrium Method (EEC Publication No. L 225, 2001)**
Deviations:	none
GLP/GEP:	**yes**

Executive Summary

The adsorption/desorption behaviour of MKH 6561-methoxy-saccharin was investigated in batch equilibrium experiments using 4 soil types varying in clay content, organic carbon content and pH value (Lufa 2.1: 2.8% clay, 0.66% organic carbon, pH 5.2, Lufa 6S: 40.7% clay, 1.66% organic carbon, pH 7.1, Labsoil F: 25.6% clay, 4.91% organic carbon, pH 4.4 and Eurosoil 5: 6.0% clay, 5.96% organic carbon, pH 3.1). One further soil (Eurosoil 1) was used in the preliminary test but excluded from all further experiments due to the low adsorption of MKH 6561-methoxy-saccharin found in this soil.

The experiments were performed at 20 ± 2°C in the dark using glass vessels and 0.01 M $CaCl_2$ solution as aqueous phase. Quantification and characterisation of the test item were achieved using UPLC-UV (nominal test item concentration of 2.5 mg/L to 25 mg/L) and LC-MS/MS analysis (nominal test item concentration of 0.025 mg/L to 2.5 mg/L). Prior to analysis, samples were filtered using 0.2 µm cellulose acetate syringe filters. The analytical methods were validated in the course of the study.

Preliminary tests were performed to determine the appropriate soil/solution ratios as well as the equilibration time for adsorption. The test item did not adsorb to the surfaces of the test vessels. Recoveries in control samples (0.01 M $CaCl_2$ solution and soil matrix solution) ranged from 98% and 104% of the nominal applied amount, except for the matrix of Eurosoil 5 for which only 73% were recovered. However, complete parental mass balances were obtained for this soil as well as for soils Lufa 2.1 and Lufa 6S. In case of the fourth soil, Labsoil F, mass balances were < 90% in the preliminary tests. Therefore, an extended extraction procedure with four extraction steps was applied with the solid phase after the adsorption/desorption isotherm experiments. The final parental mass balance was still < 90% (76% for a soil/solution ratio of 1/1). However, the stability of the test item was shown in presence of soil matrix in the control samples (recovery of 104%) as well as by the absence of degradation products in the presence of soil (according to UPLC-UV). The lower parental mass balance might be a result of the high organic carbon content of Labsoil F leading to an irreversible adsorption of the test item.

For the determination of the adsorption and desorption isotherms, the adsorption phase of the study was carried out using pre-conditioned soil aliquots treated with non-radiolabelled MKH 6561-methoxy-saccharin at nominal concentrations of 0.025, 0.14, 0.25, 1.4 and 2.5 mg/L (soils Lufa 2.1 and Lufa 6S) or 0.25, 1.4, 2.5, 14 and 25 mg/L (Labsoil F and Eurosoil 5). A soil/solution ratio of 1/1 was used for soils Lufa 2.1, Lufa 6S and Labsoil F (20 g air-dried soil and 20 mL solution) and a soil/solution ratio of 1/2 was used for Eurosoil 5 (10 g air-dried soil and 20 mL solution). During the adsorption phase, the samples were shaken for 24 h on a horizontal shaker. Thereafter, the solid and liquid phases were separated by centrifugation and the decanted volume of the aqueous supernatant was replaced by an equal volume of fresh 0.01 M $CaCl_2$ solution. Then, the samples were again shaken for 24 hours. Thereafter, solid and liquid phases were separated and the aqueous phases after adsorption and desorption were analysed for test item content.

Adsorption was in the range of 3.8% to 11.1% for soil Lufa 2.1, 1.1% to 8.3% for soil Lufa 6S, 25.0% to 48.0% for Labsoil F and 29.3% to 35.2% for Eurosoil 5. Desorption ranged from 44.4% to 85.9% for soil Lufa 2.1, from 48.9% to 75.3% for soil Lufa 6S, from 6.3% to 24.1% for Labsoil F and from 43.0% to 75.4% for Eurosoil 5.

Adsorption isotherms could be established for all four soil types while desorption isotherms could only be established for soils Lufa 2.1, Labsoil F and Eurosoil 5 since no linear correlation was obtained in the desorption pattern of soil Lufa 6S.

Adsorption coefficients (K_f) ranged from 0.045 to 1.018 mL/g with corresponding organic carbon normalised adsorption constants (K_{foc} values) ranging from 2.715 to 17.362 mL/g (arithmetic mean: 12.268 mL/g). Desorption coefficients (K_f^{des}) ranged from 0.309 to 1.095 mL/g with corresponding organic carbon normalised desorption constants (K_{foc}^{des} values) ranging from 17.055 to 46.88g mL/g (arithmetic mean: 28.748 mL/g). The Freundlich exponents (1/n) of the adsorption isotherms ranged from 0.690 to 1.011 indicating a slightly non-linear to linear adsorption behaviour. The Freundlich exponents of the desorption isotherms of soils Lufa 2.1, Labsoil F and Eurosoil 5 ranged between 0.730 and 1.296 indicating a slightly non-linear to linear desorption behaviour as well.

I. MATERIALS AND METHODS

A. MATERIALS

1. Test material (non-radiolabelled) MKH 6561-Methoxy-Saccharin (M11)

Chemical Name:	4-methoxy-1,2-benzothiazol-3(2H)-one 1,1-dioxide
Batch Code:	BCS-AG74018-01-01
Origin Batch No.:	BCOO 6413-13-5
Physical Appearance/Colour:	Solid, light yellow
Chemical Purity:	99.7% w/w
Expiry Date:	May 22, 2014
Storage:	At 10-30°C, under dark conditions

2. Soils

A total of five different soils (refer to Table 7.1-1) representative for the West-European area was used in the study. The soils were air-dried, passed through a 2 mm sieve prior to use and stored at room temperature. One of the soils (Eurosoil 1) was only used in the preliminary test and excluded from all further experiments due to the low adsorption found in this soil. The investigation of the sorption behaviour in this soil was not expected to provide additional information.

Table 7.1-51 Soil physicochemical properties

Soil	Lufa 2.1 [1)]	Lufa 6S [1)]	Labsoil F [1)]	Eurosoil 5	Eurosoil 1
Location	Rhineland-Palatinate ([redacted])	Rhineland-Palatinate ([redacted])	[redacted] ([redacted])	Schleswig-Holstein	Sicily
Country	Germany	Germany	United Kingdom	Germany	Italy
Depth of Sampling (cm)	20	20	5-15	max. 30	max. 30
Soil type [1)]	sand [2)]	clay [2)]	silt loam [2)]	loamy sand	clay
Sand (%) [1)]	87.3 / 86.7 [2)]	22.2 / 24.8 [2)]	15.5 / 17.1 [2)]	71.6 [3)]	3.3 [3)]
Silt (%) [1)]	10.1 / 10.5 [2)]	36.8 / 34.5 [2)]	59.8 / 57.3 [2)]	12.7 [3)]	21.9 [3)]
Clay (%) [1)]	2.7 / 2.8 [2)]	41.0 / 40.7 [2)]	24.7 / 25.6 [2)]	6.0 [3)]	75.0 [3)]
Organic carbon (%)	0.62 / 0.66	1.64 / 1.66	5.43 / 4.91	5.96	3.27
pH (0.01 $CaCl_2$)	5.1 / 5.2	7.1 / 7.1	4.2 / 4.4	3.1	5.7
CEC (meq/100 g)	3.8 / 4.1	23.7 / 26.9	20.4 / 18.5	Not reported	Not reported

1) Two batches (1 / 2) were used for soils Lufa 2.1, Lufa 6S and Labsoil F. The second batch was used solely for the isotherm experiments
2) According to USDA classification for soils Lufa 2.1, Lufa 6S and Labsoil F (clay: < 0.002 mm, silt: 0.002 – 0.05 mm, sand: 0.05 – 2 mm),
3) For Eurosoils 1 and 5 the data were taken from Gawlik et al. (1999), The Science of the Total Environment, 229 (1999) 99-107 (clay: < 0.0002 mm, silt: 0.0002 – 0.063 mm, sand: 0.063 - > 0.2 mm)

B. STUDY DESIGN

1. Experimental conditions

All experimental steps were performed at 20 ± 2°C in the dark using glass vessels and 0.01 M $CaCl_2$ solution as aqueous phase. The stock and application solutions of the test item were prepared in 0.01 M $CaCl_2$ solution. Prior to use in the different experiments, soil aliquots (air-dried) were pre-conditioned by shaking them with an appropriate amount of 0.01 M $CaCl_2$ solution overnight. Then, the respective aliquots of application solution were added. After shaking on a horizontal shaker for the appropriate time intervals, phase separation was accomplished by centrifugation (10 min at 3000 rpm, 1800 x g) and removal of the supernatant.

The preliminary test was conducted with a concentration of 2.5 mg/L using a total of five soil types with varying soil/solution ratios. Samples were taken after 4/6, 24 and 48 h. The first step was performed with three soils (Lufa 2.1, Lufa 6S and Eurosoil 5) but due to the low adsorption of the test item found for two of these soils (Lufa 2.1 and Lufa 6S), two additional soils (Labsoil F and Eurosoil 1) were tested in order to provide a broader base for the determination of reliable adsorption values. Significant adsorption > 20% was found in one of these soils (Labsoil F), while adsorption in the other one (Eurosoil 1) was < 20% after 48 hours. The latter soil was excluded from all further steps since its inclusion was not expected to bring additional information. For the four remaining soils, the following soil/solution ratios were chosen for the next steps: 1:1 for soils Lufa 2.1, Lufa 6S and Labsoil F; 1:2 for Eurosoil 5.

During the adsorption kinetics test (samples were taken after 2, 4, 10, 24 and 48 h), adsorption equilibrium was reached for all four soils after 24 h. The equilibration time for desorption was not determined separately but estimated to be within 24 hours based on the adsorption kinetics test.

For parental mass balance determinations, soil aliquots were extracted in different experimental steps. For this purpose, the aqueous phase was recovered as much as possible. In the preliminary test and the adsorption kinetics test 1, the soil remnant was suspended with 8 mL ACN/(50 mM $CaCl_2$ + 10 mM NH_4OH) 50/50 v/v, followed by 10 min sonication and shaking the samples for 20 min using an overhead shaker. Phase separation was accomplished by centrifugation (10 min at 3000 rpm, 1800 x g). The extraction procedure was repeated twice. The supernatants were combined and the final volume was adjusted to 25 mL. Soil extracts were stored in the refrigerator unfiltered until analysis. Due to parental mass balances < 90% for Labsoil F, the extraction procedure was slightly modified during the adsorption kinetics tests 2 and 3 using pure water for

the first extraction step. Final investigations on the parental mass balance were conducted after the adsorption/desorption isotherm experiment after which the soil remnant was extracted with 8 mL 0.01 M $CaCl_2$ solution (step 1) followed by 10 min sonication and shaking the samples for 20 min using an overhead shaker. Phase separation was accomplished by centrifugation (10 min at 3000 rpm, 1800 x g). In case of steps 2 to 3 a mixture of ACN/(50 mM $CaCl_2$ + 10 mM NH_4OH) 50/50 v/v was used. The supernatants were filled up to 10 mL each (not combined). Individual soil extracts were stored in the refrigerator unfiltered until analysis by UPLC-UV.

Adsorption and desorption isotherm experiments were performed at five different concentrations of the test item spanning a range of two orders of magnitude. Regarding the test item properties and the sensitivity of the analytical method as well as the percentage of adsorbed test item found during the adsorption kinetics tests, the following concentration ranges were chosen: 0.025, 0.14, 0.25, 1.4 and 2.5 mg/L for soils Lufa 2.1 and Lufa 6S; 0.25, 1.4, 2.5, 14 and 25 mg/L for Labsoil F and Eurosoil 5.

Three replicates per concentration and soil were used. A soil/solution ratio of 1/1 was used for soils Lufa 2.1, Lufa 6S and Labsoil F (20 g air-dried soil and 20 mL solution) and a soil/solution ratio of 1/2 was used for Eurosoil 5 (10 g air-dried soil and 20 mL solution). Adsorption and desorption phases were each performed for 24 hours based on the results obtained from adsorption kinetics test.

Control samples without soil were used to determine the stability of the test item in 0.01 M $CaCl_2$ solution and to investigate the adsorption onto the test vessels (preliminary test and adsorption kinetics test). Furthermore, the stability of the test item was investigated in filtered soil matrix during the adsorption kinetics test. Blank samples containing soil but no test item were used to investigate interferences with the soil matrix (one replicate per test).

The pH was measured in 0.01 M $CaCl_2$ before and after application and at each sampling point in each test.

2. Description of analytical procedures

Quantification of the test item was performed using UPLC-UV (nominal test item concentration of 2.5 mg/L to 25 mg/L) and LC-MS/MS analysis (nominal test item concentration of 0.025 mg/L to 2.5 mg/L). Specificity was ensured by comparing retention of the analyte in the standard solution with the retention time of the analyte in the sample solution using UPLC-UV detection and by test item specific mass transitions and retention time in case of LC-MS/MS analysis.

Accuracy and precision of the UPLC-UV method were determined using the control samples (without soil). Mean recovery for the test item concentration was 98% with a relative standard deviation of 1.7%. Both values were in the desired range of 90-110% (accuracy) and ≤ 20% (precision), respectively.

Regression coefficients (r) for the calibration curves were in the range of 0.9983-1.0000 (UPLC-UV) and 0.9985-1.0000 (LC-MS/MS). No Interferences were found in blank samples if UPLC-UV analysis was used. In case of LC-MS/MS analysis interferences were found. However, in the latter case interferences can be traced back to a carryover rather than contaminated soil.

The limits of detection (LOD) and quantification (LOQ) for UPLC-UV were 7.2 and 23.9 µg/L, respectively, corresponding to 0.3 and 1.0 % of the lowest nominal concentration analysed (2.5 mg/L). LOD and LOQ for LC-MS/MS were 0.6 and 2.0 µg/L, respectively, corresponding to 2.4 and 8.0% of the lowest nominal concentration analysed (0.025 mg/L).

II. RESULTS AND DISCUSSION

A. MASS BALANCE

It was demonstrated that the unlabelled test item was stable in 0.01 M $CaCl_2$ solution and in sterile filtered (0.2 µm) soil matrix. The test item did not adsorb to the surfaces of the test vessels. Recoveries in control samples (0.01 M $CaCl_2$ solution and soil matrix solution) ranged from 98% and 104% of the nominal applied amount, except for the matrix of Eurosoil 5 for which only 73%

were recovered. However, complete parental mass balances were obtained for this soil as well as for soils Lufa 2.1 and Lufa 6S. In case of the fourth soil Labsoil F, mass balances were < 90% in the preliminary tests. Therefore, an extended extraction procedure was performed after the adsorption/desorption isotherm experiments using a maximum of four extraction steps. The final parental mass balances were still < 90% (76% for a soil/solution ratio of 1/1). However, stability of the test item was shown in presence of soil matrix in the control samples (recovery of 104%) as well as by the absence of degradation products in the presence of soil. The lower recovery might be a result of the high organic carbon content of Labsoil F leading to an irreversible adsorption of the test item.

B. DATA

The adsorbed and desorbed amounts of MKH 6561-methoxy-saccharin at each concentration level in the adsorption/desorption isotherm experiments are provided in percentage of the applied amount in the table below:

Table 7.1-52 Adsorbed and desorbed amounts of MKH 6561-methoxy-saccharin

Soil type	% adsorbed at concentration of				
	0.025 mg/L	**0.14 mg/L**	**0.25 mg/L**	**1.4 mg/L**	**2.5 mg/L**
Lufa 2.1	8.1	8.5	3.8	5.5	11.1
Lufa 6S	1.1	5.8	8.3	3.7	3.0
	0.25 mg/L	**1.4 mg/L**	**2.5 mg/L**	**14 mg/L**	**25 mg/L**
Labsoil F	48.0	42.5	36.0	26.4	25.0
Eurosoil 5	35.2	35.2	32.3	29.3	29.3
	% desorbed at the respective nominal concentration				
Lufa 2.1	85.9	44.4	n.a.	72.6	48.2
Lufa 6S	n.a.	74.1	48.9	71.0	75.3
Labsoil F	6.3	13.3	12.9	20.2	24.1
Eurosoil 5	75.4	47.6	43.0	51.7	52.3

n.a.: not applicable

Adsorption ranged from 3.8% to 11.1% for soil Lufa 2.1, from 1.1% to 8.3% for soil Lufa 6S, from 25.0% to 48.0% for Labsoil F and from 29.3% to 35.2% for Eurosoil 5.
Desorption ranged from 44.4% to 85.9% for soil Lufa 2.1, from 48.9% to 75.3% for soil Lufa 6S, from 6.3% to 24.1% for Labsoil F and from 43.0% to 75.4% for Eurosoil 5.

The Freundlich parameters of the adsorption/desorption isotherms are presented in the table below:

Table 7.1-53: Adsorption and desorption coefficients of MKH 6561-methoxy-saccharin

Soil Type	Adsorption				Desorption			
	K_f 1) (mL/g)	1/n	r^2	K_{foc} 1) (mL/g)	K_f^{des} 1) (mL/g)	1/n	R^2	K_{foc}^{des} 1) (mL/g)
Lufa 2.1	0.079	1.011	0.9379	11.917	0.309	1.296	0.9634	46.886
Lufa 6S	0.045	0.690	0.8919	2.715	- 2)	- 2)	- 2)	- 2)
Labsoil F	0.852	0.781	0.9973	17.362	1.095	0.730	0.9951	22.303
Eurosoil 5	1.018	0.933	0.9982	17.079	1.017	1.145	0.9634	17.055
Mean	**0.499**	**0.854**	**0.956**	**12.268**	**0.807**	**1.057**	**0.974**	**28.748**

1) For a reference concentration of 1 mg/L the unit of the Freundlich coefficients can be expressed as mL/g
2) Desorption coefficients were not calculated for soil Lufa 6S since no linear desorption pattern was observed

Adsorption coefficients (K_f) ranged from 0.045 to 1.018 mL/g with corresponding organic carbon normalised adsorption constants (K_{foc} values) ranging from 2.715 to 17.362 mL/g for the four test soils (arithmetic mean: 12.268 mL/g). The Freundlich exponents (1/n) of the adsorption isotherms ranged from 0.690 to 1.011 indicating a slightly non-linear to linear adsorption behaviour.

Adsorption isotherms could be established for all four soil types while desorption isotherms could only be established for soils Lufa 2.1, Labsoil F and Eurosoil 5 since no linear correlation in the desorption pattern was obtained for soil Lufa 6S. Desorption coefficients (K_f^{des}) ranged from 0.309 to 1.095 mL/g with corresponding organic carbon normalised desorption constants (K_{foc}^{des} values) ranging from 17.055 to 46.88g mL/g (arithmetic mean: 28.748 mL/g). The Freundlich exponents of the desorption isotherms of soils Lufa 2.1, Labsoil F and Eurosoil 5 ranged between 0.730 and 1.296 indicating a slightly non-linear to linear desorption behaviour.

The pH of the soils was measured in 0.01 M $CaCl_2$ solution. In general, no significant differences were found before and after test item application as well as with increasing contact time during each conducted test.

III. CONCLUSIONS

Adsorption coefficients (K_f) ranged from 0.045 to 1.018 mL/g with corresponding organic carbon normalised adsorption constants (K_{foc} values) ranging from 2.715 to 17.362 mL/g for the four test soils (arithmetic mean: 12.268 mL/g). The Freundlich exponents (1/n) of the adsorption isotherms ranged from 0.690 to 1.011 indicating a slightly non-linear to linear adsorption behaviour.

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

Studies on the mobility of propoxycarbazone-sodium are not required since reliable K_{foc} values for propoxycarbazone-sodium and its major soil metabolites were obtained with the batch equilibrium experiments presented in section CA 7.1.3.

The mobility of aged residues of [phenyl-UL-^{14}C]- and [triazolinone-3-^{14}C]propoxycarbazone-sodium was investigated in soil column experiments using a loamy sand soil. Residues were aged for 29 days [phenyl-UL-^{14}C] or 28 days [triazolinone-3-^{14}C], applied to the soil columns and irrigated for 96 hours (equivalent to 508 mm/20 inches of rainfall). Total radioactivity in the leachates accounted for 85.8% (phenyl-label) and 89.0% AR (triazolinone-label). The distribution of aged residues in the leachates showed that

propoxycarbazone-sodium (76.5% AR phenyl- and triazolinone-label) and the metabolites M04 (3.1 – 3.6% AR), M06 (0.8% AR, phenyl-label only), M07 (4.3% AR, phenyl-label only) and M10 (7.9% AR, triazolinone-label only) have a high potential to leach through a loamy sand with very low organic carbon content. M05 and M09 were not detected in the leachates.

For the major soil metabolite M05, a soil column study was submitted within the former Annex I inclusion Dossier and an organic carbon normalised adsorption coefficient (K_{oc}) of 35 mL/g was determined in a loamy sand soil with a pH of 6.4 (measured in water). This value is consistent with the range of K_{foc} values obtained in the new adsorption/desorption study in which the mobility of M05 was classified as very high to high (refer to CA 7.1.3.1.2/09).

The leaching behaviour of [phenyl-UL-^{14}C]- and [triazolinone-3-^{14}C]propoxycarbazone-sodium (1:1 mixture) and its metabolites was investigated in two lysimeters for three years with two applications in a 70 WG formulation (70 g/ha, spring application in 1st and 2nd year). The annual average concentrations in leachate were 0.009, 0.004 and 0.002 µg/L for propoxycarbazone-sodium, 0.002, 0.018 and 0.007 µg/L for M10, and 0.061, 0.057 and 0.049 µg/L for the total radioactive residue. The maximum concentrations of propoxycarbazone-sodium, M10 and the total radioactive residue were 0.02, 0.04 and 0.099 µg/L, respectively. The European Commission concluded that under vulnerable conditions, propoxycarbazone-sodium and M10 might leach into groundwater (SANCO/4067/2001-Final, 30 September 2003).
Low leaching potential of propoxycarbazone-sodium is shown by groundwater modelling study (study summaries in M-CP, section 9, point 9.2.4.1). However, the maximum 80th percentile PEC_{gw} values of the metabolites M07, M10 and M11 were above 0.1 µg/L. Therefore, a non-relevance assessment was conducted for these compounds (for details please refer to Doc N4). In conclusion, metabolites M07, M10 and M11 are not considered to present a toxicological hazard and can be considered to be non-relevant.

Table 7.1-54 Overview on the mobility of propoxycarbazone-sodium and M05 in soil

Reference		Guidelines	Label	Test conditions	Results
Propoxycarbazone-sodium					
KCA 7.1.4.1.1/01	[redacted], K.K. et al., 1999	US EPA, Subdivision N, § 163-1	[triazolinone-3-^{14}C] and [phenyl-UL-^{14}C]	Soil samples aged for 28 or 29 days (0.14 ppm) were applied to the top of saturated soil columns (30 cm length and 5 cm diameter) and leached with approx. 1 L of 0.01 M $CaCl_2$ (equivalent to 508 mm/20 inches of rainfall) for 96 h. Leachate was collected in four approximately equal volume fractions from each column.	85.8% (phenyl-label) and 89.0 % (triazolinone-label) AR in leachate. Thereof: 76.5 % AR propoxycarbazone-sodium 3.1 - 3.6% AR M04, 0.8% AR M06, 4.3% AR M07 7.9% AR M10. M05 and M09 were not detected
KCA 7.1.4.1.2/01	[redacted], B.A. et al., 1999	US EPA, Subdivision N, § 163-1, Leaching Study SETAC Europe (1995), Offical Journal of the European Communities No L172, 95/36/EC	[phenyl-UL-^{14}C]	M05 application rate: 70 g a.s./ha Soil column: 30 cm height Water: 20 cm of water (392 mL) over 48 h	K_d for M05: 0.161 mL/g K_{oc} for M05: 35 mL/g Based on the results it was concluded that M05 has a high potential to leach through loamy sand.

Reference		Guidelines	Label	Test conditions	Results
KCA 7.1.4.2/01	[redacted], R. and [redacted], K., 1999, amended 2000	BBA Guidelines Part IV,4-3 (1990), Directive 91/414/EEC, Annex 1	[triazolinone-3-^{14}C] and [phenyl-UL-^{14}C]	Lysimeter study: 70 g as/ha, spring application, 2 lysimeters over 3 years, single application in year 1 and 2	Annual average concentration in leachate (µg/L), year 1, 2, 3: propoxycarbazone-sodium: 0.009, 0.004, 0.002, M10: 0.002, 0.018, 0.007, total radioactive residue: 0.061, 0.057, 0.049 Maximum concentrations in leachate (µg/L): propoxycarbazone-sodium: 0.02 M10: 0.04 total radioactive residue: 0.099

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

CA 7.1.4.1 Column leaching studies

CA 7.1.4.1.1 Column leaching of the active substance

The leaching behaviour of aged soil residues of propoxycarbazone-sodium in soil in the laboratory was evaluated during the Annex I inclusion using two radiolabel positions, [phenyl-U-^{14}C] and [triazolinone-3-^{14}C], and was accepted by the European Commission (SANCO/4067/2001-rev.Final, 30 September 2003).

Annex point	Author(s)	Year	Edition No.
KCA 7.1.4.1.1/01	[redacted], K.K., et al.	1999	M-015843-01-1

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to the corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph. A summary of the relevant data is given in section CA 7.1.4.

No additional studies are submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval.

CA 7.1.4.1.2 Column leaching of metabolites, breakdown and reaction products

The leaching behaviour of the major soil metabolite M05 in soil in the laboratory was evaluated during the Annex I inclusion using the [phenyl-U-^{14}C] label and was accepted by the European Commission (SANCO/4067/2001-rev.Final, 30 September 2003).

Annex point	Author(s)	Year	Edition No.
KCA 7.1.4.1.2/01	[redacted], B.A. et al.	1999	M-015802-01-1

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to the corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph. A summary of the relevant data is given in section CA 7.1.4.

No additional studies are submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval.

CA 7.1.4.2 Lysimeter studies

The leaching behaviour of propoxycarbazone-sodium and its degradation products in soil in lysimeters were evaluated during the Annex I inclusion using two radiolabel positions, [phenyl-U-^{14}C] and [triazolinone-3-^{14}C], and accepted by the European Commission (SANCO/4067/2001-rev.Final, 30 September 2003).

Annex point	Author(s)	Year	Edition No.
KCA 7.1.4.2/01	[redacted], R. and [redacted], K.	1999, amended 2000	M-014541-02-1

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to the corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph. A summary of the relevant data is given in section CA 7.1.4.

No additional studies are submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval.

CA 7.1.4.3 Field leaching studies

No study is available. Field leaching studies are not required due to the results of a tiered leaching assessment (please refer to KCA 7.1.4.3/01 – 03 and M-CP Section 9, point 9.2.4.1).

The potential leaching behaviour of propoxycarbazone-sodium after repeated use over several years in soil was assessed during the Annex I inclusion using PELMO calculations with different climatic and regional scenarios. The approach was accepted by the European Commission (SANCO/4067/2001-rev.Final, 30 September 2003).

Annex point	Author(s)	Year	Edition No.
KCA 7.1.4.3/01	[redacted], H.	1999	M-011088-01-1
KCA 7.1.4.3/02	[redacted], H.	1999	M-012021-01-1
KCA 7.1.4.3/03	[redacted], H.	1999	M-011051-01-1

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to the corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph.

The simulations showed that in all cases tested concentrations of propoxycarbazone-sodium in the leachate were be below 0.1 µg/L. These studies are considered as additional information, because PELMO simulations were not according to the current FOCUS guidelines.
New PEC_{gw} values calculated for the use in cereals in Europe by means of current FOCUS PEARL 4.4.4 and FOCUS PELMO 5.5.3 models confirm the results (for details please refer to M-CP Section 9, point 9.2.4.1). The maximum 80th percentile PEC_{gw} values of the active substance propoxycarbazone-sodium and its metabolites M05, M08 and M09 in the leachate at 1 m soil depth are below 0.1 µg/L for all crops

and scenarios. The maximum 80[th] percentile PEC_{gw} values of the metabolites M07, M10 and M11 were above 0.1 µg/L. Therefore, a non-relevance assessment was conducted for these compounds (please refer to Doc N4).

No additional studies are submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval.

CA 7.2 Fate and behaviour in water and sediment

Propoxycarbazone-sodium is slowly hydrolysed at 25°C, as relevant metabolites M05 and M10 were detected. The photolysis of propoxycarbazone-sodium in aqueous solution under environmentally relevant pH- and temperature conditions is slow. Thus it will contribute to its degradation in the environment only to a very limited extent. Major metabolites identified were M07 and M10.
Propoxycarbazone-sodium was stable in microbial active surface water under aerobic conditions in the dark at 20°C under artificial conditions without any sediment. Furthermore, the degradation behaviour of propoxycarbazone-sodium in two water/sediment systems investigated under aerobic conditions showed differences in the results with respect to degradation rates and formation of metabolites. On basis of the findings in the first system propoxycarbazone-sodium can be regarded as rapidly dissipating substance which is intensively metabolised in the aquatic environment. Major metabolites identified were M04, M06 and M10. In the second system, the degradation of the parent compound was much slower and the extent of metabolite formation was much lower as compared to the first system. Major metabolites detected were M05 and M10. More details for the route and rates of degradation of propoxycarbazone-sodium and its major degradation products in water and sediment are given in CA 7.2.1 and CA 7.2.2, respectively.

CA 7.2.1 Route and rate of degradation in aquatic systems (chemical and photochemical degradation)

The hydrolytic route and rate of degradation of propoxycarbazone-sodium were investigated in two studies under laboratory conditions using [phenyl-UL-^{14}C]- and [triazolinone-3-^{14}C]propoxycarbazone-sodium, respectively. According to both studies, propoxycarbazone-sodium can be regarded as stable to hydrolysis at 25°C with $DegT_{50}$ values ranging from 110.1 to 149.6 days at pH 4 and from 400.6 to 463.6 days for pH 7 and pH 9. The major metabolites detected at 25°C are M05 (max. 16.6% AR at pH 4) and M10 (max. 13.9% AR at pH 4).
At an elevated temperature of 50°C, propoxycarbazone-sodium was unstable at all pH-values investigated with $DegT_{50}$ values ranging from 2.2 to 11.4 days. The major hydrolysis products observed were M05 (max. 72.3% AR at pH 4), M07 (max. 31.4% AR at pH 9) and M10 (max. 89.0% AR at pH 4 to pH 9).
The hydrolytic degradation of the major metabolites occurring at 25°C was investigated based on the laboratory studies performed with the parent compound propoxycarbazone-sodium. For M05, the data obtained at 50°C and pH 4 were used for the evaluation and a $DegT_{50}$ value of 18.9 days was estimated. The corresponding $DegT_{50}$ value at 20°C was determined by extrapolation according to FOCUS (1997) [17] as 201 days. For M10 it was concluded that this metabolite is hydrolytically stable, based on its continuous accumulation over time.
For M07, detected at 25°C only in minor amounts, it can be concluded that it is very stable to all environmental conditions, due to high stability in food and beverage applications where M07 is used as commercial sweetener.
An overview of the hydrolytic rate of degradation of propoxycarbazone-sodium and its metabolites is given in Table 7.2-1.

The photolysis of propoxycarbazone-sodium in sterile buffer solutions at pH 7 was investigated using [phenyl-UL-^{14}C]- and [triazolinone-3-^{14}C]propoxycarbazone-sodium. Direct photolysis was slow with experimental $DegT_{50}$ values of 18.1 and 40.9 days for phenyl- and triazolinone-labels, respectively. In a

[17] FOCUS (1997): Soil Persistence Models and EU Registration, EU Document No. 7617/VI/96

further study using non-radiolabelled propoxycarbazone-sodium, no photodegradation was observed. Thus photolysis will contribute to the degradation of propoxycarbazone-sodium in the environment only to a very limited extent.
Major metabolites identified were M07 (max. 22% of AR) for the phenyl-label and M10 (max. 13.6% AR) for the triazolinone-label. M07 degraded slowly but steadily with a $DegT_{50}$ value of 49 days. The metabolite M10 was not further addressed as it has no ecotoxicolgical effects and was classified as non-critical in aquatic systems (refer to M-CA, Section 8).

Table 7.2-1 Hydrolysis of propoxycarbazone-sodium and its major metabolites M05 and M10

Reference	Guideline(s)	Label	pH	Temperature	$DegT_{50}$ (days)	Metabolites / Comments
Propoxycarbazone-sodium						
KCA 7.2.1.1/01	[redacted], B. and [redacted], H.-E., 1999	US EPA, Subdivision N, § 161-1 (1982), Comission Directive 94/37/EC (1994)	[phenyl-UL-^{14}C]	4	50°C	2.2	M05 (max.72.3% AR), M07 (max. 16.8% AR)
				7		9.3	M05 (max.32.2% AR), M07 (max. 31.1% AR
				9		11.4	M07 (max. 31.4% AR
				4	25°C	110.1	M05 (max.16.6% AR), M07 (max. 22% AR)
				7		463.6	M07 (max. 3.3% AR)
				9		400.6	M07 (max. 3.8% AR)
KCA 7.2.1.1/02	[redacted], B. and [redacted], H.-E., 1999	US EPA, Subdivision N, § 161-1 (1982), Comission Directive 94/37/EC (1994)	[triazolinone-3-^{14}C]	4	50°C	2.2	M10 (max. 89.0%)
				7		10.3	M10 (max. 40.0%)
				9		10.8	M10 (max. 37.6%)
				4	25°C	149.6	M10 (max. 13.9%)
				7		410.8	M10 (max. 4.2%)
				9		361.8	M10 (max. 4.7%)
M05							
KCA 7.2.1.1/03	[redacted], H., 1999	FOCUS (1997)[17]	Not applicable, Evaluation of data of [redacted], B. and [redacted], H-E., 1999 (refer to KCA 7.2.1.1/01)	50°C		18.9	Calculated based on the data for pH 4
				20°C		201	Extrapolated
M10							
KCA 7.2.1.1/04	[redacted], B. and [redacted], H-E. 1999	Commission Directive 95/36/EC (1995)	Not applicable, Evaluation of data of [redacted], B. and [redacted], H-E., 1999 (refer to KCA 7.2.1.1/02)	50°C, 25°C		stable	Conclusion was based on continuous accumulation of M10 over time

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium

Table 7.2-2 Direct photolysis of propoxycarbazone-sodium and its major metabolite M07

Reference		Guideline(s)	Label	Test conditions	Temp.	$DegT_{50}$	Metabolites / Comments
Propoxycarbazone-sodium							
KCA 7.2.1.2/01	Hellpointner, E., 1997	UBA: Phototransformation of Chemicals in Water, Part A (1992)	none	Quantum yield was determined in water, ECETOC method, TQ Hg-lamp with Duran 50 filter for λ < 295	25°C	> 1 year	No photodegradation or photoproduct observed
KCA 7.2.1.2/02	[redacted], B., et al., 1999	US EPA, Subdivison N, § 161-2 (1982), Commission Directive 94/37/EC (1994)	[Phenyl -UL-^{14}C]	pH 7 (0.02 M phosphate buffer),sterilised, Xenon lamp producing artificial sunlight, 19 days test period	25°C	18.1 days	Relevant metabolite: M07 (max. 22% AR) Minor metabolite: M05 (max. 5.8% AR) Experimental $DegT_{50}$ is equivalent to an environmental half-live of 41.6 days (40° latitude, midsummer sunlight)
KCA 7.2.1.2/03	[redacted], B., and [redacted], H.-E., 1999	US EPA, Subdivison N, § 161-2 (1982), Commission Directive 94/37/EC (1994)	[Triazolinone-3-^{14}C]	pH 7 (0.02 M phosphate buffer),sterilised, Xenon lamp producing artificial sunlight, 19 days test period	25°C	40.9 days	Relevant metabolite: M10 (max. 13.6% AR) Experimental $DegT_{50}$ is equivalent to an environmental half-live of 94 days (40° latitude, midsummer sunlight)
M07							
KCA 7.2.1.2/04	[redacted], B., and [redacted], H.-E., 1999	US EPA, Subdivison N, § 161-2 (1982), Commission Directive 94/37/EC (1994)	[Phenyl -UL-^{14}C]	pH 7 (0.02 M phosphate buffer),sterilised, Xenon lamp producing artificial sunlight (Suntest), 20 days test period	25°C	49 days	No relevant metabolite identified (amounts 0.3 – 5.6% AR) Experimental $DegT_{50}$ is equivalent to an environmental half-live of 117 days (40° latitude, midsummer sunlight)

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium

CA 7.2.1.1 Hydrolytic degradation

The hydrolytic route and rate of degradation of propoxycarbazone-sodium in buffers under sterile conditions in the dark in the laboratory were evaluated during the Annex I inclusion using two radiolabel positions, [phenyl-UL-^{14}C] and [triazolinone-3-^{14}C].The hydrolytic degradation of M05 and M10 was deduced from these studies in two separate reports. The studies and reports were evaluated during the Annex I inclusion and accepted by the European Commission (SANCO/4067/2001-Final, 30 September 2003).

Annex point	Author(s)	Year	Edition No.
KCA 7.2.1.1/01 also filed in KCA 2.8/01	[redacted], B. and [redacted], H.-E.	1999	M-013505-01-1
KCA 7.2.1.1/02 also filed in KCA 2.8/02	[redacted], B. and [redacted], H.-E.	1999	M-008682-01-1
KCA 7.2.1.1/03	[redacted], H.	1999	M-014362-01-1
KCA 7.2.1.1/04	[redacted], B. and [redacted], H.-E.	1999	M-008684-01-1

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to the corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph. A summary of the relevant data is given in CA 7.2.1

No additional studies are submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval.

CA 7.2.1.2 Direct photochemical degradation

The photolytic routes and rates of degradation of propoxycarbazone-sodium and its major degradation product M07 in buffers in the laboratory were evaluated during the Annex I inclusion using two radiolabel positions, [phenyl-UL-^{14}C] and [triazolinone-3-^{14}C], as well as unlabelled propoxycarbazone-sodium and M07, and were accepted by the European Commission (SANCO/4067/2001-Final, 30 September 2003).

Annex point	Author(s)	Year	Edition No.
KCA 7.2.1.2/01 also filed in KCA 2.8/05	[redacted], E.	1997	M-001627-01-1
KCA 7.2.1.2/02 also filed in KCA 2.8/03	[redacted], B., et al.	1999	M-010180-01-1
KCA 7.2.1.2/03 also filed in KCA 2.8/04	[redacted], B. and [redacted], H.-E.	1999	M-010186-01-1
KCA 7.2.1.2/04 also filed in KCA 2.8/04	[redacted], B. and [redacted], H.-E.	1999	M-012272-01-1

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to the corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph. A summary of the relevant data is given in CA 7.2.1.

No additional studies are submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval.

CA 7.2.1.3 Indirect photochemical degradation

Studies on the indirect photochemical degradation of propoxycarbazone were not performed.

CA 7.2.2 Route and rate of biological degradation in aquatic systems

A new study on the aerobic mineralisation of propoxycarbazone-sodium in surface water was performed and is submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval. This type of study is a new data requirement according to Commission Regulation (EU) No 283/2013 and was not addressed within the former Annex I inclusion dossier.
The study was performed using [phenyl-UL-^{14}C] and [triazolinone-3-^{14}C] labelled propoxycarbazone-sodium which was stable in the used microbial active surface water during the 61 days of incubation. In samples of particular concentration levels a second component was observed (approx. 4% AR) which was, however, assumed to be rather an impurity than a transformation product due to its restricted occurrence. The formation of volatile transformation products (e.g. carbon dioxide) was found to be negligible (≤ 1.0% AR). A kinetic analysis of the data was not performed due to the observed stability of the test item.
As the test design was artificial by using a pelagic system without sediment, worst-case conditions were tested. In the environment, translocation into the sediment, additional biological processes (plants) as well as photolysis might accelerate the degradation process.

The aerobic route and rate of degradation of propoxycarbazone-sodium was studied in the water/sediment systems [redacted] Pond and von [redacted] Lake. One replicate of each system was applied with [phenyl-UL-^{14}C]propoxycarbazone-sodium and the other one with [triazolinone-3-^{14}C]propoxycarbazone-sodium. The results obtained for the two water/sediment systems differ with respect to the degradation rates and the formation of metabolites. A summary of the formation of metabolites is presented in Table 7.2-3.
Based on the findings in the [redacted] Pond system, propoxycarbazone-sodium can be regarded as a rapidly dissipating substance, which is intensively metabolised in the aquatic environment. Major metabolites identified in the total systems were M04 (max. 68.5% AR), M06 (max. 19.4% AR) and M10 (max. 34.4% AR). Only a slight formation of carbon dioxide was observed with 1.6% for the triazolinone-label and 16.4% for the phenyl-label (single values). Non-extractable radioactivity accounted for up to 13% AR at study end (single value, phenyl-label and triazolinone-label). The DT_{50} values calculated for both labels as persistence endpoints according to the current FOCUS kinetics guidance were 10.0 days for the water phase and 12.4 days for the entire system with corresponding DT_{90} values of 33.2 and 33.4 days, respectively. The DT_{50} values for both labels as modelling endpoints were calculated to be 10.0 days for the water phase and 11.9 days days for the entire system (refer to Table 7.2-4).

In the Von [redacted] Lake system, the degradation of the parent compound was much slower and the extent of metabolite formation was much lower as compared to the [redacted] Pond test system. Major metabolites detected were M05 (max. 11.3%) and M10 (max. 6.9%). Carbon dioxide formation was low with up to 1.9% AR at study end (single value, triazolinone-label). Non-extractable radioactivity accounted for up to 18.2% AR at study end (single value, triazolinone-label). The DT_{50} values calculated for both labels as persistence endpoints according to the current FOCUS kinetics guidance were 94.5 days for the water phase and 194.6 days for the entire system with corresponding DT_{90} values of 378.3 and 646.3 days, respectively. The DT_{50} values for both labels used as modelling endpoints were calculated to be 103.6 days for the water phase and 194.6 days for the entire system. For sediment, a DT_{50} of 8.84 days could be derived for persistence and modelling endpoint.

A possible explanation for the reduced degradation observed in the Von [redacted] Lake System is the low organic carbon content in combination with the low microbial activity in this system. Under field use conditions, additional biological activities (plants) and the influence of light could raise the degradation rates. Therefore, the potential for persistence or accumulation of propoxycarbazone-sodium in an aquatic microbial active environment is assumed to be low.

The degradation rates of propoxycarbazone-sodium in water and sediment for modelling purpose and trigger evaluation are summarised in Table 7.2-4. The proposed pathway for the degradation of propoxycarbazone-sodium in water/sediment systems is presented in Figure 7.2-1.

For the major metabolites detected in the water/sediment systems, only a few reliable half-lives could be determined: For M04 and M10, neither M-I dissipation nor degradation endpoints could be estimated. For M05, a geometric mean DT_{50} of 32.56 days for modelling purpose could be derived. The DT_{50} value of M05 for trigger evaluation was calculated in all systems to be 1.06 days with a corresponding DT_{90} of 3.52 days. The DT_{50} of M06 in all systems was given with 29.88 days as persistence endpoint. For modelling pupose for M06, default DT_{50} values of 1000 days need to be used for PEC_{SW} modelling at Steps1-2. However, a geometric half-life of 172.86 days would be available for FOCUS Step 3 modelling (for more details please refer to CA 7.2.2.3/04).

Figure 7.2-1 Degradation pathway of propoxycarbazone-sodium (MKH 6561) in water/sediment systems

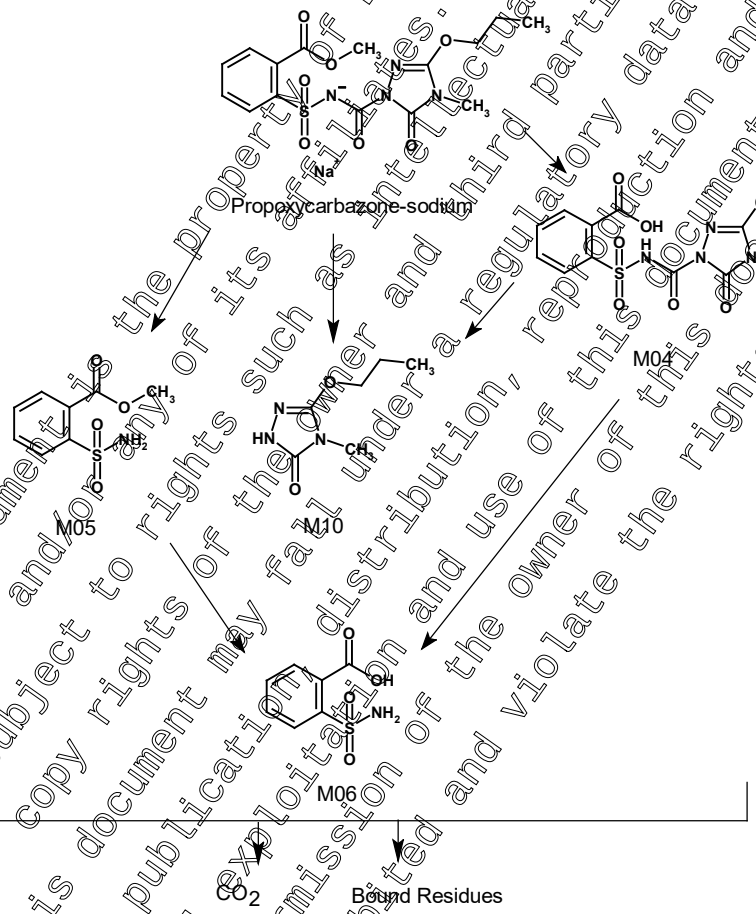

Table 7.2-3 Overview of the results of the water/sediment study

Reference		Guidelines	Test Conditions	System		Maximum amounts (% AR)			
						M04	M05	M06	M10
KCA 7.2.2.3/01	[redacted], K., 1998	BBA-Guidelines Part IV, 5-1 (1990), Comission Directive 95/36/EC (1995), SETAC (1995)	Application Rate: 68 g/ha Temperature: 20°C Duration: 100 days	[redacted] Pond	Water	50.2	2.6	16.2	21.2
					Sediment	19.3	0.0	3.2	13.2
					Total	68.5	2.6	19.4	34.4
				Von [redacted] Lake	Water	0.1	3.7	1.6	3.1
					Sediment	0.0	7.6	0.0	3.8
					Total	0.1	11.3	1.6	6.3

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

Table 7.2-4 Overview of the persistence and modelling endpoints of propoxycarbazone-sodium in water/sediment systems

Reference		Guidelines	System		Persistence endpoints at level P-I			Modelling endpoints at level P-I	
					Model	DT_{50} 1) (days)	DT_{90} 1) (days)	Model	SFO DT_{50} 1) (days)
KCA 7.2.2.3/04	[redacted], S., 2014	FOCUS (2006, 2011)	Total system	[redacted] Pond	HS	12.37	33.35	SFO	11.85
				Von [redacted] Lake	SFO	194.57	646.34	SFO	194.57
				Geometric Mean		**49.06**	**146.82**		**48.00**
			Water Phase	[redacted] Pond	SFO	10.00	33.22	SFO	10.00
				Von [redacted] Lake	DFOP	94.46	378.28	SFO	103.56
				Geometric Mean		**30.73**	**112.10**		**32.18**
			Sediment Phase	[redacted] Pond	SFO	8.84	29.39	SFO	8.84
				Von [redacted] Lake	-2)	-2)	-2)	-2)	1000 3)
				Geometric Mean		**8.84**	**29.39**		**94.02**

1) DT_{xx} = $DegT_{xx}$ for total system but $DisT_{xx}$ for water and sediment phase.
2) not calculated due to insufficient number of data points after peak.
3) FOCUS default DT_{50} for use in surface water modelling.

CA 7.2.2.1 "Ready biodegradability"

No study on the ready biodegradability of propoxycarbazone-sodium was performed. Therefore, propoxycarbazone-sodium is classified as "not ready biodegradable", which is in line with the available information on the substance.

CA 7.2.2.2 Aerobic mineralisation in surface water

A study for the determination of the route and rate of degradation of propoxycarbazone-sodium in surface water under aerobic conditions in the dark in the laboratory has been performed and is submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval using two radiolabel position, [phenyl-UL-^{14}C] and [triazolinone-3-^{14}C]. This type of study (OECD 309) is a new data requirement according to Commission Regulation (EU) No 283/2013 and was not addressed within the former Annex I inclusion dossier.

Report:	[redacted]h; [redacted];2014;M-484629-01
Title:	Aerobic mineralisation in surface water simulation biodegradation of propoxycarbazone-sodium (MKH 6561) in a pelagic test [OECD 309]
Report No:	M-484629-01-1
Document No:	M-484629-01-1
Guidelines:	**OECD Guidelines for Testing of Chemicals, Guideline No. 309, Aerobic Mineralisation in Surface Water Simulation Biodegradation Test; adopted April 13, 2004.**
Deviations:	Temperature range of 20±2°C was slightly exceeded for 4.75 hours (max 24.7°C). LOD and LOQ for the lowest concentration are higher than 1 and 10% of the initial applied amount, respectively. No adverse effects on the results of the study expected.
GLP/GEP:	**yes**

Executive Summary

The present laboratory study investigated the degradation and transformation of MKH 6561 (propoxycarbazone-sodium) at low concentrations in one type of surface water for 61 days under aerobic conditions in the dark at 20°C ± 2°C.

[Triazolinone-3-^{14}C]- and [phenyl-UL-^{14}C]-labelled MKH 6561 were used as test items in separate approaches. The natural surface water was taken from a pond which can be classified as pelagic. 500 mL of the natural pond water were treated at three different test concentrations (both labels, respectively): 10 µg/L, 100 µg/L and 1003 µg/L. Test vessels were incubated in the dark under aerobic conditions at a temperature of 20 ± 2°C except for 4.75 h during the main test during which slightly higher temperatures were observed (max. 24.7°C).

Samples were taken immediately after incubation (0 h) and 25, 46, 53 and 61 days after treatment.

The test was accomplished as a batch approach for the test samples (F_T samples), meaning that at each sampling time point an aliquot of the same sample was taken while the remaining sample was further incubated.

Additionally, samples for the determination of $^{14}CO_2$ dissolved in water and particle adsorbed radioactivity were incubated (F_M samples). Those samples were taken completely at each sampling time point. Prior to sampling, each test vessel was connected to a flow-through system to collect volatile transformation products. Sterile samples were also incubated.

Independent analytical methods were used: a) liquid scintillation counting (LSC) to determine the total radioactivity and b) test item specific chromatographic methods for quantification and identification of the parent test items and screening for transformation products (HPLC UV and radio detection). Additionally, the characterisation of the parent test items was confirmed by LC-MS/MS analysis.

The microbial activity of the test water was investigated by the degradation time of ^{14}C-labelled benzoic acid and the number of the colony forming units (CFU) at test start. Aerobic incubation conditions during the incubation period were confirmed by the oxygen content and the redox potential measured in the surface water.

For all samples of the degradation test (F_T), the mean total recovery was in the required range of 90% to 110% of AR (applied radioactivity). For the samples used to determine dissolved CO_2 mass balances were also sufficient, except for four individual samples for which mass balances range from 71-135%.

The formation of volatile transformation products (e.g. carbon dioxide) was found to be negligible in the course of incubation since in the trapping solutions of each concentration (I-III) and each label (phenyl, triazolinone), detected amounts were ≤ 1.0% of AR (mean).

Analysis of the surface water by HPLC radio detection showed that the radioactivity in the samples could almost completely be related to the parent MKH 6561 with a percentage of ≥ 96% for the triazolinone-label and ≥ 95% for the phenyl-label. In addition, analysis of samples of particular concentration levels (II-triazolinone label; I-phenyl label) showed a second peak. As the peak could only be found in lower concentrations and no peak occurred in samples with the higher concentration, it was assumed that the

signal resulted from an impurity rather than from a transformation product. With a total peak area of approx. 4% in both cases, the amount of the unknown compound was not relevant.

The test indicated that propoxycarbazone-sodium (MKH 6561) was stable in the used microbial active surface water during 61 days of incubation under aerobic conditions in the dark at 20°C ± 2°C.

I. MATERIALS AND METHODS

A. MATERIALS

1. Test material (radiolabelled)	[triazolinone-3-^{14}C]propoxycarbazone-sodium
Sample ID:	KML 9506
Specific Radioactivity:	5.13 MBq/mg (138.68 µCi/mg)
Radiochemical Purity:	> 98% (HPLC, radioactivity detector), > 99% TLC, scan
Chemical Purity:	> 99%
Description:	Solid, white
Storage:	In original container, < - 20°C, in the dark and the absence of moisture
Expiry Date:	Not applicable; the amount of total radioactivity was determined by LSC and absence of degradation products was verified by HPLC coupled with UV and radio detection.
2. Test material (radiolabelled)	[phenyl-UL-^{14}C]propoxycarbazone-sodium
Sample ID:	KML 9507
Specific Radioactivity:	3.82 MBq/mg (103.3 µCi/mg)
Radiochemical Purity:	≥ 99% (HPLC, radio detection and TLC, scan)
Chemical Purity:	≥ 99%
Description:	Solid, white
Storage:	In original container, < 20°C, in the dark and the absence of moisture
Expiry Date:	Not applicable; the amount of total radioactivity was determined by LSC and absence of degradation products was verified by HPLC coupled with UV and radio detection.
3. Test material (non-labelled)	MKH 6561
Chemical Name:	Methyl 2-(4,5-dihydro-4-methyl-5-oxo-3-propoxy-1H-1,2,4-triazol-1-yl)carboxamidosulfonylbenzoate, sodium salt
Description:	Solid, off white
Batch #:	AE 0298618 00 1B98 0001
Origin Batch #:	M28217 (used for the entire test, except for the determination of the concentration of the stock solution prior to application).
CAS No.:	181274-15-7

Purity:	98.0% w/w
Storage:	At +5 ± 5°C under dark and dry conditions (long-term storage conditions; storage at room temperature for several days will have no impact on the stability)
Expiry Date:	September 26, 2018

4. Reference material (non-labelled)	MKH 6561
Chemical Name:	Methyl 2-(4,5-dihydro-4-methyl-5-oxo-3-propoxy-1H-1,2,4-triazol-1-yl)carboxamidosulfonylbenzoate, sodium salt
Description:	Solid, white
Batch #:	AE 029861801-09
Origin Batch #:	2012-000352 (solely used for the determination of the percentage of non-labelled test item within the labelled stock solution prior to application).
CAS No.:	181274-15-7
Purity:	95.1%
Storage:	At 10-30°C under dark and dry conditions
Expiry Date:	January 24, 2014

5. Reference material (non-labelled)	MKH 6561-carboxylic acid di-sodium salt (M04)
Chemical Name:	2-{[4-methyl-5-oxo-3-propoxy-4,5-dihydro-1H-1,2,4-triazol-1-yl)carbonyl]sulfamoyl}benzoic acid
Description:	Solid, white
Batch #:	BCS-AT62307-01-01
Origin Batch #:	BCOO 6361-31-3
Chemical purity:	87.1% (96.7% dried substance)
Storage:	At 10-30°C under dark and dry conditions (desiccator)
Expiry Date:	August 14, 2013

6. Reference material (non-labelled)	MKH 6561-sulfonamide acid (M06)
Chemical Name:	2-sulfamoylbenzoic acid
Description:	Solid, white
Batch #:	AE 1234964-01-01
Origin Batch #:	BCOO 6368-1-4
Chemical purity:	98.5%
Storage:	At 10-30°C under dark and dry conditions
Expiry Date:	April 18, 2015

7. Reference material (non-labelled)	MKH 6561-propoxytriazolinone (M10)
Chemical Name:	4-methyl-5-propoxy-2,4-dihydro-3H-1,2,4-triazol-3-one

Description:	Solid, white
Batch #:	AE 1364263-01-01
Origin Batch #:	NLL 5797-6-5
Purity:	99%
Storage:	At 10-30°C under dark and dry conditions
Expiry Date:	April 26, 2014

8. Reference material (non-labelled)	MKH 6561-sulfonamide (M05) (used only for the initial determination of the chemical and radiochemical purity of the stock solutions)
Chemical Name:	Methyl 2-sulfamoylbenzoate
Description:	Solid, white (according to CoA)
Batch #:	AE F073550-01-01
Origin Batch #:	BCQO-5771-1-1
Chemical purity:	99.4% w/w
Storage:	At 10-30°C under dark and dry conditions
Expiry Date:	March 14, 2015

9. Reference material (non-labelled)	MKH 6561-saccharin (referred to as M07)
Chemical Name:	1,2-benzisothiazol-3(2H)-one 1,1-dioxide
Description:	Solid, off-white
Batch #:	AE F159737 00-HB99 0002
Origin Batch #:	M00402
Chemical purity:	99.9%
Storage:	At 5°C ± 5°C under dark conditions
Expiry Date:	29 May, 2016

10. Reference material (radiolabelled)	[7-^{14}C]Benzoic Acid
Description:	Liquid, Colourless
Lot #:	130501
Specific Radioactivity:	56.2 mCi/mmol
Radiochemical/ Chemical purity:	99%
Storage:	No storage. The content of the container was dissolved to prepare the stock solution at day of arrival. The stock solution was stored until use at < -20°C.
Expiry Date:	Not applicable; the amount of total radioactivity was determined by LSC and absence of degradation products was verified by HPLC coupled with UV and radio detection.

11. Reference material (non-labelled) Benzoic Acid

Description:	Solid, Colourless.
Batch #:	K40769036
Chemical purity:	≥ 99.9%
Storage:	At 5-30°C under dark conditions
Expiry Date:	January 31, 2015

12. Surface water

The water originated from [redacted] GmbH, [redacted] ([redacted]), Germany. At May 13, 2013 (11:55 am) the water was taken from a pond [redacted] system approx. 10 cm below the water surface. The depth of the pond was about 1.2 m, thus the water body can be classified as "pelagic". The water sample was stored at 4°C ± 4°C in the dark for a maximum period of 10 days.

Table 7.2-5 Characterisation of surface water

Sampling point	[redacted] GmbH, [redacted] ([redacted]), Germany; Pond ([redacted] system)
Sampling date/time	May 13, 2013, 11:55 h
Sampling depth	Approx. 10 cm below the water surface
Water temperature at sampling	14°C
Colour / Turbidity of the water	Slightly yellow and turbid
Anions	Nitrate: n.d. Nitrite: n.d. o-Phosphate: <0.06 mg/L [1] Orthophosphate: <0.01 mg/L [2] Total phosphate: <0.02 mg/L [2]
Cations	Ammonium: n.d.
TOC	55 mg/L
DOC	53 mg/L
Total nitrogen fixed	<1.0 mg/L [2]
Microbial investigations	Colony forming units (CFU) at 20°C: 4312 CFU/mL Colony forming units (CFU) at 36°C: 12 CFU/mL
Further parameters determined in the course of incubation	The pH-value, oxygen concentration, redox potential and conductivity of the water were measured prior to application and at each individual sampling. pH: prior to test item application 8.0-8.2 after test item application: 6.5-6.8 Oxygen concentration: 8.26 mg/mL - 10.39 mg/mL **Redox potential:** +193 mV to +233 mV **Conductivity:** 134.5 µS/cm - 146.97 µS/cm

n.d.: not detected (< LOD)
1) Particular samples which were < LOD or < LOQ were not used for result evaluations
2) Values were between LOD and LOQ (qualitative determination)

B. STUDY DESIGN

1. Experimental conditions

The test systems were maintained under aerobic conditions in the dark under continuous agitation (120 rpm) at a temperature of 20±2°C (except for 4.75 h during which slightly higher temperatures were observed).

To estimate the degradation behaviour of the test item in surface water a screening sample was prepared additionally to the test samples and incubated simultaneously. Sampling time points of the test samples (F_T, F_M) were chosen on basis of the results of the screening sample.

An estimation of the test item's solubility in different solvents (e.g. in a mixture of acetonitrile (ACN) and pure water or pure and surface water solely) was done during a preliminary non-GLP phase of the study.

Prior to filling the natural water into the 5 L and 10 L glass bottles, the water was filtered through a 100 µm nylon filter to remove coarse particles.

Aliquots of the respective application or stock solutions were added to each test vessel containing 500 mL of surface water resulting in the following three nominal test concentrations: 10 100 and 1003 µg/L. For the application of the highest concentration, non-labelled test item was mixed with radiolabelled test item while only radiolabelled test items were used for the application of the lower concentration levels: :

Samples for determination of mass balances mass balance calculation (dissolved CO_2) were equally prepared as the test samples, resulting in the concentrations mentioned above. Determination of mass balance (total radioactivity in water and distinct volatile traps) was done for each test item concentration.

Three necked glass bottles were used as incubation vessels. Each bottle was closed hermetically during incubation. Prior to sampling the flasks containing the ^{14}C-labelled test items were connected to a flow-through system. A moderate stream of sterile, CO_2-free air was used as carrier gas to collect $^{14}CO_2$ and other volatiles in distinct traps consisting of the following trapping solutions:

1) Trap content for test samples F_T (in order of connection to sample flasks): 15 mL ethylene glycol, 15 mL 0.05 M H_2SO_4, 15 mL 2 M NaOH and as protection for the pump 15 mL pure water.

2) Trap content for test samples F_M (dissolved $^{14}CO_2$) (in order of connection to sample flasks): 15 mL 2 M NaOH, 15 mL 2 M NaOH and as protection for the pump 15 mL pure water.

For examining possible abiotic degradation or other non-biological removal of the test item (e.g. hydrolysis or adsorption to the test vessel), two sterile samples were prepared by autoclaving the test vessels (20 min, 121°C) before test item application. 100 µL of the non-labelled stock solution was added to 500 mL of surface water resulting in a concentration of 100 µg/L (concentration II).

Two blank samples containing 500 mL surface water without test item application were prepared as background control to detect interfering compounds or contaminated solutions.

A reference control with the application of benzoic acid was used to confirm microbial activity of the surface water. A solvent control (^{14}C-labelled benzoic acid and ACN) was additionally prepared to examine possible adverse effects of the solvent acetonitrile on the microbial activity of the surface water. A sterility control was also prepared to identify dissipation processes (e.g. hydrolysis, sorption) others than the microbial degradation of benzoic acid. After application of [7-^{14}C]benzoic acid or solvent, the test vessels were connected to the flow-through system. Each sample was continuously agitated by shaking. After sampling, the flasks were closed, re-connected and further agitated.

2. Sampling

The test was accomplished as a batch approach for the test samples (F_T samples), meaning that at each sampling time point an aliquot of the same sample was taken while the remaining sample was further incubated. Samples were taken immediately after incubation (0 h) and 25, 40, 53, 61 days after treatment (in duplicate). Additionally, samples for the determination of $^{14}CO_2$ dissolved in water and particle adsorbed radioactivity were incubated (F_M samples). Those samples were taken completely at each sampling time point (in duplicate). Sampling intervals correspond to those of the F_T samples.

Analysis of stored soil extracts obtained from fortified samples confirmed sufficient storage stability over a period of 49 and 50 days. The concentration of test item in the extracts analysed after 49 and 50 days was 90% to 107% related to the concentration determined immediately after preparation.

Aliquots of sterile controls were taken after a total incubation time of 110 days.

Aliquots of the vessels applied with [7-^{14}C]Benzoic Acid or with [7-^{14}C]Benzoic Acid and solvent were taken 0, 1, 2, 3 and 4 days after application. However, the NaOH trap was replaced at each sampling point of the reference/solvent control to prevent a saturation of the trap during incubation. Sterile samples were taken with the final samples of the reference/solvent control (after 4 days of incubation).

3. Description of analytical procedures

The following analytical methods were used in course of the study: LSC, HPLC coupled with UV and radio-detection and LC-MS/MS analysis. Mass balancing and screening for transformation products was accomplished for each sampling time point.

The methods were validated during the course of the study. Specificity was ensured by comparing retention of the standard solution with the retention of the analyte in the sample solution. Characterisation was verified for the test item by LC-MS/MS analysis (test item and label specific mass transitions). Linearity was assessed by investigating the correlation between peak areas of standard solutions to their corresponding nominal concentration. Linear calibration was accomplished for HPLC-UV and LC-MS/MS analysis. Regression coefficients (r^2) were used to verify linearity and were at least 0.9947 for LC-MS/MS (concentration range 0.1 – 100 µg/L) and at least 0.9996 for HPLC-UV (concentration range 0.5 – 10 mg/L).

Fortified samples were prepared in surface water to assess the accuracy and precision of the method. The chosen fortification levels ranged from 1000 µg/L (100% of sample concentration III) to 1 µg/L (10% of samples concentration I, 1% of sample concentration II). Fortified surface water was analysed without further treatment by LSC (all levels) and LC-MS/MS (fortification level 1 µg/L to 50 µg/L). Recovery values were mostly in the desired range of 90% to 110% of the applied amount, whereas relative standard deviation values were found to be << 20% for each fortification level. The lowest fortification level of 1 µg/L was stated as limit of quantification for the analysis by means of LC-MS/MS. Overall, the chosen approach was considered valid over the concentration range of interest.

<u>Screening sample:</u>

Immediately after sampling aliquots were diluted with acetonitrile 1/1 v/v to stop any degradation processes and analysed for the test item and known transformation products by LC-MS/MS analysis. Sample intervals and corresponding results were sufficient for the estimation of sampling time points of the test samples.

<u>Test samples (F_T):</u>

Samples were connected to a flow through system prior to sampling to collect $^{14}CO_2$ and further volatile transformation products. A moderate stream of CO_2 free, sterile air was used to aerate the samples overnight. At each sampling time point pH, oxygen content, redox potential and conductivity of the surface water were measured. After 5 mL of the samples were taken, the flasks were hermetically closed and agitated again until the next sampling time point. Aliquots of the samples and trap contents were analysed by LSC. Additionally, an aliquot of the samples was analysed by HPLC radio detection for test item quantification and screening of transformation products as well as by LC-MS/MS analysis.

<u>Samples for mass balance calculation (F_M):</u>

First, samples were connected to a flow through system prior to sampling to collect $^{14}CO_2$. A moderate stream of CO_2 free and sterile air was used to aerate the samples overnight. The evolved $^{14}CO_2$ was trapped and an aliquot of the samples and trapping solutions were analysed by LSC analysis prior to acidification. Second, the samples were acidified to pH 2-3 (10% HCl). The evolved $^{14}CO_2$ was trapped in separate traps. Third, an aliquot of the samples was collected after

acidification for the determination of phase distribution via separation of particulate by centrifugation. Aliquots of each sample and trap content were analysed by LSC. As the removed volume in the test samples (F_T) was < 10% (50 mL) of the total volume, no adjustment of the total volume of the F_M samples was necessary.

Sterile samples:

The sterile samples were not connected to the flow-through system. Aliquots of sterile controls were taken after a total incubation time of 110 days. Immediately after sampling aliquots were diluted with acetonitrile 1/1 v/v to stop any abiotic degradation process and analysed for the test item and known transformation products by LC-MS/MS analysis. Sterility of the samples was confirmed by using a commercially available dip slide kit (Hycon GK-T/HS, [redacted], Germany) for a total count of microorganisms and to determine the total count of yeast and moulds.

Blank samples:

Blank samples were not connected to the flow-through system. Aliquots of the blank samples were taken at each sampling time point of the test samples and analysed by HPLC radio detection.

Benzoic Acid: reference/solvent control, sterile control:

Aliquots of the samples and trap contents were analysed by LSC. Additionally, an aliquot of the samples was analysed by HPLC radio detection.

The limit of detection (LOD) was determined for all analytical methods as signal/noise ratio (3:1). In case of LC-MS/MS analysis, the limit of quantification (LOQ) was determined as the lowest analyte concentration at which an acceptable recovery (70-110% for the non-labelled or 90-110% for the labelled analyte) with a relative standard deviation (RSD) of ≤ 20% could be obtained. Fortified samples were used for LOQ determination. In case of LSC and HPLC radio detection LOQ was determined as signal/noise ratio (10:1).

For LSC, the LOD was determined to be 84 dpm (equal to 1.4 Bq) with a corresponding LOQ of 280 dpm (equal to 4.7 Bq).

For HPLC with radiodetection, the following LODs were determined for the phenyl and triazolinone-label, respectively: 21 and 15% AR for Concentration I, 2 and 2% AR for Concentration II and 0.3 and 0.3% AR for Concentration III. The corresponding LOQs are 69 and 50% AR for Concentration I, 7 and 5% for Concentration II and 1.2 and 0.9% AR for Concentration III (Phenyl and Triazolinone-label, respectively).

For LC-MS/MS, the LOD and LOQ were 0.17 and 1.0 µg/L, respectively, for both labels.

II. RESULTS AND DISCUSSION

The results indicated that the test water was microbially active and that aerobic conditions were maintained throughout the entire incubation time. Sterile samples confirmed the absence of adsorption of MKH 6561 to the surface of the test vessels and any abiotic mechanisms leading to decay of MKH 6561 in the surface water. The investigation of the additional samples (F_M) showed that it can be excluded that $^{14}CO_2$ was solved in the surface water and that adsorption to particles took place.

A. DATA

Table 7.2-6 Distribution of radioactivity after application of [triazolinone-3-^{14}C]MKH 6561 (mean values of duplicates)

Incubation time [d]	Aqueous phase (%AR)			Volatiles (%AR)	Total Recovery (%AR)
	% AR	Distribution [1)]			
		MKH 6561 % Peak Area	Unknown % Peak Area (RT: 7.5 min)		
Test samples – concentration I: 10 µg/L					
0	100.0	100	n.a.	n.a.	100
25	99.0	100	n.a.	n.a.	99
40	99.7	100	n.a.	n.a.	100
53	98.8	100	n.a.	n.a.	99
61	98.6	100	n.a.	0.16	99
Test samples – concentration II: 100 µg/L					
0	100.0	100	n.a.	n.a.	100
25	97.1	100	n.a.	0.09	97
40	97.0	96	4	0.15	97
53	96.1	96	4	0.19	96
61	98.1	96	4	0.23	98
Test samples – concentration III: 1003 µg/L					
0	100.0	100	n.a.	n.a.	100
25	99.0	100	n.a.	0.19	99
40	98.3	100	n.a.	0.22	98
53	97.6	100	n.a.	0.25	98
61	95.5	100	n.a.	0.27	96

1) values represent a peak of entire chromatogram (HPLC radiodetection)
n.a. not applicable, n.d.: not detected, RT: Retention Time

Table 7.2-7 Distribution of radioactivity after application of [phenyl-UL-^{14}C] MKH 6561 (mean values of duplicates)

Incubation time (d)	Aqueous phase (%AR)			Volatiles (%AR)	Total Recovery (%AR)
	% AR	Distribution [1)]			
		MKH 6561 % Peak Area	Unknown % Peak Area (RT: 8 min)		
Test samples –concentration I: 10 µg/L					
0	100.0	96	4	n.a.	100
25	94.7	96	4	n.a.	95
40	94.9	96	4	n.a.	95
53	94.2	95	5	0.19	94
61	95.4	96	4	0.19	95
Test samples –concentration II: 100 µg/L					
0	100.0	100	n.a.	n.a.	100
25	96.4	100	n.a.	0.02	96
40	100.5	100	n.a.	0.02	101
53	102.1	100	n.a.	0.02	102
61	97.8	100	n.a.	0.02	98
Test samples –concentration III: 1003 µg/L					
0	100.0	100	n.a.	n.a.	100
25	96.9	100	n.a.	0.02	97
40	100.1	100	n.a.	0.02	100
53	101.6	100	n.a.	0.02	102
61	98.8	100	n.a.	0.02	99

1) values represent % peak of entire chromatogram (HPLC radiodetection)
n.a. not applicable, n.d.: not detected, RT: Retention Time

B. MASS BALANCE

For all samples of the degradation test (F_T), the mean total recovery was in the required range of 90% to 110% of AR (applied radioactivity). For the samples used to determine dissolved CO_2 sufficient mass balances were obtained except for the following samples: (a) F_M after acidification concentration II (triazolinone label) incubated for 25 d, (b) F_M after acidification concentration III (triazolinone label) incubated for 61 d, (c) F_M after acidification/centrifugation concentration II (triazolinone label) incubated for 25 d and (d) F_M after acidification/centrifugation concentration III (phenyl label) incubated for 61 d. The latter ones showed recoveries of 86% to 116% of AR (mean). In each case one out of two replicates of the same sample was out of the required range, the second replicates showed recoveries in the range of 91% to 103% of AR which indicated a complete mass balance for each of the above mentioned samples. An explanation for the outliers could not be given.

However, recoveries calculated were considered acceptable and it was concluded that generally no radioactivity was lost during incubation or sample processing.

For the samples applied with benzoic acid, mass balances ranged from 66% to 72% of AR after 4 days of incubation. It was assumed that the missing radioactivity probably consisted of dissolved $^{14}CO_2$ in the water which escaped during sampling and LSC measurement.

C. VOLATILISATION

For the trapping solutions of each concentration (I-III) and each label (phenyl, triazolinone) recoveries were ≤ 1.0% of AR (mean). Thus, the formation of volatile transformation products was found to be negligible in the course of incubation.

D. TRANSFORMATION OF PARENT COMPOUND

Triazolinone label

In case of concentration II a signal emerged after 40 days of incubation. The peak area of the entire chromatogram of 4.2% (mean) remained steady until the end of the study. However, the intensity of the peaks was below the LOD, except for samples 40d-3 and 53d-2 which were between LOD and LOQ. Thus, an unequivocal determination of the percentage of the transformation product/impurity was not possible.The detected peak in samples of concentration II has a similar retention time as the possible aquatic transformation product M10. As the peak could only be found in a very low concentration in samples of concentration II after 40 to 61 days of incubation and no peak occurred in samples with the higher concentration level III, it was assumed that the signal resulted from an impurity rather than from a transformation product.

An entry of the transformation product/impurity via the stock solution can be excluded as no peaks were observed in samples of concentration levels I and III. Additionally, for the samples of concentration level II taken directly after application (0 d) and after 25 days of incubation the same amount of the transformation product/impurity should have been found compared to the following sampling time points but in those samples no peaks were observed.

The entry of an impurity in a low concentration sample could be explained regarding the sampling process. At each sampling time point, the same sample was opened and an aliquot was taken (batch method). So, if the impurity was applied at sampling day 40, the same amount (if stable) should be found at the following sampling time points.

For samples of concentration levels I and III no transformation product/impurity could be observed. The entire radioactivity can be assigned to the parent test item.

Phenyl label

A peak was observed in all samples of concentration level I. The mean retention time of the compound (7.1 min) did not match with the retention time of the impurity or transformation product (8.0 min) found within the corresponding stock solution. A comparison of the estimated retention times of possible transformation products showed no accordance and thus, a structure could not be stated.

A percentage of 4.0% area chromatogram (mean) could be found in samples taken after application. No trend was observed for the unknown compound (i.e. increase/decrease) in the course of incubation. The amount remained steady up to 61 days of incubation.

As the unknown compound was found only in samples of concentration level I, it was assumed that the signal resulted more likely from an impurity than from a transformation product.

The explanation of the entry of an impurity in the low concentration samples is equal to the samples with the triazolinone labelled test item. Samples were prepared in batch, meaning that only aliquots were taken from the sample at each sampling time point. So, if the impurity was introduced during application, the same amount (if stable) should be found at the following sampling time points.

For samples of concentration levels II and III no transformation product could be observed. The entire radioactivity can be assigned to the parent test item.

III. CONCLUSIONS

For each concentration (I-III) MKH 6561 was found with a percentage of > 95% of total radioactivity within the samples. The test indicated that MKH 6561 was stable in the used microbial active surface water during 61 days of incubation under aerobic conditions in the dark at approx. 20°C.

CA 7.2.2.3 Water/sediment studies

The route and rate of degradation of propoxycarbazone-sodium in water/sediment systems under aerobic conditions were evaluated during the Annex I inclusion using two radiolabel positions, [phenyl-UL-^{14}C] and [triazolinone-3-^{14}C], and were accepted by the European Commission (SANCO/4067/2001-Final, 30 September 2003).

Annex point	Author(s)	Year	Edition No.
KCA 7.2.2.3/01	[redacted], K.	1998	M-005219-01-1

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to the corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph. A summary of the relevant data is given in CA 7.2.2.

The route and rate of degradation of propoxycarbazone-sodium in water/sediment systems under anaerobic conditions were evaluated during the Annex I and accepted by the European Commission (SANCO/4067/2001-Final, 30 September 2003). These studies were not considered relevant for this Supplemental Dossier for the renewal of approval.

Annex point	Author(s)	Year	Edition No.
KCA 7.2.2.3/02	[redacted], E.L. et al.	1999	M-012966-01-1
KCA 7.2.2.3/03	[redacted], E.L. et al.	1999	M-012960-02-1

Studies shaded in grey have been reviewed as part of the first EU review of propoxycarbazone-sodium.

The two studies showed that the parent compound is well degradable in the aquatic environment even under anaerobic conditions (DT_{50} 28 d phenyl-label and 16 d triazolinone-label). The major metabolites observed were M04, M06 and M10. For further information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to the corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograph.

An updated kinetic evaluation of the degradation behaviour of propoxycarbazone-sodium and its major degradation products in water and sediment (refer to KCA 7.2.2.3/01) was performed according to current FOCUS kinetics guidances to derive kinetic parameters suitable for modelling purpose and environmental risk assessment and is submitted within this Supplemental Dossier for the propoxycarbazone-sodium renewal of approval (summary is provided below). A summary of the route and rate of degradation of propoxycarbazone-sodium in water and sediment is given in CA 7.2.2 and Table 7.2-3 and Table 7.2-4.

Report:	[redacted]t;[redacted];2014;M-475412-01
Title:	Kinetic modelling analysis of the degradation behaviour of propoxycarbazone-sodium and its major metabolites from aerobic water-sediment studies
Report No:	358525-3
Document No:	M-475412-01-1
Guidelines:	FOCUS (2006): Guidance Document on Estimating Persistence and Degradation Kinetics from Environmental Fate Studies on Pesticides in EU Registration. Report of the Work Group on Degradation Kinetics of FOCUS. EC Document Reference SANCO/10058/2005 version 2.0, June 2006. FOCUS (2011): Generic Guidance for Estimating Persistence and Degradation Kinetics from Environmental Fate Studies on Pesticides in EU Registration, version 1.0
Deviations:	none
GLP/GEP:	**no**

Executive Summary

A kinetic evaluation of a laboratory water-sediment study with two different sediment systems and with [phenyl-UL-^{14}C]MKH 6561 and [triazolinone-3-^{14}C]MKH 6561 being the applied substances was conducted using the fitting software KinGUI2 and according to FOCUS kinetics guidance (FOCUS, 2006, 2011).

The analysis was conducted in order to derive dissipation and degradation rates of MKH 6561 and its metabolites M04 (MKH 7018), M05 (STJ 4934), M06 (MKH 7283), and M10 (MKH 7017) in water-sediment systems for use in subsequent risk assessments.

All datasets were initially evaluated by comparing single first-order (SFO) and first-order multi-compartment (FOMC) kinetic models. Persistence endpoints were then evaluated using best-fit kinetics. A set of different rules of acceptance were followed for determining modelling endpoints to be used in FOCUS PEC_{SW} simulations. An assessment of the goodness-of-fit of optimised degradation and dissipation curves was used to evaluate the reliability of all parameter estimates following FOCUS kinetics guidance.

At level P-I, single first-order (SFO), double first-order in parallel (DFOP), and Hockey-Stick (HS) kinetic models were used to describe the behaviour of MKH 6561 in the water phase, sediment phase and the total system. No level P-II was calculated. Modelling endpoints at level P-I were solely derived from SFO model. The model to best describe degradation of the parent in total system was HS for system [redacted] Pond and SFO for system Von [redacted] Lake. Level M-I degradation was therefore based on these two best-fit models for parent, while for metabolites only SFO was tested. Level M-I dissipation endpoints were obtained from SFO.

Geometric means of persistence endpoints for MKH 6561 were 49.06 days for total system and 30.73 days for the water phase. For sediment, a single DT_{50} of 8.84 days could be derived for system [redacted] Pond.

Geometric means of modelling endpoints for MKH 6561 were 48.00 days for total system, 32.18 days for the water phase, and 94.02 days for sediment. The geometric mean $DegT_{50,\text{total system}}$ of 48.00 days may be used in FOCUS STEP 3 surface water modelling, in combination with a default DT_{50} of 1000 days for the second compartment.

For metabolites, only a few reliable half-lives could be estimated:

For M04 and M10, neither M-I dissipation nor degradation endpoints could be estimated. Consequently, for PEC_{SW} modelling, default DT_{50} values of 1000 days need to be used.

For M05, a geometric mean DT_{50} of 32.56 days for FOCUS Steps1-2 modelling could be derived.

For M06, default DT_{50} values of 1000 days need to be used for PEC_{SW} modelling at Steps1-2. However, a geometric half-life of 172.86 days would be available for FOCUS Step 3 modelling – if needed.

I. MATERIALS AND METHODS

The standard procedures recommended by FOCUS (2006, 2011) were followed to adjust the experimental residue data of the water-sediment study for the kinetic modelling. All datasets were initially evaluated by comparing single first-order (SFO) and first-order multi-compartment (FOMC) kinetic models. Persistence endpoints were then evaluated using best-fit kinetics. A set of different rules of acceptance were followed for determining modelling endpoints to be used in FOCUS PEC_{SW} simulations. An assessment of the goodness-of-fit of optimised degradation and dissipation curves was used to evaluate the reliability of all parameter estimates following FOCUS kinetics guidance.

At Level P-I, parent data for the total system, the water phase and the sediment phase were analysed separately. Sediment data were accounted for from the maximum onwards. As a first step for all parent data sets at Level P-I, the fit of SFO kinetic model was tested for the applied substance. For persistence (best-fit) endpoints the SFO model was compared to the FOMC model. In cases, where SFO was not appropriate as best-fit model, DFOP and HS were tested as further bi-phasic models. For modelling endpoints, in cases where SFO was not appropriate, the decision whether to test only HS and DFOP model (> 10% AR) or additionally FOMC (< 10% AR) as bi-phasic models depended on the amount of residues in the respective compartment (water, sediment, total system) at the end of the experimental phase. No Level P-II was calculated. At Level M-I, both persistence and modelling endpoints were estimated using a one compartmental approach. Data for the total system, the water phase and the sediment phase were analysed separately. All metabolite data sets were evaluated from peak concentration onwards (Level M-I dissipation), where applicable. Additionally, total system data were evaluated together with parent data to obtain Level M-I degradation endpoints (formation plus degradation). These pathway fits were based on the previously optimised parent only fit.

The kinetic analysis was conducted using the software package KinGUI (version 2.2012.320.1629) for parameter fitting ([redacted] et al., 2007[18]; Schmitt et al., 2011[19]). Optimisations were carried out for the initial soil residue (M_0), degradation rate constants (k), (g) or breakpoint (t_b), depending on the kinetic model. The parameters are optimised by minimising the sum of squared differences between measured and calculated data using Iteratively Reweighted Least Square (IRLS) routines. The error tolerance and the number of iterations were set to the default values of $1x10^{-3}$ and 10, respectively. The initial estimates for the parameters were calculated as proposed in [redacted] & [redacted] (2006)[20]. Data were not weighted and the initial concentration was not constrained in any of the fits.

II. RESULTS AND DISCUSSION

At level P-I, single first-order (SFO), double first-order in parallel (DFOP), and Hockey-Stick (HS) kinetic models were used to describe the behaviour of MKH 6561 in the water phase, sediment phase and the total system. No level P-II was calculated. Modelling endpoints at level P-I were solely derived from SFO model. The model to best describe degradation of the parent in total system was HS for system [redacted] Pond and SFO for system Von [redacted] Lake. Level M-I degradation was therefore based on these two best-fit models for parent, while for metabolites only SFO was tested. Level M-I dissipation endpoints were obtained from SFO.

Summaries of the obtained endpoints for MKH 6561 and its metabolites are provided in Table 7.2-8 to Table 7.2-14. For M04 and M10, no persistence endpoints at all could be estimated. Respective tables are missing.

[18] Schäfer, D., Mikolasch, M., Rainbird, P., Harvey, B. (2007): KinGUI: A new kinetic software tool for evaluations according to FOCUS Degradation Kinetics. In: Del Re, A.A.M. et al. (Eds.): Proceedings of the XIII Symposium on Pesticide Chemistry, Piacenza, 2007, p. 916-923.
[19] Schmitt, W., Gao, Z., Meyer, H. (2011): KinGUI2, version 2.2012.320.1629. Bayer CropScience AG.
[20] Schäfer, D. & Mikolasch, B. (2006): Kinetic Evaluation with MATLAB: Introduction to the Use of KINGUI Version 1.1. Bayer CropScience AG.

Table 7.2-8 Persistence and modelling endpoints for MKH 6561

	Persistence endpoints at level P-I			Modelling endpoints at level P-I	
	Model	**DT_{50}[1] [days]**	**DT_{90}[1] [days]**	**Model**	**SFO DT_{50}[1] [days]**
Total system (both labels)					
[redacted] Pond	HS	12.37	33.35	SFO	11.85
Von [redacted] Lake	SFO	194.57	646.34	SFO	194.57
Geometric mean		**49.06**	**146.82**		**48.00**
Water phase (both labels)					
[redacted] Pond	SFO	10.00	33.22	SFO	10.00
Von [redacted] Lake	DFOP	94.46	378.28	SFO	103.56
Geometric mean		**30.73**	**112.10**		**32.18**
Sediment phase (both labels)					
[redacted] Pond	SFO	8.84	29.39	SFO	8.84
Von [redacted] Lake	-[2]	-[2]	-[2]	-[2]	1000[3]
Geometric mean		**8.84**	**29.39**		**94.02**

1) DT_{xx} = $DegT_{xx}$ for total system but $DisT_{xx}$ for water and sediment phase.
2) not calculated due to insufficient number of data points after peak.
3) FOCUS default DT_{50} for use in surface water modelling

Table 7.2-9 Modelling endpoints for M04 (MKH 7018)

System	FOCUS Step	DT_{50}[1] [days]	Kinetic Level and Type
[redacted] Pond	STEP 1	1000	Default DT_{50}
Von [redacted] Lake	STEP 1	1000	Default DT_{50}
Geometric mean		**1000**	
[redacted] Pond	STEP 2	1000	Default DT_{50}
Von [redacted] Lake	STEP 2	1000	Default DT_{50}
Geometric mean		**1000**	
[redacted] Pond	STEP 3	1000	Default DT_{50}
Von [redacted] Lake	STEP 3	1000	Default DT_{50}
Geometric mean		**1000**	

1) DT_{xx} = DegTxx for total system but $DisT_{xx}$ for water and sediment phase

Table 7.2-10 Persistence endpoints for M05 (STJ 4934)

System	Model	DT_{50}[1)] [days]	DT_{90}[1)] [days]	Type of Endpoint
Total system (both labels)				
[redacted] Pond	SFO	1.06	3.52	M-I, system decline
Von [redacted] Lake	-	-	-	-
Water phase (both labels)				
[redacted] Pond	SFO	1.06	3.52	M-I, water decline
Von [redacted] Lake	-	-	-	-
Sediment phase (both labels)				
[redacted] Pond	SFO	1.06	3.52	M-I, system decline
Von [redacted] Lake	-	-	-	-

1) DTxx = DegTxx for total system but DisTxx for water and sediment phase

Table 7.2-11 Modelling endpoints for M05 (STJ 4934)

System	FOCUS Step	DT_{50}[1)] [days]	Kinetic Level and Type
[redacted] Pond	STEP 1	1.06	M-I, system decline, SFO
Von [redacted] Lake	STEP 1	1000	Default DT_{50}
	Geometric mean	**32.56**	
[redacted] Pond	STEP 2	1.06	M-I, system decline, SFO
Von [redacted] Lake	STEP 2	1000	Default DT_{50}
	Geometric mean	**32.56**	
[redacted] Pond	STEP 3	1000	Default DT_{50}
Von [redacted] Lake	STEP 3	1000	Default DT_{50}
	Geometric mean	**1000**	

1) DT_{xx} = DegTxx for total system but $DisT_{xx}$ for water and sediment phase.

Table 7.2-12 Persistence endpoints for M06 (MKH 7283)

System	Model	DT_{50}[1)] [days]	DT_{90}[1)] [days]	Type of Endpoint
Total system (both labels)				
[redacted] Pond	SFO	29.88		M-I, system degradation
Von [redacted] Lake	-	-	-	-
Water phase (both labels)				
[redacted] Pond	SFO	29.88		M-I, system degradation
Von [redacted] Lake	-	-	-	-
Sediment phase (both labels)				
[redacted] Pond	SFO	29.88		M-I, system degradation
Von [redacted] Lake	-	-	-	-

1) DTxx = DegTxx for total system but DisTxx for water and sediment phase.

Table 7.2-13 Modelling endpoints for M06 (MKH 7283)

System	FOCUS Step	DT_{50} 1) [days]	Kinetic Level and Type
[redacted] Pond	STEP 1	1000	Default DT_{50}
Von [redacted] Lake	STEP 1	1000	Default DT_{50}
	Geometric mean	**1000**	
[redacted] Pond	STEP 2	1000	Default DT_{50}
Von [redacted] Lake	STEP 2	1000	Default DT_{50}
	Geometric mean	**1000**	
[redacted] Pond	STEP 3	Water: 1000 Sediment: 1000	Default DT_{50} Default DT_{50}
Von [redacted] Lake	STEP 3	Water: 29.88 Sediment: 1000	M-I, system degradation, SFO-SFO-SFO Default DT_{50}
	Geometric mean	Water: **172.86** Sediment: **1000**	

1) DT_{xx} = DegTxx for total system but $DisT_{xx}$ for water and sediment phase.

Table 7.2-14 Modelling endpoints for M10 (MKH 7017)

System	FOCUS Step	DT_{50} 1) [days]	Kinetic Level and Type
[redacted] Pond	STEP 1	1000	Default DT_{50}
Von [redacted] Lake	STEP 1	1000	Default DT_{50}
	Geometric mean	**1000**	
[redacted] Pond	STEP 2	1000	Default DT_{50}
Von [redacted] Lake	STEP 2	1000	Default DT_{50}
	Geometric mean	**1000**	
[redacted] Pond	STEP 3	1000	Default DT_{50}
Von [redacted] Lake	STEP 3	1000	Default DT_{50}
	Geometric mean	**1000**	

1) DT_{xx} = DegTxx for total system but $DisT_{xx}$ for water and sediment phase.

III. CONCLUSIONS

Modelling endpoints at level P-I were solely derived from SFO model. No level P-II was calculated. The model to best describe degradation of the parent in total system was HS for system [redacted] Pond and SFO for system Von [redacted] Lake. Level M-I degradation was therefore based on these two best-fit models for parent, while for metabolites only SFO was tested. Level M-I dissipation endpoints were obtained from SFO.

Geometric means of persistence endpoints for MKH 6561 were 49.06 days for total system and 30.73 days for the water phase. For sediment, a single DT_{50} of 8.84 days could be derived for system [redacted] Pond. Geometric means of modelling endpoints for MKH 6561 were 48.00 days for total system, 32.18 days for the water phase, and 94.02 days for sediment. The geometric mean $DegT_{50,total\ system}$ of 48.00 days may be used in FOCUS STEP 3 surface water modelling, in combination with a default DT_{50} of 1000 days for the second compartment.

For metabolites, only a few reliable half-lives could be estimated:

For M04 and M10, neither M-I dissipation nor degradation endpoints could be estimated. Consequently, for PEC_{SW} modelling, default DT_{50} values of 1000 days need to be used.

For M05, a geometric mean DT_{50} of 32.56 days for FOCUS Steps1-2 modelling could be derived.

For M06, default DT_{50} values of 1000 days need to be used for PEC_{SW} modelling at Steps1-2. However, a geometric half-life of 172.86 days would be available for FOCUS Step 3 modelling – if needed.

CA 7.2.2.4 Irradiated water/sediment study

This type of study is not required since it is not needed as a higher tier option.

CA 7.2.3 Degradation in the saturated zone

This type of study is not required since it is not needed as a higher tier option.

CA 7.3 Fate and behaviour in air

Propoxycarbazone-sodium has a very low vapour pressure (< 1 x 10^{-8} hPa at 20°C) and a low [redacted] Law Constant (< 1 x 10^{-1} Pa m^3 mol^{-1}). Therefore, a significant volatilisation of propoxycarbazone-sodium is not expected.

The volatilisation of propoxycarbazone-sodium was investigated under field conditions using [phenyl-UL-^{14}C]propoxycarbazone-sodium formulated as WG 70 and applied at a rate of 70 g/ha. Under the weather conditions typical for a spring application it was demonstrated that no significant loss of radioactivity is expected for propoxycarbazone-sodium and its degradation products.

The calculated half-life of propoxycarbazone-sodium is 4.5 hours according to the model of Atkinson. This corresponds to a chemical lifetime in air of 6.5 hours. Therefore, an accumulation of propoxycarbazone-sodium in the air and a contamination by wet or dry deposition are not expected.

CA 7.3.1 Route and rate of degradation in air

The study on vapour pressure and Henry's Law constant, the field experiment to determine volatilisation of propoxycarbazone-sodium as well as the calculation of the chemical lifetime were evaluated during the Annex I inclusion and accepted by the European Commission (SANCO/4067/2001-Final, 30 September 2003).

Annex point	Author(s)	Year	Edition No.
KCA 7.3.1/01 also filed in KCA 2.1/01, KCA 2.12/01; KCA 2.2/01, KCA 2.3/01; KCA 2.5/01, KCA 2.6/01; KCA 2.7/01, KCA 2.8/06	[redacted], J.	1996	M-001575-01-1
KCA 7.3.1/02	[redacted], E.	1998	M-005214-01-1
KCA 7.3.1/03	[redacted], E.	1996	M-001629-01-1

For information on studies already evaluated during the first EU review of propoxycarbazone-sodium, please refer to the corresponding section in the Baseline Dossier provided by [redacted] on behalf of Bayer CropScience and in the Monograconstantph. A summary of the relevant data is given in section CA 7.3.

CA 7.3.2 Transport via air

The transport via air of propoxycarbazone-sodium was not studied since its vapour pressure is below the trigger value of 10^{-5} Pa.

CA 7.3.3 Local and global effects

As propoxycarbazone-sodium is not applied in high volumes, local and global effects are not expected.

CA 7.4 Definition of the residue

For the renewal of approval of propoxycarbazone-sodium new data on metabolism in soil are available while the data basis for water/sediment systems remained the same. The new soil studies have revealed one new metabolite (M11). Accordingly, the residue definition for risk assessment remains the same only that in addition the new metabolite M11 has to be considered in soil, water and sediment. Ecotoxicological studies have confirmed that the major metabolites have only low risk in all aquatic and soil dwelling test organisms. However, propoxycarbazone-sodium is ecotoxicologically relevant in aquatic and terrestrial plants, due to its herbicidal effects. Nevertheless, the absence of any critical toxicity of propoxycarbazone-sodium and its toxicologically relevant metabolites was confirmed. Therefore, no residue relevant for monitoring neither propoxycarbazone-sodium nor any of the major metabolites is defined.

CA 7.4.1 Definition of the residue for risk assessment

In summary, the proposed residue definitions relevant for risk assessment for each compartment are the following. Details are listed below.

Compartment	Residue Definition
Soil	propoxycarbazone-sodium, M05, M07, M08, M09, M10, M11
Groundwater	same as soil
Surface water	same as soil plus M04, M06
Sediment	same as surface water
Air	not relevant

Soil

In the first EU review report five major metabolites M05, M07, M08, M09 and M10 with an occurrence > 10% AR in soil were defined. Other minor degradation products were observed that did not occur > 10% AR at any sampling point or > 5% AR on two consecutive sampling points in any of the studies.
For the renewal of approval of propoxycarbazone-sodium in a new anaerobic soil degradation study three metabolites known from former studies (M10, M07, M08) and one new metabolite (M11) were found with occurrences of > 10% AR.

The proposed residue definitions relevant for risk assessment for soil are the following:

	Maximum occurrence (%)	Reference
propoxycarbazone-sodium	*parent*	
M05	20.9	KCA 7.1.1.1/03
M07	26.7	KCA 7.1.1.1/03
M08	21.9	KCA 7.1.1.1/03
M09	13.2	KCA 7.1.1.1/02
M10	55.2	KCA 7.1.1.1/04
M11	17.1	KCA 7.1.1.2/01

Groundwater

Groundwater leaching of propoxycarbazone-sodium cannot be excluded due to its classification as highly mobile in soil. In addition, the mobility of its relevant metabolites M05, M07, M10 and M11 were classified as very high. M09 was classified as highly mobile and M08 has a low mobility. Based on the results of aged residue leaching, propoxycarbazone-sodium and M10 might leach into groundwater. However, the results of the lysimeter studies demonstrated a low leaching potential of propoxycarbazone-sodium or its metabolites to groundwater.

The proposed residue definitions relevant for risk assessment for groundwater are the following:

propoxycarbazone-sodium (parent)
Metabolites: M05, M07, M08, M09, M10 and M11

Surface Water and Sediment

Regarding the surface water compartment the entry of compounds via spray drift, runoff and drainage into the water body is possible. The major degradation products in the hydrolysis study were M05 and M10 (at 25°C). In the aqueous photolytic degradation study M10 and in addition M07 were detected as major metabolites.
The major metabolites detected in the original aerobic water/sediment study were M04, M06 and M10 in the pond system and M05 and M10 in the lake system.
The anaerobic water/sediment study evaluated during the Annex I inclusion reported three metabolites, M04, M06 and M10.

The proposed residue definitions relevant for risk assessment for surface water and sediment are the following:

	Maximum occurrence (%)	Reference
propoxycarbazone-sodium	*parent*	
M04	50.2 (water) 19.3 (sediment)	KCA 7.2.2.3/01 KCA 7.2.2.3/01
M05	3.7 (water) 7.0 (sediment) 16.6 (hydrolysis)	KCA 7.2.2.3/01 KCA 7.2.2.3/01 KCA 7.2.1.1/01
M06	16.2 (water) 3.2 (sediment)	KCA 7.2.2.3/01 KCA 7.2.2.3/01
M07	22 (photolysis)	KCA 7.2.1.2/02
M10	21.2 (water) 13.2 (sediment) 13.9 (hydrolysis) 13.6 (photolysis)	KCA 7.2.2.3/01 KCA 7.2.2.3/01 KCA 7.2.1.1/02 KCA 7.2.1.2/03

In addition, all major soil metabolites (M05, M07, M08, M09, M10 and M11) have to be addressed, due to possible runoff and drainage scenarios.
Therefore, the following compounds have to be considered for surface water and sediment compartment:

propoxycarbazone-sodium (parent)
Metabolites: M04, M05, M06, M07, M08, M09, M10 and M11

Air

Propoxycarbazone-sodium shows low volatilisation and fast degradation in the air. Therefore, no significant occurrence of propoxycarbazone-sodium in the air is expected. No degradation products were identified for the air compartment.

The proposed residue definition relevant for risk assessment for air is the following:

not relevant

CA 7.4.2 Definition of the residue for monitoring

Ecotoxicological studies have confirmed the non-relevance of all major metabolites. However, propoxycarbazone-sodium is ecotoxicologically relevant in aquatic and terrestrial plants due to its herbicidal effects. Furthermore, toxicological testings of propoxycarbazone and its toxicoglogically relevant metabolites confirmed the absence of any critical toxicity of propoxycarbazone-sodium and its metabolites M04, M08, M09, M10 and M11. Therefore, no residue relevant for monitoring neither propoxycarbazone-sodium nor any of the major metabolites is defined.

CA 7.5 Monitoring data

Monitoring data for propoxycarbazone-sodium are not available and not required.