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Summary of the fate and behaviour in the environment iodosulfuron-methyl-sodium + mefenpyr-diethyl OD 400 (100+300 g/L)

Data Requirements

EU Regulation 1107/2009 & EU Regulation 284/2013
Document MCP
Section 9: Fate and behaviour in the environment

According to the guidance document, SANCO 10181/2013, for preparing dossiers for the approval of a chemical active substance

Date

2015-05-27

Author(s)

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Bayer CropScience

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Version history

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

[1] It is suggested that applicants adopt a similar approach to showing revisions and version history as outlined in SANCO/10180/2013 Chapter 4 How to revise an Assessment Report

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CP 9 FATE AND BEHAVIOUR IN THE ENVIRONMENT

This document contains updated calculations for the predicted environmental concentrations of iodosulfuron and its metabolites in soil and water. The reports submitted for the first European approval are not included in this document or in the baseline dossier as they are calculations which were not performed to the current standards and thus are not considered to be relevant.

Use pattern considered in the environmental exposure and risk assessment

Table CP 9- 1: Intended application pattern

Crop	Timing of application (range)	Number of applications	Application interval [days]	Maximum label rate [L/ha]	Maximum application rate, individual treatment [g/ha]	
					Iodosulfuron-methyl-sodium	Mefenpyr-diethyl
Winter cereals	BBCH 13-32	1	-	0.1	10	30
Winter cereals	BBCH 20-32	1	-	0.075	7.5	22.5

Definition of the residue for risk assessment

Justification for the residue definition for risk assessment is provided in MCA Sec.7, Point 7.4.1.

Table CP 9- 2 Definition of the residue for risk assessment

Compartment	Compound / Code
Soil	Iodosulfuron-methyl-sodium AE F075736 AE F145741 AE F145740 AE 0002166 AE F161778 BCS-CW81253 AE 0000119 AE F059411
Groundwater	same as soil
Surface Water	Iodosulfuron-methyl-sodium AE F075736 AE F145741 AE F145740 AE 0002166 AE F161778 BCS-CW81253 AE 0000119 AE F059411 AE 0014966 AE 0034855 AE 1234964 AE F159737 AE F154781
Air	Iodosulfuron-methyl-sodium

CP 9.1 Fate and behaviour in soil

Fate and behaviour of iodosulfuron-methyl-sodium in soil were assessed in the MCA document (Section 7) of the current renewal dossier based on the application of the active substance in laboratory studies and of formulated iodosulfuron-methyl-sodium in soil field dissipation studies. The behaviour of the active substance observed in the field studies is driven by the properties of the active substance molecule, whereas the impact of the formulation is considered negligible. The endpoints derived from these field studies are therefore related to the active substance. Together with the endpoints from the laboratory studies they are considered as appropriate to assess the exposure of iodosulfuron-methyl-sodium after application of the formulation IMS+MPR OD 400 (100+300).
Laboratory studies assessing the fate and behaviour of the preparation in soil have not been performed.

CP 9.1.1 Rate of degradation in soil

CP 9.1.1.1 Laboratory studies

Experimental studies with the representative formulation have not been performed. Please refer to Document MCA 7.1.2.1.

CP 9.1.1.2 Field studies

CP 9.1.1.2.1 Soil dissipation studies

Experimental studies with the representative formulation have not been performed. Please refer to Document MCA 7.1.2.2.1.

CP 9.1.1.2.2 Soil accumulation studies

Please refer to Document MCA 7.1.2.2.2.

CP 9.1.2 Mobility in the soil

CP 9.1.2.1 Laboratory studies

Experimental studies with the representative formulation have not been performed. Please refer to Document MCA 7.1.3.

CP 9.1.2.2 Lysimeter studies

Please refer to Document MCA 7.1.4.2.

CP 9.1.2.3 Field leaching studies

Please refer to CP 9.1 and MCA 7.1.4.3.

CP 9.1.3 Estimation of concentrations in soil

Predicted environmental concentrations in soil (PEC_S)

Report:	KCP 9.1.3 /01; [redacted], L.; [redacted], B.;2014; M-476705-01
Title:	Iodosulfuron-methyl-sodium (IMS) and metabolites: PEC_{soil} EUR - Use in winter cereals in Europe
Report No:	EnSa-14-0114
Document No:	M-476705-01-1
Guidelines:	**EU Commission, 2000, Guidance Document on Persistence in Soil (Working Document), 9188/VI/97 rev. 8** **FOCUS 1997, Soil persistence models and EU registration** **FOCUS, 2002, Generic Guidance for FOCUS Groundwater Scenarios, Version 1.1**
GLP/GEP:	**no**

Methods and Materials:
The predicted environmental concentrations in soil (PEC_{soil}) of iodosulfuron-methyl-sodium and its metabolites were estimated based on a first tier approach using a Microsoft® Excel spreadsheet. A bulk density of 1.5 kg/L and a soil mixing depth of 5 cm were used as recommended by FOCUS (1997) and EU Commission (1995, 2000). Detailed application data used for simulation of PEC_{soil} were compiled in Table CP 9.1.3- 1.

Table CP 9.1.3- 1: Application pattern used for PEC_{soil} calculations of iodosulfuron-methyl-sodium

Individual Crop	FOCUS Crop Used for Interception	Application				Amount reaching soil per season application [g a.s./ha]
		Rate per Season [g a.s./ha]	Interval [days]	Plant Interception [%]	BBCH Stage	
Winter cereals, GAP & Simulation	winter cereals	1 × 10		25	13-32	1 × 7.50
Winter cereals, GAP & Simulation	winter cereals	1 × 7.5	-	50	20-32	1 × 3.75

Substance Specific Parameters:
PEC_{soil} calculations were based on the maximum DT_{50} of laboratory studies; normalized to 20°C and 100 % field capacity according to FOCUS (2000). Further compound specific input parameters are summarized below.

Table CP 9.1.3- 2: Input parameters of iodosulfuron-methyl-sodium and its metabolites for PEC_{soil}

Compound	DT_{50} [1] [days]	Max. occur. in soil [%]	Molar mass [g/mol]	Molar mass correction factor	Amount reaching soil per season application 10 g a.s./ha	7.5 g a.s./ha
Iodosulfuron-methyl-sodium	12.2	100	529.3	1	7.5	3.75
AE F075736*	66.7	88.5	381.4	0.7206	4.78	2.39
AE F161778 *	17.5	14.5	367.3	0.6939	0.75	0.38
AE F059411 *	242.3	40.9	140.1	0.264	0.81	0.41
AE F145740 *	81.4	8.7	493.2	0.9318	0.61	0.30
AE F145741 *	43.0	6.9	493.2	0.9318	0.48	0.24
AE 0000119 *	91.0	19.9	183.2	0.3461	0.52	0.26
BCS-CW81253 *	115.8	35.1	343.3	0.6486	1.71	0.85
AE 0002166**	10.1	20.0	397.4	0.7508	1.13	0.56

* Aerobic soil degradation, see MCA 7.1.1
** Soil photolysis, not normilised, MCA 7.1.1
[1] Maximum DT_{50} of laboratory studies; normalized to 20°C and 100 % field capacity, for details please refer to CA 7.1.2.1

Findings:

The maximum PEC_{soil} values for iodosulfuron-methyl-sodium and its metabolites are summarised in the following table. The maximum, short-term and long-term PEC_{soil} values and the time weighted average values ($TWAC_{soil}$) of iodosulfuron-methyl-sodium and its metabolites are provided thereafter for 1 x 10 g a.s./ha (BBCH 13-32, 25 % crop interception) and 1 x 7.5 g a.s./ha (BBCH 20-32, 50 % crop interception).

Table CP 9.1.3- 3: Maximum PEC_{soil} of iodosulfuron-methyl-sodium and its metabolites for the uses assessed

Use pattern	Winter cereals, 1 × 10 g a.s./ha (25% interception) [mg/kg]	Winter cereals, 1 × 7.5 g a.s./ha (50% interception) [mg/kg]
Iodosulfuron-methyl-sodium	0.010	0.005
AE F075736	0.006	0.003
AE F161778	0.001	<0.001
AE F059411	0.001	<0.001
AE F145740	<0.001	<0.001
AE F145741	0.001	<0.001
AE 0000119	<0.001	<0.001
BCS-CW81253	0.002	0.001
AE 0002166	0.002	<0.001

Table CP 9.1.3- 4: PEC_{soil} (actual) and $TWAC_{soil}$ of iodosulfuron-methyl-sodium

	Time [days]	Iodosulfuron-methyl-sodium			
		Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
		PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]	PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]
Initial	0	0.010	-	0.005	-
Short term	1	0.009	0.010	0.005	0.005
	2	0.009	0.009	0.004	0.005
	4	0.008	0.009	0.004	0.004
Long term	7	0.007	0.008	0.003	0.004
	14	0.005	0.007	0.002	0.003
	21	0.003	0.006	0.002	0.003
	28	0.002	0.005	0.001	0.003
	42	<0.001	0.004	<0.001	0.002
	50	<0.001	0.003	<0.001	0.002
	100	<0.001	0.002	<0.001	< 0.001

Table CP 9.1.3- 5: PEC_{soil} (actual) and $TWAC_{soil}$ of metabolite AE F075736

	Time [days]	AE F075736			
		Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
		PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]	PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]
Initial	0	0.006	-	0.003	-
Short term	1	0.006	0.006	0.003	0.003
	2	0.006	0.006	0.003	0.003
	4	0.006	0.006	0.003	0.003
Long term	7	0.006	0.006	0.003	0.003
	14	0.006	0.006	0.003	0.003
	21	0.005	0.006	0.003	0.003
	28	0.005	0.006	0.002	0.003
	42	0.004	0.005	0.002	0.003
	50	0.004	0.005	0.002	0.002
	100	0.002	0.004	0.001	0.002

Table CP 9.1.3- 6: PEC_{soil} (actual) and $TWAC_{soil}$ of metabolite AE F145741

	Time [days]	AE F145741			
		Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
		PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]	PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]
Initial	0	<0.001	-	<0.001	-
Short term	1	<0.001	< 0.001	<0.001	< 0.001
	2	<0.001	< 0.001	<0.001	< 0.001
	4	<0.001	< 0.001	<0.001	< 0.001
Long term	7	<0.001	< 0.001	<0.001	< 0.001
	14	<0.001	< 0.001	<0.001	< 0.001
	21	<0.001	< 0.001	<0.001	< 0.001
	28	<0.001	< 0.001	<0.001	< 0.001
	42	<0.001	< 0.001	<0.001	< 0.001
	50	<0.001	< 0.001	<0.001	< 0.001
	100	<0.001	< 0.001	<0.001	< 0.001

Table CP 9.1.3- 7: PEC_{soil} (actual) and $TWAC_{soil}$ of metabolite AE F145740

	Time [days]	AE F145740			
		Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
		PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]	PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]
Initial	0	<0.001	-	<0.001	-
Short term	1	<0.001	< 0.001	<0.001	< 0.001
	2	<0.001	< 0.001	<0.001	< 0.001
	4	<0.001	< 0.001	<0.001	< 0.001
Long term	7	<0.001	< 0.001	<0.001	< 0.001
	14	<0.001	< 0.001	<0.001	< 0.001
	21	<0.001	< 0.001	<0.001	< 0.001
	28	<0.001	< 0.001	<0.001	< 0.001
	42	<0.001	< 0.001	<0.001	< 0.001
	50	<0.001	< 0.001	<0.001	< 0.001
	100	<0.001	< 0.001	<0.001	< 0.001

Table CP 9.1.3- 8: PEC_{soil} (actual) and $TWAC_{soil}$ of metabolite AE 0002166

	Time [days]	AE 0002166			
		Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
		PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]	PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]
Initial	0	0.002	-	<0.001	-
Short term	1	0.001	0.001	<0.001	< 0.001
	2	0.001	0.001	<0.001	< 0.001
	4	0.001	0.001	<0.001	< 0.001
Long term	7	<0.001	0.001	<0.001	< 0.001
	14	<0.001	< 0.001	<0.001	< 0.001
	21	<0.001	< 0.001	<0.001	< 0.001
	28	<0.001	< 0.001	<0.001	< 0.001
	42	<0.001	< 0.001	<0.001	< 0.001
	50	<0.001	< 0.001	<0.001	< 0.001
	100	<0.001	< 0.001	<0.001	< 0.001

Table CP 9.1.3- 9: PEC_{soil} (actual) and $TWAC_{soil}$ of metabolite AE F161778

	Time [days]	AE F161778			
		Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
		PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]	PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]
Initial	0	0.001	-	<0.001	-
Short term	1	<0.001	< 0.001	<0.001	< 0.001
	2	<0.001	< 0.001	<0.001	< 0.001
	4	<0.001	< 0.001	<0.001	< 0.001
Long term	7	<0.001	< 0.001	<0.001	< 0.001
	14	<0.001	< 0.001	<0.001	< 0.001
	21	<0.001	< 0.001	<0.001	< 0.001
	28	<0.001	< 0.001	<0.001	< 0.001
	42	<0.001	< 0.001	<0.001	< 0.001
	50	<0.001	< 0.001	<0.001	< 0.001
	100	<0.001	< 0.001	<0.001	< 0.001

Table CP 9.1.3- 10: PEC_{soil} (actual) and $TWAC_{soil}$ of metabolite BCS-CW81253

	Time [days]	BCS-CW81253			
		Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
		PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]	PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]
Initial	0	0.002	-	0.001	-
Short term	1	0.002	0.002	0.001	0.001
	2	0.002	0.002	0.001	0.001
	4	0.002	0.002	0.001	0.001
Long term	7	0.002	0.002	0.001	0.001
	14	0.002	0.002	0.001	0.001
	21	0.002	0.002	0.001	0.001
	28	0.002	0.002	<0.001	0.001
	42	0.002	0.002	<0.001	0.001
	50	0.002	0.002	<0.001	0.001
	100	0.001	0.002	<0.001	< 0.001

Table CP 9.1.3- 11: PEC_{soil} (actual) and $TWAC_{soil}$ of metabolite AE F059411

	Time [days]	AE F059411			
		Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
		PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]	PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]
Initial	0	0.001	-	<0.001	-
Short term	1	0.001	0.001	<0.001	< 0.001
	2	0.001	0.001	<0.001	< 0.001
	4	0.001	0.001	<0.001	< 0.001
Long term	7	0.001	0.001	<0.001	< 0.001
	14	0.001	0.001	<0.001	< 0.001
	21	0.001	0.001	<0.001	< 0.001
	28	<0.001	0.001	<0.001	< 0.001
	42	<0.001	0.001	<0.001	< 0.001
	50	<0.001	0.001	<0.001	< 0.001
	100	<0.001	0.001	<0.001	< 0.001

Table CP 9.1.3- 12: PEC_{soil} (actual) and $TWAC_{soil}$ of metabolite AE 0000119

	Time [days]	AE 0000119			
		Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
		PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]	PEC_{soil} [mg/kg]	$TWAC_{soil}$ [mg/kg]
Initial	0	<0.001	-	<0.001	-
Short term	1	<0.001	< 0.001	<0.001	< 0.001
	2	<0.001	< 0.001	<0.001	< 0.001
	4	<0.001	< 0.001	<0.001	< 0.001
Long term	7	<0.001	< 0.001	<0.001	< 0.001
	14	<0.001	< 0.001	<0.001	< 0.001
	21	<0.001	< 0.001	<0.001	< 0.001
	28	<0.001	< 0.001	<0.001	< 0.001
	42	<0.001	< 0.001	<0.001	< 0.001
	50	<0.001	< 0.001	<0.001	< 0.001
	100	<0.001	< 0.001	<0.001	< 0.001

Potential accumulation in soil:

The accumulation potential after long term use for all substances with DT_{50} longer than 90 days was assessed, i.e. metabolites AE F059411, AE 0000119 and BCS-CW81253. The results for a standard mixing depth of 5 cm are presented in Table CP 9.1.3- 13.

Table CP 9.1.3- 13: PEC_{soil} of metabolites AE F059411, AE 0000119 and BCS-CW81253 for the uses assessed, taking the effect of accumulation into account (standard mixing depth of 5 cm)

Use Pattern	PEC_{soil}	AE F059411 [mg/kg]	AE 0000119 [mg/kg]	BCS-CW81253 [mg/kg]
Winter cereals 1 × 10 g a.s./ha, 25% interception	plateau	<0.001	0.001	<0.001
	total*	0.002	<0.001	0.003
Winter cereals 1 × 7.5 g a.s./ha, 50% interception	plateau	<0.001	0.001	<0.001
	total*	<0.001	<0.001	0.001

* total = plateau (background concentration after multi-year use) + max. PEC_{soil} (see Table CP 9.1.3- 3)

CP 9.2 Fate and behaviour in water and sediment

Laboratory studies assessing the fate and behaviour of the preparation in water and sediment have not been performed. The fate and behaviour of iodosulfuron-methyl-sodium in aquatic environment were assessed in the MCA document of the current review dossier, based on laboratory studies with application of the active substance. The endpoints derived from these studies are considered appropriate to assess the exposure of iodosulfuron-methyl-sodium and its metabolites after application of the formulation IMS+MPR OD 400 (100+300).

CP 9.2.1 Aerobic mineralisation in surface water

Experimental studies with the formulation have not been performed. Please refer to Document MCA 7.2.2.2.

CP 9.2.2 Water/sediment study

Experimental studies with the formulation have not been performed. Please refer to Document MCA 7.2.2.3.

CP 9.2.3 Irradiated water/sediment study

Experimental studies with the formulation have not been performed. Please refer to Document MCA 7.2.2.4.

CP 9.2.4 Estimation of concentrations in groundwater

CP 9.2.4.1 Calculation of concentrations in groundwater

Predicted environmental concentrations in groundwater (PEC_{GW})

Tier 1: Standard calculations following the recommendations of FOCUS (2000) with the DT_{50} values calculated in a kinetic evaluation of several laboratory degradation studies ([redacted] & [redacted], 2013; M-447102-02-1, KCA 7.1.2.1.2/02) and normalised to referenced conditions 20°C and 100 % field capacity.

Higher tier: Calculations refining the laboratory data based calculations using modelling endpoints for iodosulfuron-methyl-sodium and its metabolite AE F075736 coming from terrestrial field dissipation studies. Also, outcomes of the experimental determination of the plant uptake factor of AE F075736 are taken into account.

During the implementation of the modelling pathway in the groundwater models PEARL and PELMO, a set of separate calculations had to be designed in order to overcome some limitations of technical nature. The overall groundwater assessment involving laboratory substance data consists of the following calculations:

- Calculation 1: FOCUS PEARL with parent and all metabolites except soil photometabolite AE 0002166, corresponding calculations are presented in KCP 9.2.4.1 /01.
- Calculation 2: FOCUS PELMO with parent and all metabolites except soil photometabolite AE 0002166 and soil metabolite AE F059411 (in order to keep sum of formation fractions metabolites generated from AE F075736 below 1), corresponding calculations are presented in KCP 9.2.4.1 /02.
- Calculation 3: FOCUS PELMO with parent and soil metabolites AE F075736 and AE F059411 (in order to address the remaining part of the soil degradation pathway), corresponding calculations are presented in KCP 9.2.4.1 /03.
- Calculation 4: FOCUS PEARL & PELMO with soil photometabolite AE 0002166, using pseudo application of the metabolite, corresponding calculations are presented in KCP 9.2.4.1 /04.
- Calculation 5 (higher tier): FOCUS PEARL & PELMO higher tier calculation refining the laboratory data based calculations using modelling endpoints for iodosulfuron-methyl-sodium and its metabolite AE F075736 coming from terrestrial field dissipation studies. Also, outcomes of the experimental determination of the plant uptake factor of AE F075736 are taken into account. Corresponding calculations are presented in KCP 9.2.4.1 /05.

Tier 1 assessment:

Report:	KCP 9.2.4.1 /01; [redacted], L.; [redacted], B.;2014; M-476701-01
Title:	Iodosulfuron-methyl-sodium (IMS) and metabolites: PEC_{gw} FOCUS PEARL EUR - Use in winter cereals in Europe
Report No:	EnSa-14-0110
Document No:	M-476701-01-1
Guidelines:	**FOCUS 2000, SANCO/321/2000 rev. 2** **FOCUS 2009, SANCO/13144/2010 version 1** **FOCUS 2012, Generic Guidance for Tier 1 FOCUS Groundwater Assessments, version 2.1**
GLP/GEP:	**no**

Report:	KCP 9.2.4.1 /02; [redacted], L.; [redacted], B.;2014; M-476702-01
Title:	Iodosulfuron-methyl-sodium (IMS) and metabolites: PEC_{gw} FOCUS PELMO EUR (pathway 1) - Use in winter cereals in Europe
Report No:	EnSa-14-0111
Document No:	M-476702-01-1
Guidelines:	**FOCUS 2000, SANCO/321/2000 rev. 2** **FOCUS 2009, SANCO/13144/2010 version 1** **FOCUS 2012, Generic Guidance for Tier 1 FOCUS Groundwater Assessments, version 2.1**
GLP/GEP:	**no**

Report:	KCP 9.2.4.1 /03; [redacted], L.; [redacted], B.;2014; M-476704-01
Title:	Iodosulfuron-methyl-sodium (IMS) and metabolites: PEC_{gw} FOCUS PELMO EUR (pathway 2) - Use in winter cereals in Europe
Report No:	EnSa-14-0112
Document No:	M-476704-01-1
Guidelines:	**FOCUS 2000, SANCO/321/2000 rev. 2** **FOCUS 2009, SANCO/13144/2010 version 1** **FOCUS 2012, Generic Guidance for Tier 1 FOCUS Groundwater Assessments, version 2.1**
GLP/GEP:	**no**

Report:	KCP 9.2.4.1 /04; [redacted], L.; [redacted], B.;2014; M-476703-01
Title:	Iodosulfuron-methyl-sodium (IMS) photometabolite AE 0002166: PEC_{gw} FOCUS PEARL, PELMO EUR - Use in winter cereals in Europe
Report No:	EnSa-14-0128
Document No:	M-476703-01-1
Guidelines:	**FOCUS 2000, SANCO/321/2000 rev. 2** **FOCUS 2009, SANCO/13144/2010 version 1** **FOCUS 2012, Generic Guidance for Tier 1 FOCUS Groundwater Assessments, version 2.1**
GLP/GEP:	**no**

Higher tier assessment:

Report:	[redacted]; [redacted]; [redacted];2014;M-476847-01
Title:	Iodosulfuron-methyl-sodium (IMS) and metabolite: PEC$_{gw}$ FOCUS PEARL, PELMO EUR (field data) - Use in winter cereals in Europe
Report No:	EnSa-14-0113
Document No:	M-476847-01-1
Guidelines:	**FOCUS 2000, SANCO/321/2000 rev. 2** **FOCUS 2009, SANCO/13144/2010 version 1** **FOCUS 2012, Generic Guidance for Tier 1 FOCUS Groundwater Assessments, version 2.1**
GLP/GEP:	**no**

Materials and Methods:

The predicted environmental concentrations in groundwater (PEC$_{gw}$) for iodosulfuron-methyl-sodium and its metabolites were calculated using the simulation model FOCUS PEARL (version 4.4.4) and FOCUS PELMO (version 5.5.3).

For the metabolite AE 0002166 separate simulations were made, to address the information obtained from the environmental fate studies. The metabolite was observed only in soil photolysis studies at maximum occurrence of 20 %. In PEC$_{gw}$ calculations, this is addressed as a pseudo application of the metabolite which takes into account the intended application rate of the parent compound, the relevant crop interception, the maximum occurrence of the metabolite, and the difference in the molar masses of parent and metabolite.

For the worst case use pattern in winter cereals the results for the PEC$_{gw}$ calculations for the metabolite AE F075736 exceeded the trigger of 0.1 µg/L in three European scenarios. Therefore, higher tier calculations for the metabolite AE F075736 were performed.

Detailed application data used for simulation of PEC$_{gw}$ were compiled in Table CP 9.2.4.1- 1 and Table CP 9.2.4.1- 2.

Table CP 9.2.4.1- 1: Application pattern used for PEC$_{gw}$ calculations

Individual Crop	FOCUS Crop Used for Interception	Application				Amount reaching soil per season application [g a.s./ha]
		Rate per Season [g a.s./ha]	Interval [days]	Plant Interception [%]	BBCH Stage	
Winter cereals, GAP & Simulation	winter cereals	1 × 10	-	25	13-32	1 × 7.50
Winter cereals, GAP & Simulation	winter cereals	1 × 7.5	-	50	20-32	1 × 3.75

Table CP 9.2.4.1- 2: Pseudo-application pattern used for PEC_{gw} calculations of metabolite AE 0002166

Individual Crop	FOCUS Crop Used for Interception	Application				Amount reaching soil per season application
		Rate per Season [g metab./ha]	Interval [days]	Plant Interception [%]	BBCH Stage	[g metab./ha]
Winter cereals, Simulation*	winter cereals	1 × 1.502	-	25	13-32	1 × 1.127
Winter cereals, Simulation*	winter cereals	1 × 1.126	-	50	20-32	1 × 0.563

* pseudo application data used for PEC_{gw} photometabolite AE 0002166 (for details see Table CP 9.2.4.1- 8)

The application in winter cereals according to GAP is done at the end of winter or in early spring, usually at the beginning of the vegetation period. For this purpose, the application timing was based on the <u>emergence of the earliest crop in each scenario</u> (Table CP 9.2.4.1- 3). The application was set 14 days before the respective date.

Table CP 9.2.4.1- 3: Spring emergence dates of earliest crops in the FOCUS scenarios

Scenario	Crop	Emergence date	Application date
[redacted]	spring cereals	10 Mar	24 Feb/(55)
	carrots	10 Mar	24 Feb/(55)
	spring cereals	18 May	04 May/(124)
	carrots	10 Mar	24 Feb/(55)
	field beans	15 Mar	01 Mar/(60)
	sugar beet	20 Mar	06 Mar/(65)-
	carrots	28 Feb	14 Feb/(45)
	cabbage	01 Mar	15 Feb/(46)
	potatoes	01 Mar	15 Feb/(46)

Following this procedure, the application dates are realistic and consistent with crop event dates and weather pertinent to the respective scenario as given by FOCUS (2009). Crop interception was taken into account according to the BBCH growth stage, as recommended by FOCUS (2012).

Table CP 9.2.4.1- 4: First application dates and related information for iodosulfuron-methyl-sodium as used for the simulation runs

Individual crop	Winter cereals 1 × 10 g a.s./ha BBCH 13-32	Winter cereals 1 × 7.5 g a.s./ha BBCH 20-32
Repeat Interval for App. Events	Every Year	Every Year
Application Technique	Spray	Spray
Absolute / Relative to	Absolute	Absolute
Scenario	1st App. Date (Julian day) Offset	1st App. Date (Julian day) Offset
[redacted]	24 Feb (55) - 24 Feb (55) - 04 May (124) - 24 Feb (55) - 01 Mar (60) - 06 Mar (65) - 14 Feb (45) - 15 Feb (46) - 15 Feb (46) -	24 Feb (55) - 24 Feb (55) - 04 May (124) - 24 Feb (55) - 01 Mar (60) - 06 Mar (65) - 14 Feb (45) - 15 Feb (46) - 15 Feb (46) -

Substance specific and model related input parameters for the different PEC_{gw} calculations are summarised in the following tables.

During the implementation of the modelling pathway in the groundwater models PEARL and PELMO, a set of separate calculations had to be designed in order to overcome some limitations of technical nature. The overall groundwater assessment involving laboratory substance data consists of the following calculations:

- Calculation 1: FOCUS PEARL with parent and all metabolites except soil photometabolite AE 0002166, corresponding compound input parameters are presented in Table CP 9.2.4.1- 5 and Table CP 9.2.4.1- 6.
- Calculation 2: FOCUS PELMO with parent and all metabolites except soil photometabolite AE 0002166 and soil metabolite AE F059411 (in order to keep sum of formation fractions metabolites generated from AE F075736 below 1), corresponding compound input parameters are presented in Table CP 9.2.4.1- 5 and Table CP 9.2.4.1- 6.

- Calculation 3: FOCUS PELMO with parent and soil metabolites AE F075736 and AE F059411 (in order to address the remaining part of the soil degradation pathway), corresponding compound input parameters are presented in Table CP 9.2.4.1- 7.
- Calculation 4: FOCUS PEARL & PELMO with soil photometabolite AE 0002166, using pseudo application of the metabolite, corresponding compound input parameters presented in Table CP 9.2.4.1- 8.
- Calculation 5: FOCUS PEARL & PELMO higher tier calculation refining the laboratory data based calculations using modelling endpoints for iodosulfuron-methyl-sodium and its metabolite AE F075736 coming from terrestrial field dissipation studies. Also outcomes of the experimental determination of the plant uptake factor of AE F075736 are taken into account. Corresponding compound input parameters are presented in Table CP 9.2.4.1- 9.

Table CP 9.2.4.1- 5: Substance specific and model related input parameter for PEC_{gw} calculation of iodosulfuron-methyl-sodium and its metabolites (model parameters not listed are kept as default) – Calculation 1 & 2

Parameter	Unit	Iodosulfuron-methyl-sodium	AE F145740	AE F075736	AE F145741
Common					
Molar Mass	[g/mol]	529.3	493.2	381.4	493.2
Water Solubility	[mg/L]	25000	1000	2790	1000
Vapour Pressure	[Pa]	2.60E-09	1.00E-10	1.00E-10	1.00E-10
Freundlich Exponent	[-]	0.870 [1)]	0.920 [1)]	0.920 [1)]	1.000 [2)]
Plant Uptake Factor	[-]	0.0	0.0	0.0	0.0
Walker Exponent	[-]	0.7	0.7	0.7	0.7
PEARL parameters					
Substance Code	[-]	IMS	I740	I736	I741
DT_{50}	[days]	2.1 [3)]	51.3 [4)]	25.1 [3)]	11.1 [4)]
Molar Activ. Energy	[kJ/mol]	65.4	65.4	65.4	65.4
K_{om}	[mL/g]	29.4 [1)]	11.2 [1)]	7.1 [1)]	0.0 [1)]
K_f	[mL/g]	-	-	-	-
PELMO parameters					
Substance Code	[-]	AS	A1	B1	C1
Rate Constant	[1/day]	0.33010	0.01350	0.02770	0.06240
Q_{10}	[-]	2.58	2.58	2.58	2.58
K_{oc}	[mL/g]	50.7 [1)]	19.3 [1)]	12.3 [1)]	0.0 [2)]
Degradation fraction from → to (FOCUS PEARL)		0.06 IMS -> I741 0.83 IMS -> I736 0.04 IMS -> I740 0.50 I736 -> I778 0.44 I736 -> I411 0.27 I736 -> I119 0.81 I778 -> I253 1.00 I740 -> I119			
Degradation rate from → to (FOCUS PELMO)		0.0132000 Active Substance -> A1 0.2740000 Active Substance -> B1 0.0198000 Active Substance -> C1 0.0231000 Active Substance -> <BR/CO_2 0.0135000 A1 -> B2 0.0075000 B1 -> B2 0.0138000 B1 -> C2 0.0064000 B1 -> <BR/CO_2 0.0624000 C1 -> <BR/CO_2 0.0648000 B2 -> <BR/CO_2 0.0610000 C2 -> D2 0.0143000 C2 -> <BR/CO_2 0.0216000 D2 -> <BR/CO_2			

1) Arithmetic mean value from different soils. The K_{oc} values were converted into K_{om} values with the standard conversion factor of 1.724 (for detailed values please refer to CA 7.1.3.1).

2) The adsorption to soil of AE F145741 was not investigated. Therefore, for PEC_{gw} calculations conservative estimates are used.

3) Median of normalised DT_{50} in aerobic soil under laboratory conditions (for detailed values please refer to CA 7.1.2-1).

4) Geometric mean of normalised DT_{50} in aerobic soil under laboratory conditions (for detailed values please refer to CA 7.1.2.1).

Table CP 9.2.4.1- 6: Substance specific and model related input parameter for PEC_{gw} calculation of iodosulfuron-methyl-sodium and its metabolites (model parameters not listed are kept as default) – Calculation 1 & 2 (continued)

Parameter	Unit	AE 0000119	AE F161778	BCS-CW81253	AE F059411
Common					
Molar Mass	[g/mol]	183.2	367.3	343.3	140.1
Water Solubility	[mg/L]	200	1000	1000	1000
Vapour Pressure	[Pa]	1.00E-10	1.00E-10	1.00E-10	1.00E-10
Freundlich Exponent	[-]	0.910 [1)]	0.960 [1)]	0.900 [1)]	0.900 [1)]
Plant Uptake Factor	[-]	0.0	0.0	0.0	0.0
Walker Exponent	[-]	0.7	0.7	0.7	0.7
PEARL parameters					
Substance Code	[-]	I119	I778	I253	I411
DT_{50}	[days]	10.7 [2)]	9.2 [2)]	32.1 [2)]	172.5 [2)]
Molar Activ. Energy	[kJ/mol]	65.4	65.4	65.4	65.4
K_{om}	[mL/g]	92.0 [1)]	18.0 [1)3)]	21.3 [1)]	46.4 [1)]
K_f	[mL/g]	-	-	-	-
PELMO parameters					
Substance Code	[-]	B2	C2	D2	-*
Rate Constant	[1/day]	0.00480	0.07530	0.02160	-*
Q_{10}	[-]	2.58	2.58	2.58	-*
K_{oc}	[mL/g]	158.6 [1)]	31.0 [1)3)]	36.8 [1)]	-*
Degradation fraction from → to (FOCUS PEARL)		0.06 IMS -> I741 0.83 IMS -> I736 0.04 IMS -> I740 0.50 I736 -> I778 0.44 I736 -> I411 0.27 I736 -> I119 0.81 I778 -> I253 1.00 I740 -> I119			
Degradation rate from → to (FOCUS PELMO)		0.0132000 Active Substance -> A1 0.2740000 Active Substance -> B1 0.0198000 Active Substance -> C1 0.0231000 Active Substance -> <BR/CO_2 0.0135000 A1 -> B2 0.0075000 B1 -> B2 0.0138000 B1 -> C2 0.0064000 B1 -> <BR/CO_2 0.0624000 C1 -> <BR/CO_2 0.0648000 B2 -> <BR/CO_2 0.0610000 C2 -> D2 0.0142000 C2 -> <BR/CO_2 0.0216000 D2 -> <BR/CO_2			

1) Arithmetic mean value from different soils. The K_{oc} values were converted into K_{om} values with the standard conversion factor of 1.724 (for detailed values please refer to CA 7.1.3.1).

2) Geometric mean of normalised DT_{50} in aerobic soil under laboratory conditions (for detailed values please refer to CA 7.1.2.1).

3) Deviation from the mean K_{om} and K_{oc} value as reported in MCA result from deviating rounding of in decimal places considered for calculation of the average.

* PELMO parameters for the metabolite AE F059411 are presented in Table CP 9.2.4.1- 7 below

Table CP 9.2.4.1- 7: Substance specific and model related input parameter for PEC_{gw} calculation of iodosulfuron-methyl-sodium and the metabolites AE F075736 and AE F059411 (model parameters not listed are kept as default) – Calculation 3

Parameter	Unit	Iodosulfuron-methyl-sodium	AE F075736	AE F059411
Common				
Molar mass	[g/mol]	529.3	387.4	140.1
Water Solubility	[mg/L]	25000	-	-
Vapour Pressure	[Pa]	2.60E-09	-	-
Freundlich Exponent	[-]	0.870 [1)]	0.920 [1)]	0.900 [1)]
Plant Uptake Factor	[-]	0.0	0.0	0.0
Walker Exponent	[-]	0.7	0.7	0.7
PELMO parameters				
Substance Code	[-]	A8	B1	C2
Rate Constant	[1/day]	0.33010 [2)]	0.02970 [2)]	0.00369 [3)]
Q_{10}	[-]	2.58	2.58	2.58
K_{oc}	[mL/g]	50.7 [1)]	12.3 [1)]	80.1 [1)]
Degradation rate from → to (FOCUS PELMO)		0.2740000 Active Substance -> B1 0.0561000 Active Substance -> <BR/CO_2> 0.0122000 B1 -> C2 0.0155000 B1 -> <BR/CO_2> 0.0036910 C2 -> <BR/CO_2>		

1) Arithmetic mean value from different soils (for detailed values please refer to CA 7.1.3.1).
2) Median of normalised DT_{50} in aerobic soil under laboratory conditions (for detailed values please refer to CA 7.1.2.1).
3) Geometric mean of normalised DT_{50} in aerobic soil under laboratory conditions (for detailed values please refer to CA 7.1.2.1).

Table CP 9.2.4.1- 8: Substance specific and model related input parameter for PEC_{gw} calculation of the metabolite AE 0002166 (model parameters not listed are kept as default) – Calculation 4

Parameter	Unit	AE 0002166
Common		
Molar Mass	[g/mol]	397.4
Water Solubility	[mg/L]	1000
Vapour Pressure	[Pa]	1.00E-10
Freundlich Exponent	[-]	1.000 [1)]
Plant Uptake Factor	[-]	0.0
Walker Exponent	[-]	0.7
PEARL parameters		
Substance Code	[-]	H166
DT_{50}	[days]	7.5 [2)]
Molar Activ. Energy	[kJ/mol]	65.4
K_{om}	[mL/g]	0.0 [1)]
K_f	[mL/g]	
PELMO parameters		
Substance Code	[-]	AS
Rate Constant	[1/day]	0.09242
Q_{10}	[-]	2.58
K_{oc}	[mL/g]	0.0 [1)]
Degradation fraction from → to (FOCUS PEARL)		
Degradation rate from → to (FOCUS PELMO)		0.0924200 <Active Substance -> <BR/CO_2

1) The adsorption to soil of AE 0002166 was not investigated. Therefore, for PEC_{gw} calculations conservative estimates are used.

2) Geometric mean of normalised DT_{50} in aerobic soil under laboratory conditions (4 different soils, range 4.7 - 10.1 days); for detailed values please refer to Table CA 7.1.2-1.

Table CP 9.2.4.1- 9: Substance specific and model related input parameter for PEC_{gw} calculation of iodosulfuron-methyl-sodium and its metabolite AE F075736 (model parameters not listed are kept as default) – Calculation 5 (higher tier)

Parameter	Unit	Iodosulfuron-methyl-sodium	AE F075736
Common			
Molar mass	[g/mol]	529.3	381.4
Water Solubility	[mg/L]	25000	2790
Vapour Pressure	[Pa]	2.60E-09	1.00E-10
Freundlich Exponent	[-]	0.870 [1)]	0.920 [1)]
Plant Uptake Factor	[-]	0.0	0.5
Walker Exponent	[-]	0.7	0.7
PEARL parameters			
Substance Code	[-]	IMS	I736
DT_{50}	[days]	3.3 [2)]	14.2 [3)]
Molar Activ. Energy	[kJ/mol]	65.4	65.4
K_{om}	[mL/g]	29.4	7.1
K_f	[mL/g]	-	-
PELMO parameters			
Substance Code	[-]	AS	B1
Rate Constant	[1/day]	0.21004	0.04881
Q_{10}	[-]	2.58	2.58
K_{oc}	[mL/g]	50.7 [1)]	12.3 [1)]
Degradation fraction from → to (FOCUS PEARL)		0.61 IMS -> I736	
Degradation rate from → to (FOCUS PELMO)		0.1281272 Active Substance -> B1 0.0819174 Active Substance -> <BR/CO_2> 0.0488130 B1 -> <BR/CO_2>	

1) Arithmetic mean value from different soils (for detailed values please refer to CA 7.1.3.1).
2) Median of normalised DT_{50} in soil under field conditions (13 different field sites, 10 reliable DT_{50} in the range of 0.6 – 10.3 days); for detailed values please refer to CA 7.1.2.2.
3) Geometric mean of normalised DT_{50} in soil under field conditions (13 different field sites, 8 reliable DT_{50} in the range of 6.9 – 35.6 days); for detailed values please refer to CA 7.1.2.2.

Findings:

PEC_{gw} were evaluated as the 80th percentile of the mean annual leachate concentration at 1 m soil depth. Tier 1 PEC_{gw} values for iodosulfuron-methyl-sodium and its metabolites are given in the following tables. The higher tier PEC_{gw} results for the metabolite AE F075736, based on field data and an experimentally determined PCF of 0.5, are summarised in Table CP 9.2.4.1- 15.

Table CP 9.2.4.1- 10: Calculation 1 & 2 - PEC_{gw} (PEARL and PELMO) of iodosulfuron-methyl-sodium

FOCUS Scenario	Iodosulfuron-methyl-sodium			
	Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
	PEARL	PELMO	PEARL	PELMO
	Calculation 1*	Calculation 2*	Calculation 1*	Calculation 2*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001

* Calculation 1 & 2 - for compound specific input parameters see Table CP 9.2.4.1- 5 and Table CP 9.2.4.1- 6

Table CP 9.2.4.1- 11: Calculation 3 - PEC_{gw} (PELMO) of iodosulfuron-methyl-sodium

FOCUS Scenario	Iodosulfuron-methyl-sodium	
	Winter cereals 1 × 10 g a.s./ha, 25% interception	Winter cereals 1 × 7.5 g a.s./ha, 50% interception
	PELMO	PELMO
	Calculation 3*	Calculation 3*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001
[redacted]	<0.001	<0.001

* Calculation 3 - for compound specific input parameters see Table CP 9.2.4.1- 7

Table CP 9.2.4.1- 12: Calculation 5 - PEC_{gw} (PEARL and PELMO) of iodosulfuron-methyl-sodium

FOCUS Scenario	Iodosulfuron-methyl-sodium			
	Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
	PEARL	PELMO	PEARL	PELMO
	Calculation 5*	Calculation 5*	Calculation 5*	Calculation 5*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001

* Calculation 5 - for compound specific input parameters see Table CP 9.2.4.1- 9

Table CP 9.2.4.1- 13: Calculation 1 & 2 - PEC_{gw} (PEARL and PELMO) of AE F075736

FOCUS Scenario	AE F075736			
	Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1× 7.5 g a.s./ha, 50% interception	
	PEARL	PELMO	PEARL	PELMO
	Calculation 1*	Calculation 2*	Calculation 1*	Calculation 2*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	0.034	0.027	0.016	0.012
[redacted]	**0.111**	**0.100**	0.052	0.046
[redacted]	0.091	**0.100**	0.042	0.045
[redacted]	0.079	0.092	0.037	0.044
[redacted]	**0.113**	**0.132**	0.053	0.062
[redacted]	0.050	0.061	0.023	0.029
[redacted]	0.046	0.055	0.022	0.025
[redacted]	0.002	0.002	<0.001	0.001
[redacted]	0.011	0.006	0.005	0.003

* Calculation 1 & 2 - for compound specific input parameters see Table CP 9.2.4.1- 5 and Table CP 9.2.4.1- 6

In **bold**: values exceeding the trigger value of 0.1 µg/L

Table CP 9.2.4.1- 14: Calculation 3 - PEC_{gw} (PELMO) of AE F075736

FOCUS Scenario	AE F075736	
	Winter cereals 1 × 10 g a.s./ha, 25% interception	Winter cereals 1 × 7.5 g a.s./ha, 50% interception
	PELMO	PELMO
	Calculation 3*	Calculation 3*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	0.027	0.012
[redacted]	**0.100**	0.046
[redacted]	**0.100**	0.045
[redacted]	0.092	0.044
[redacted]	**0.132**	0.062
[redacted]	0.061	0.029
[redacted]	0.055	0.025
[redacted]	0.002	0.001
[redacted]	0.006	0.003

* Calculation 3 - for compound specific input parameters see Table CP 9.2.4.1- 7
In **bold**: values exceeding the trigger value of 0.1 µg/L

For the worst case use pattern in winter cereals the results for the PEC_{gw} calculations for the metabolite AE F075736 exceeded the trigger of 0.1 µg/L in [redacted] and [redacted] scenario based on calculations with PEARL (calculation 1) and in [redacted], [redacted] and [redacted] scenario based on the calculations with PELMO (calculations 2 and 3). Therefore, higher tier calculations were performed using the field DT_{50} for both iodosulfuron-methyl-sodium and AE F075736 and the experimentally determined PUF of 0.5 for AE F075736 (for details see Table CP 9.2.4.1- 9).

Table CP 9.2.4.1- 15: Calculation 5 - PEC_{gw} (PEARL and PELMO) of AE F075736

FOCUS Scenario	AE F075736			
	Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
	PEARL	PELMO	PEARL	PELMO
	Calculation 5*	Calculation 5*	Calculation 5*	Calculation 5*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	0.002	0.001	<0.001	0.001
[redacted]	0.011	0.009	0.005	0.004
[redacted]	0.010	0.009	0.005	0.004
[redacted]	0.008	0.009	0.004	0.004
[redacted]	0.013	0.015	0.006	0.007
[redacted]	0.005	0.005	0.002	0.002
[redacted]	0.005	0.007	0.002	0.003
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001

* Calculation 5 (higher tier) - for compound specific input parameters see Table CP 9.2.4.1- 9

Table CP 9.2.4.1- 16: Calculation 1 & 2 - PEC_{gw} (PEARL and PELMO) of AE F145741

FOCUS Scenario	AE F145741			
	Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
	PEARL	PELMO	PEARL	PELMO
	Calculation 1*	Calculation 2*	Calculation 1*	Calculation 2*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	<0.001	0.001	<0.001	0.001
[redacted]	0.007	0.009	0.003	0.004
[redacted]	0.013	0.009	0.007	0.004
[redacted]	0.004	0.005	0.002	0.003
[redacted]	0.005	0.009	0.002	0.004
[redacted]	0.002	0.004	0.001	0.002
[redacted]	0.004	0.009	0.002	0.005
[redacted]	<0.001	<0.001	<0.001	0.001
[redacted]	<0.001	<0.001	<0.001	<0.001

* Calculation 1 & 2 - for compound specific input parameters see Table CP 9.2.4.1- 5 and Table CP 9.2.4.1- 6

Table CP 9.2.4.1- 17: Calculation 1 & 2 - PEC_{gw} (PEARL and PELMO) of AE F145740

FOCUS Scenario	AE F145740			
	Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
	PEARL	PELMO	PEARL	PELMO
	Calculation 1*	Calculation 2*	Calculation 1*	Calculation 2*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	0.006	0.006	0.003	0.003
[redacted]	0.013	0.014	0.006	0.006
[redacted]	0.011	0.012	0.005	0.005
[redacted]	0.010	0.012	0.005	0.006
[redacted]	0.012	0.013	0.005	0.006
[redacted]	0.007	0.008	0.003	0.004
[redacted]	0.006	0.007	0.003	0.003
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	0.003	0.002	0.001	0.001

* Calculation 1 & 2 - for compound specific input parameters see Table CP 9.2.4.1- 5 and Table CP 9.2.4.1- 6

Table CP 9.2.4.1- 18: Calculation 4 - PEC_{gw} (PEARL and PELMO) of AE 0002166

FOCUS Scenario	AE 0002166			
	Winter cereals 1 × 10 g a.s./ha, 25% interception (1×1.502 g AE 0002166/ha)**		Winter cereals 1 × 7.5 g a.s./ha, 50% interception (1×1.126 AE 0002166/ha)**	
	PEARL	PELMO	PEARL	PELMO
	Calculation 4*	Calculation 4*	Calculation 4*	Calculation 4*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	0.005	0.012	0.003	0.006
[redacted]	0.007	0.007	0.004	0.004
[redacted]	0.003	0.005	0.001	0.003
[redacted]	0.005	0.013	0.003	0.007
[redacted]	0.002	0.005	0.001	0.002
[redacted]	0.008	0.022	0.004	0.011
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001

* Calculation 4 - for compound specific input parameters see Table CP 9.2.4.1- 5

** Pseudo application rate was used for the calculation, for details see Table CP 9.2.4.1- 2

Table CP 9.2.4.1- 19: Calculation 1 & 2 - PEC_{gw} (PEARL and PELMO) of AE F161778

FOCUS Scenario	AE F161778			
	Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
	PEARL	PELMO	PEARL	PELMO
	Calculation 1*	Calculation 2*	Calculation 1*	Calculation 2*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	0.006	0.005	0.003	0.002
[redacted]	0.020	0.020	0.009	0.010
[redacted]	0.016	0.015	0.007	0.007
[redacted]	0.016	0.019	0.007	0.009
[redacted]	0.022	0.026	0.011	0.012
[redacted]	0.010	0.012	0.005	0.006
[redacted]	0.009	0.010	0.004	0.005
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	0.002	0.001	<0.001	<0.001

* Calculation 1 & 2 - for compound specific input parameters see Table CP 9.2.4.1- 5 and Table CP 9.2.4.1- 6

Table CP 9.2.4.1- 20: Calculation 1 & 2 - PEC_{gw} (PEARL and PELMO) of BCS-CW81253

FOCUS Scenario	BCS-CW81253			
	Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
	PEARL	PELMO	PEARL	PELMO
	Calculation 1*	Calculation 2*	Calculation 1*	Calculation 2*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	0.020	0.019	0.009	0.008
	0.045	0.048	0.021	0.022
	0.031	0.030	0.014	0.014
	0.044	0.054	0.020	0.025
	0.050	0.055	0.023	0.026
	0.032	0.038	0.015	0.017
	0.025	0.031	0.011	0.014
	<0.001	0.001	<0.001	0.001
	0.006	0.003	0.002	0.001

* Calculation 1 & 2 - for compound specific input parameters see Table CP 9.2.4.1- 5 and Table CP 9.2.4.1- 6

Table CP 9.2.4.1- 21: Calculation 1 - PEC_{gw} (PEARL) of AE F059411

FOCUS Scenario	AE F059411	
	Winter cereals 1 × 10 g a.s./ha, 25% interception	Winter cereals 1 × 7.5 g a.s./ha, 50% interception
	PEARL	PEARL
	Calculation 1*	Calculation 1*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	0.044	0.019
	0.061	0.029
	0.039	0.017
	0.051	0.024
	0.055	0.026
	0.047	0.022
	0.034	0.016
	0.001	<0.001
	0.038	0.016

* Calculation 1 - for compound specific input parameters see Table CP 9.2.4.1- 5 and Table CP 9.2.4.1- 6

Table CP 9.2.4.1- 22: Calculation 3 - PEC_{gw} (PELMO) of AE F059411

FOCUS Scenario	AE F059411	
	Winter cereals 1 × 10 g a.s./ha, 25% interception	Winter cereals 1 × 7.5 g a.s./ha, 50% interception
	PELMO	PELMO
	Calculation 3*	Calculation 3*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	0.051	0.022
[redacted]	0.075	0.035
[redacted]	0.046	0.021
[redacted]	0.068	0.031
[redacted]	0.065	0.031
[redacted]	0.064	0.030
[redacted]	0.041	0.019
[redacted]	0.004	0.002
[redacted]	0.027	0.011

* Calculation 3 - for compound specific input parameters see Table CP 9.2.4.1- 7

Table CP 9.2.4.1- 23: Calculation 1 & 2 - PEC_{gw} (PEARL and PELMO) of AE 0000119

FOCUS Scenario	AE 0000119			
	Winter cereals 1 × 10 g a.s./ha, 25% interception		Winter cereals 1 × 7.5 g a.s./ha, 50% interception	
	PEARL	PELMO	PEARL	PELMO
	Calculation 1*	Calculation 2*	Calculation 1*	Calculation 2*
	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]	PEC_{gw} [µg/L]
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	0.002	0.002	0.001	0.001
[redacted]	<0.001	0.001	<0.001	<0.001
[redacted]	0.001	0.001	<0.001	0.001
[redacted]	0.001	0.001	<0.001	0.001
[redacted]	0.001	0.001	<0.001	0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001
[redacted]	<0.001	<0.001	<0.001	<0.001

* Calculation 1 & 2 - for compound specific input parameters see Table CP 9.2.4.1- 5 and Table CP 9.2.4.1- 6

Conclusion:

There are no concerns for groundwater from the use of iodosulfuron-methyl-sodium in accordance with the use pattern for the representative formulation.

CP 9.2.4.2 Additional field tests

Additional field tests to assess the leaching behaviour of iodosulfuron and its metabolites are not considered necessary.

CP 9.2.5 Estimation of concentrations in surface water and sediment

Predicted environmental concentrations in surface water (PEC_{SW})

Predicted environmental concentrations in sediment (PEC_{SED})

Tier 1: standard calculations following the recommendations of FOCUS (2000) with the DT_{50} values calculated in a kinetic evaluation of several laboratory degradation studies ([redacted] & [redacted], 2013; M-447102-02-1) and normalised to referenced conditions 20°C and 100 % field capacity.

Higher tier: calculations refining the laboratory data based calculations using modelling endpoints for iodosulfuron-methyl-sodium and its metabolite AE F075736 coming from terrestrial field dissipation studies. Also, outcomes of the experimental determination of the plant uptake factor of AE F075736 are taken into account.

For technical reasons, it was necessary to split the calculations related to the aquatic exposure assessment into several parts:

- Calculation 1: Steps 1 and 2 for parent and all soil metabolites (except soil metabolite AE F075736 and soil photometabolite AE 0002166); corresponding calculations are presented KCP 9.2.5 /01.
- Calculation 2: Steps 1 and 2 with parent, soil photometabolite AE 0002166, and all purely aquatic metabolites, corresponding calculations are presented KCP 9.2.5 /02.
- Calculation 3: Steps 1-3 with parent and metabolite AE F075736, using laboratory soil degradation data; corresponding calculations are presented KCP 9.2.5 /03.
- Calculation 4: Step 3 with parent and metabolite AE F075736, higher tier calculation refining the laboratory data based calculations (calculation 3) using soil-relevant modelling endpoints coming from terrestrial field dissipation studies. Also, outcomes of the experimental determination of the plant uptake factor of AE F075736 are taken into account; corresponding calculations are presented KCP 9.2.5 /04.

Tier 1 assessments:

Report:	KCP 9.2.5 /01; [redacted], L.; 2014; M-476706-01
Title:	Iodosulfuron-methyl-sodium (IMS) and metabolites: $PEC_{sw,sed}$ FOCUS EUR (Step12, part 1) - Use in winter cereals in Europe
Report No:	EnSa-14-0115
Document No:	M-476706-01-1
Guidelines:	**FOCUS 2003: SANCO/4802/2001-rev2**
GLP/GEP:	**No**

Report:	KCP 9.2.5 /02; [redacted], L.; 2014; M-476707-01
Title:	Iodosulfuron-methyl-sodium (IMS) and metabolites: $PEC_{sw,sed}$ FOCUS EUR (Step12, part 2) - Use in winter cereals in Europe
Report No:	EnSa-14-0116
Document No:	M-476707-01-1
Guidelines:	**FOCUS 2003: SANCO/4802/2001-rev2**
GLP/GEP:	**no**

Report:	KCP 9.2.5 /03; [redacted], L.; [redacted], H.;2014;M-477279-02
Title:	Iodosulfuron-methyl-sodium (IMS) and metabolite: $PEC_{sw,sed}$ FOCUS EUR (Step1&2, lab) - Use in winter cereals in Europe
Report No:	EnSa-14-0117
Document No:	M-477279-02-1
Guidelines:	**FOCUS 2003: SANCO/4802/2001-rev2** **FOCUS 2007: SANCO/10422/2005 v 2.0**
GLP/GEP:	**no**

Higher tier assessment:

Report:	[redacted];2014;M-477282-01
Title:	Iodosulfuron-methyl-sodium (IMS) and metabolite: $PEC_{sw,sed}$ FOCUS EUR (Step3, field) - Use in winter cereals in Europe
Report No:	EnSa-14-0153
Document No:	M-477282-01-1
Guidelines:	**FOCUS 2003: SANCO/4802/2001-rev2** **FOCUS 2007: SANCO/10422/2005 v 2.0**
GLP/GEP:	**no**

Materials and Methods:

Predicted environmental concentrations in surface water and sediment (PEC_{sw} and PEC_{sed}) of iodosulfuron-methyl-sodium and its metabolites have been calculated for the use in winter cereals in Europe.

At FOCUS Step 2 the application period was set to October to February and calculations considered the use in Northern and Southern Europe. Details of the application pattern used in the Step 2 calculations are summarised in Table CP 9.2.5- 1.

Table CP 9.2.5- 1: Application pattern used for $PEC_{sw,sed}$ calculations (FOCUS Step 1&2)

Individual Crop	FOCUS Crop Used for Interception	Application				Amount reaching soil per season application [g a.s./ha]
		Rate per Season [g a.s./ha]	Interval [days]	Plant Interception [%]	BBCH Stage	
Winter cereals, GAP & Simulation	cereals, winter (arable crops)	1 × 10	-	minimal crop cover (25%)	13-32	1 × 7.50
Winter cereals, GAP & Simulation	cereals, winter (arable crops)	1 × 7.5	-	average crop cover (50%)	20-32	1 × 3.75

At FOCUS Step 3 actual application dates are generally determined by the PAT (pesticide application timer) included within SWASH. However, the application in winter cereals according to GAP is done at the end of winter, corresponding to begin of the vegetation period. For this purpose, the application timing was based on the emergence date of the earliest crop in each scenario (see Table CP 9.2.5- 2). Therefore the start of the PAT window was then set 14 days before the respective date. Details of the parameters used in the Step 3 calculations are summarised in Table CP 9.2.5- 3.

Table CP 9.2.5- 2: Spring emergence dates of earliest crops in the FOCUS scenarios

Scenario	Location	Crop	Emergence date	Julian date
D1	[redacted]	spring cereals	05-May	21-Apr
D2		spring cereals [a)]	15-Mar [a)]	01-Mar [a)]
D3		spring cereals	01-Apr	18-Mar
D4		field beans	15-Apr	01-Apr
D5		spring cereals	15-Mar	01-Mar
D6		root vegetables	25-Feb	11-Feb
R1		field beans	10-Apr	27-Mar
R2		bulb vegetables	28-Feb	14-Feb
R3		root vegetables	26-Feb	12-Feb
R4		root vegetables	26-Feb	12-Feb

[a)] no crop with emergence in spring defined; D5 data used instead

Table CP 9.2.5- 3: Application dates of iodosulfuron-methyl-sodium for the FOCUS Step 3 calculations

Parameter	Winter cereals (1 × 10 g a.s./ha)		Winter cereals (1 × 7.5 g a.s./ha)	
PAT start date rel./absolute	Absolute		Absolute	
Appl. method (appl. type)	ground spray (CAM 2)		ground spray (CAM 2)	
No of appl.	1		1	
PAT window range	30		30	
Appl. interval	1		1	
Application Details	PAT Start Date (Julian Day)	Appl. Date	PAT Start Date (Julian Day)	Appl. Date
D1 (1st)	21-Apr (111)	25-Apr	21-Apr (111)	25-Apr
D2 (1st)	01-Mar (60)	12-Mar	01-Mar (60)	12-Mar
D3 (1st)	18-Mar (77)	17-Mar	18-Mar (77)	17-Mar
D4 (1st)	01-Apr (91)	18-Apr	01-Apr (91)	18-Apr
D5 (1st)	01-Mar (60)	07-Mar	01-Mar (60)	07-Mar
D6 (1st)	11-Feb (42)	27-Feb	11-Feb (42)	27-Feb
R1 (1st)	27-Mar (86)	26-Apr	27-Mar (86)	26-Apr
R3 (1st)	12-Feb (43)	19-Feb	12-Feb (43)	19-Feb
R4 (1st)	12-Feb (43)	02-Mar	12-Feb (43)	02-Mar

For technical reasons, it was necessary to split the calculations related to the aquatic exposure assessment into several parts:

- Calculation 1: Steps 1 and 2 for parent and all soil metabolites (except soil metabolite AE F075736 and soil photometabolite AE 0002166); corresponding compound input parameters are presented in Table CP 9.2.5- 4 and Table CP 9.2.5- 5.

- Calculation 2: Steps 1 and 2 with parent, soil photometabolite AE 0002166, and all purely aquatic metabolites, corresponding compound input parameters are presented in Table CP 9.2.5- 6 and Table CP 9.2.5- 7
- Calculation 3: Steps 1-3 with parent and metabolite AE F075736 using laboratory soil degradation data; corresponding compound input parameters are presented in Table CP 9.2.5-8.
- Calculation 4: Step 3 with parent and metabolite AE F075736, higher tier calculation refining the laboratory data based calculations (calculation 3) using soil-relevant modelling endpoints coming from terrestrial field dissipation studies. Also, outcomes of the experimental determination of the plant uptake factor of AE F075736 are taken into account; corresponding compound input parameters are presented in Table CP 9.2.5- 9.

Table CP 9.2.5- 4: Substance parameters used for iodosulfuron-methyl-sodium and metabolites at Steps 1 & 2 – Calculation 1

Parameter	Unit	Iodosulfuron-methyl-sodium	AE F145740	AE F145741	AE 0000119
Molar Mass	[g/mol]	529.3	493.2	493.2	183.2
Water Solubility	[mg/L]	25000	1000 [6)]	1000	200
K_{oc}	[mL/g]	50.7 [1)]	19.3 [1)]	0.0 [6)]	158.6 [1)]
Degradation					
Soil	[days]	2.1 [2)]	51.3 [5)]	11.1 [5)]	10.7 [5)]
Total System	[days]	19.8 [3)]	45.4 [3)]	73.4 [3)]	28.4 [3)]
Water	[days]	19.8 [4)]	45.4 [4)]	73.4 [4)]	28.4 [4)]
Sediment	[days]	19.8 [4)]	45.4 [4)]	73.4 [4)]	28.4 [4)]
Max Occurrence					
Water / Sediment [7]	[%]	100	12.6	8.7	24.9
Soil [8]	[%]	100	8.7	6.9	19.9

1) Arithmetic mean value from different soils; for detailed values please refer to CA 7.4.3.1.
2) Median of normalised DT_{50} in aerobic soil under laboratory conditions (11 different soils; range: 0.6 to 20.8 days); for detailed values please refer to CA 7.1.2.1.
3) Geometric mean (for cases where more than 1 value is available) DT_{50} value from two laboratory aerobic water-sediment studies (3 different aquatic systems); for detailed values please refer to CA 7.2.2.3.
4) DT_{50} value of total system was used for calculations, as recommended in FOCUS (2003).
5) Geometric mean of normalised DT_{50} in aerobic soil under laboratory conditions; for detailed values please refer to CA 7.1.2.1.
6) Not investigated. Therefore, conservative default estimate is used.
7) For detailed values please refer to CA 7.2.2.3.
8) For detailed values please refer to CA 7.1.1.

Table CP 9.2.5- 5: Substance parameters used for iodosulfuron-methyl-sodium and its metabolites at Steps 1 & 2 - Calculation 1 (continued)

Parameter	Unit	AE F161778	BCS-CW81253	AE F059411
Molar Mass	[g/mol]	367.3	343.3	140.1
Water Solubility	[mg/L]	1000	1000	1000
K_{oc}	[mL/g]	31 [1]	36.8 [1]	80.1 [1]
Degradation				
Soil	[days]	9.2 [4]	32.1 [4]	172.5 [4]
Total System	[days]	1000 [5]	1000 [5]	9.9 [2]
Water	[days]	1000 [5]	1000 [5]	9.9 [3]
Sediment	[days]	1000 [5]	1000 [5]	9.9 [3]
Max Occurrence				
Water / Sediment	[%]	2.6 [6]	0.0001 [5]	27.5 [6]
Soil [7]	[%]	14.5	35.1	40.9

1) Arithmetic mean value from different soils; for detailed values please refer to CA 7.1.3.1.
2) Geometric mean (for cases where more than 1 value is available) DT_{50} value from two laboratory aerobic water-sediment studies (3 different aquatic systems); for detailed values please refer to CA 7.2.2.3.
3) DT_{50} value of total system was used for calculations, as recommended in FOCUS (2003).
4) Geometric mean of normalised DT_{50} in aerobic soil under laboratory conditions (11 different soils); for detailed values please refer to CA 7.1.2.1.
5) Not investigated. Therefore, conservative default estimate is used.
6) For detailed values please refer to CA 7.2.2.3.
7) For detailed values please refer to CA 7.1.1.

Table CP 9.2.5- 6: Substance parameters used for iodosulfuron-methyl-sodium and metabolites at Steps 1 & 2 – Calculation 2

Parameter	Unit	Iodosulfuron-methyl-sodium	AE 0002166	AE 0014966	AE 0034855
Molar Mass	[g/mol]	529.3	397.4	367.3	169.1
Water Solubility	[mg/L]	25000	1000	1000	1000
K_{oc}	[mL/g]	50.7 [1]	0.0 [6]	0.0 [6]	0.0 [6]
Degradation					
Soil	[days]	2.1 [2]	7.5 [5]	0.0001 [7]	0.0001 [7]
Total System	[days]	19.8 [3]	1000 [6]	43.9 [3]	1000 [8]
Water	[days]	19.8 [4]	1000 [6]	43.9 [4]	1000 [8]
Sediment	[days]	19.8 [4]	1000 [6]	43.9 [4]	1000 [8]
Max Occurrence					
Water / Sediment [9]	[%]	100	25.1	15.5	24.2
Soil	[%]	100 [10]	20 [10]	0.0001 [7]	0.0001 [7]

1) Arithmetic mean value from different soils; for detailed values please refer to CA 7.1.3.1.
2) Median of normalised DT_{50} in aerobic soil under laboratory conditions (11 different soils; range: 0.6 to 20.8 days); for detailed values please refer to CA 7.1.2.1.
3) Geometric mean (for cases where more than 1 value is available) DT_{50} value from two laboratory aerobic water-sediment studies (3 different aquatic systems); for detailed values please refer to CA 7.2.2.3.
4) DT_{50} value of total system was used for calculations, as recommended in FOCUS (2003).
5) Geometric mean of normalised DT_{50} in aerobic soil under laboratory conditions (4 different soils); for detailed values please refer to CA 7.1.2.1.
6) Not investigated. Therefore, conservative default estimate is used.
7) Metabolite was not identified in aerobic soil degradation studies. Therefore, conservative default estimate is used.
8) No valid DT_{50} could be derived from experimental data. Therefore, conservative default estimate is used.
9) For detailed values please refer to CA 7.2.2.3.
10) For detailed values please refer to CA 7.1.1.

Table CP 9.2.5- 7: Substance parameters used for iodosulfuron-methyl-sodium and metabolites at Steps 1&2 - Calculation 2 (continued)

Parameter	Unit	AE F159737	AE 1234964	AE F154781
Molar Mass	[g/mol]	183.2	201.2	126.1
Water Solubility	[mg/L]	1000	1000	1000
K_{oc}	[mL/g]	0.0 [2]	0.0 [2]	0.0 [2]
Degradation				
Soil	[days]	0.0001 [1]	0.0001 [1]	0.0001 [1]
Total System	[days]	1000 [3]	1000 [3]	1000 [3]
Water	[days]	1000 [3]	1000 [3]	1000 [3]
Sediment	[days]	1000 [3]	1000 [3]	1000 [3]
Max Occurrence				
Water / Sediment [4]	[%]	7.8	7.4	8.7 [5]
Soil	[%]	0.0001 [1]	0.0001 [1]	0.0001 [1]

1) Metabolite was not identified in any of the soil degradation studies. Therefore, conservative default estimate is used.
2) Not investigated. Therefore, conservative default estimate is used.
3) No valid DT_{50} could be derived from experimental data. Therefore, conservative default estimate is used.
4) For detailed values please refer to CA 7.2.2.4.
5) For detailed values please refer to CA 7.2.2.2

Table CP 9.2.5- 8: Substance specific and model related input parameter for PEC_{sw} calculation of iodosulfuron-methyl-sodium and its metabolite AE F075736 at Steps 1-3 (model parameters not listed are kept as default) – Calculation 3

Parameter	Unit	Iodosulfuron-methyl-sodium	AE F075736
Company Code	[-]	AE F115008	AE F075736
SWASH Code	[-]	IMS	1736
General Parameters			
Molar Mass	[g/mol]	529.3	381.4
Water Solubility	[mg/L]	25000	2790
Vapour Pressure	[Pa]	2.6E-09	1.1E-10
Plant Uptake Factor	[-]	0.0	0.0
Wash-Off Factor PRZM	[1/cm]	0.5	0.5
Wash-Off Factor MACRO	[1/mm]	0.05	0.05
Sorption			
K_{oc}	[mL/g]	50.7 [2)]	12.3 [2)]
Freundlich Exponent	[-]	0.87 [2)]	0.92 [2)]
Degradation			
Soil	[days]	2.1 [1)]	25.1 [1)]
Form. Frac. PRZM	[molar basis]	-	0.830 [7)]
Form. Frac. MACRO	[mass basis]	-	0.598
Total System	[days]	19.8 [3)]	64.1 [3)]
Water	[days]	19.8 [4)]	64.1 [4)]
Sediment	[days]	19.8 [4)] (Steps 1&2) 1000 [5)] (Step 3)	64.1 [4)] (Steps 1&2) 1000 [5)] (Step 3)
Walker Exponent	[-]	0.7	0.7
Max Occurrence			
Water / Sediment	[%]	100	67.8 [6),]
Soil	[%]	100	88.5 [8)]
Effect of Temperature			
Activation Energy	[J/mol]	65400	65400
Exponent	[1/K]	0.095	0.095
Q_{10}	[-]	2.58	2.58

1) Median of normalised DT_{50} in aerobic soil under laboratory conditions (11 different soils; range: 0.6 - 20.8 days for iodosulfuron-methyl-sodium and 10.6 – 66.7 days for AE F075736); for detailed values please refer to CA 7.1.2.1.
2) Arithmetic mean value from different soils; for detailed values please refer to CA 7.1.3.1.
3) Geometric mean DT_{50} value from two laboratory aerobic water-sediment studies (3 different aquatic systems); for detailed values please refer to CA 7.2.2.3.
4) DT_{50} value of total system was used for calculations, as recommended in FOCUS (2003)
5) Default value used in the calculations.
6) Maximum occurrence in the water phase of 57 % on day 43 in system Rhine is used for the assessment of the aquatic generation of AE F075736, for detailed values please refer to CA 7.2.2.3.
7) For detailed values please refer to CA 7.1.2.1.
8) For detailed values please refer to CA 7.1.1.

Table CP 9.2.5- 9: Substance specific and model related input parameter for PEC_{sw} calculation of iodosulfuron-methyl-sodium and its metabolite AE F075736 at Step 3 level (model parameters not listed are kept as default) – Calculation 4

Parameter	Unit	Iodosulfuron-methyl-sodium	AE F075736
Company Code	[-]	AE F115008	AE F075736
SWASH Code	[-]	IMS	I736
General Parameters			
Molar Mass	[g/mol]	529.3	381.4
Water Solubility	[mg/L]	25000	2790
Vapour Pressure	[Pa]	2.6E-09	1.1E-10
Plant Uptake Factor	[-]	0.0	0.5
Wash-Off Factor PRZM	[1/cm]	0.5	0.5
Wash-Off Factor MACRO	[1/mm]	0.05	0.05
Sorption			
K_{oc}	[mL/g]	50.7 [2)]	12.3 [2)]
Freundlich Exponent	[-]	0.87 [2)]	0.92 [2)]
Degradation			
Soil	[days]	3.3 [1)]	14.2 [3)]
Form. Frac. PRZM	[molar basis]	-	0.610 [6)]
Form. Frac. MACRO	[mass basis]	-	0.440
Water	[days]	19.8 [4)]	64.1 [4)]
Sediment	[days]	1000 [5)]	1000 [5)]
Walker Exponent	[-]	0.7	0.7
Effect of Temperature			
Activation Energy	[J/mol]	65400	65400
Exponent	[1/K]	0.095	0.095
Q_{10}	[-]	2.58	2.58

1) Median of normalised DT_{50} in soil under field conditions (13 different soils; 10 reliable DT_{50} in the range of 0.6 - 10.3 days); for detailed values please refer to CA 7.1.2.2.
2) Arithmetic mean value from different soils; for detailed values please refer to CA 7.1.3.1.
3) Geometric mean of normalised DT_{50} in soil under field conditions (13 different soils; 8 reliable DT_{50} in the range of 6.9 - 35.6 days); for detailed values please refer to CA 7.1.2.2.
4) Geometric mean DT_{50} value of total system was used for calculations, as recommended in FOCUS (2003), the DT_{50} value is based on two laboratory aerobic water-sediment studies (3 different aquatic systems); for detailed values please refer to CA 7.2.2.3.
5) Default value used in the calculations.
6) For detailed values please refer to CA 7.1.2.2.

Findings:

Steps 1 and 2: The maximum PEC_{sw} and PEC_{sed} values for iodosulfuron-methyl-sodium and its metabolites at Steps 1 and 2 are given in the following tables.

Table CP 9.2.5- 10: Maximum PEC_{sw} and PEC_{sed} values for iodosulfuron-methyl-sodium and its metabolites at Steps 1 & 2 – Calculation 1*

Use pattern	FOCUS scenario	Iodosulfuron-methyl-sodium		AE F145741		AE F145740		AE F161778	
		PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]
Winter cereals 1 × 10 g a.s./ha	Step 1	3.214	1.583	0.222	<0.001	0.274	0.051	0.324	0.100
	Step 2								
	N-EU Single	0.389	0.190	0.070	<0.001	0.104	0.020	0.091	0.028
	S-EU Single	0.327	0.159	0.057	<0.001	0.085	0.016	0.073	0.023
Winter cereals 1 × 7.5 g a.s./ha	Step 1	2.411	1.187	0.166	<0.001	0.206	0.038	0.243	0.075
	Step 2								
	N-EU Single	0.214	0.104	0.037	<0.001	0.054	0.010	0.046	0.014
	S-EU Single	0.183	0.089	0.030	<0.001	0.045	0.009	0.037	0.011

* Calculation 1 - for compound specific input parameters see Table CP 9.2.5- 4 and Table CP 9.2.5- 5

Table CP 9.2.5- 11: Maximum PEC_{sw} and PEC_{sed} values for iodosulfuron-methyl-sodium and its metabolites at Steps 1 & 2 – Calculation 1* (continued)

Use pattern	FOCUS scenario	BCS-CW81253		AE F059411		AE 0000119	
		PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]
Winter cereals 1 × 10 g a.s./ha	Step 1	0.723	0.266	0.333	0.261	0.197	0.301
	Step 2						
	N-EU Single	0.249	0.092	0.125	0.099	0.061	0.094
	S-EU Single	0.199	0.073	0.101	0.080	0.050	0.077
Winter cereals 1 × 7.5 g a.s./ha	Step 1	0.543	0.200	0.250	0.196	0.148	0.225
	Step 2						
	N-EU Single	0.124	0.046	0.064	0.050	0.032	0.049
	S-EU Single	0.100	0.037	0.052	0.040	0.027	0.041

* Calculation 1 - for compound specific input parameters see Table CP 9.2.5- 4 and Table CP 9.2.5- 5

Table CP 9.2.5- 12: Maximum PEC_{sw} and PEC_{sed} values for iodosulfuron-methyl-sodium and its metabolites at Steps 1 & 2 – Calculation 2*

Use pattern	FOCUS scenario	Iodosulfuron-methyl-sodium		AE 0002166		AE F154781		AE 0014966	
		PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]
Winter cereals 1 × 10 g a.s./ha	Step 1	3.214	1.583	0.518	<0.001	0.002	<0.001	0.010	<0.001
	Step 2								
	N-EU Single	0.389	0.190	0.147	<0.001	0.002	<0.001	0.010	<0.001
	S-EU Single	0.327	0.159	0.121	<0.001	0.002	<0.001	0.010	<0.001
Winter cereals 1 × 7.5 g a.s./ha	Step 1	2.411	1.187	0.388	<0.001	0.001	<0.001	0.007	<0.001
	Step 2								
	N-EU Single	0.214	0.104	0.078	<0.001	0.001	<0.001	0.007	<0.001
	S-EU Single	0.183	0.089	0.065	<0.001	0.001	<0.001	0.007	<0.001

* Calculation 2 - for compound specific input parameters see Table CP 9.2.5- 6 and Table CP 9.2.5- 7

Table CP 9.2.5- 13: Maximum PEC_{sw} and PEC_{sed} values for iodosulfuron-methyl-sodium and its metabolites at Steps 1 & 2 – Calculation 2*(continued)

Use pattern	FOCUS scenario	AE 0034855		AE 1234964		AE F159737	
		PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]
Winter cereals 1 × 10 g a.s./ha	Step 1	0.007	<0.001	0.003	<0.001	0.003	<0.001
	Step 2						
	N-EU Single	0.007	<0.001	0.003	<0.001	0.003	<0.001
	S-EU Single	0.007	<0.001	0.003	<0.001	0.003	<0.001
Winter cereals 1 × 7.5 g a.s./ha	Step 1	0.005	<0.001	0.002	<0.001	0.002	<0.001
	Step 2						
	N-EU Single	0.005	<0.001	0.002	<0.001	0.002	<0.001
	S-EU Single	0.005	<0.001	0.002	<0.001	0.002	<0.001

* Calculation 2 - for compound specific input parameters see Table CP 9.2.5- 6 and Table CP 9.2.5- 7

Table CP 9.2.5- 14: Maximum PEC_{sw} and PEC_{sed} values for iodosulfuron-methyl-sodium and its metabolite AE F075736 at Steps 1 & 2 – Calculation 3*

Use pattern	FOCUS scenario	Iodosulfuron-methyl-sodium		AE F075736	
		PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]
Winter cereals 1 × 10 g a.s./ha	Step 1	3.214	1.583	2.136	0.257
	Step 2				
	N-EU Single	0.389	0.190	0.745	0.091
	S-EU Single	0.327	0.159	0.604	0.074
Winter cereals 1 × 7.5 g a.s./ha	Step 1	2.411	1.187	1.602	0.193
	Step 2				
	N-EU Single	0.214	0.104	0.383	0.047
	S-EU Single	0.183	0.089	0.313	0.038

* Calculation 3 - for compound specific input parameters see Table CP 9.2.5- 8

Step 3: The maximum PEC_{sw} and PEC_{sed} values for relevant FOCUS Step 3 scenarios are given below in Table CP 9.2.5- 15 and Table CP 9.2.5- 16. The PEC values of the higher tier calculation (calculation 4; based on field data and the experimentally determined PUF of 0.5) are summarised in Table CP 9.2.5- 17 and Table CP 9.2.5- 18.

Table CP 9.2.5- 15: Maximum PEC_{sw} and PEC_{sed} of iodosulfuron-methyl-sodium and its metabolite AE F075736 for all scenarios at Step 3 (winter cereals, 1 × 10 g a.s./ha) – Calculation 3*

Use pattern	Winter cereals, 1 × 10 g a.s./ha				
	Iodosulfuron-methyl-sodium			AE F075736	
FOCUS scenario	Entry route**	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]
D1 (ditch, 1st)	S	0.064	0.055	0.051	0.051
D1 (stream, 1st)	S	0.055	0.007	0.034	0.030
D2 (ditch, 1st)	D	0.143	0.060	0.787	0.264
D2 (stream, 1st)	D	0.092	0.037	0.495	0.154
D3 (ditch, 1st)	S	0.063	0.014	0.004	0.008
D4 (pond, 1st)	S	0.002	0.003	0.021	0.027
D4 (stream, 1st)	S	0.050	0.002	0.014	0.013
D5 (pond, 1st)	S	0.002	0.003	0.005	0.007
D5 (stream, 1st)	S	0.050	0.001	0.003	0.003
D6 (ditch, 1st)	S	0.063	0.010	0.004	0.003
R1 (pond, 1st)	S	0.002	0.004	0.001	0.001
R1 (stream, 1st)	S	0.042	0.007	0.025	0.002
R3 (stream, 1st)	R	0.133	0.024	0.042	0.003
R4 (stream, 1st)	R	0.088	0.021	0.040	0.005

* Calculation 3 - for compound specific input parameters see Table CP 9.2.5- 8
** Entry route: letters S, D, and R correspond to the dominant entry path – spray drift, drainage, and runoff

Table CP 9.2.5- 16: Maximum PEC_{sw} and PEC_{sed} of iodosulfuron-methyl-sodium and its metabolite AE F075736 for all scenarios at Step 3 (winter cereals, 1 × 7.5 g a.s./ha) – Calculation 3*

Use pattern	Winter cereals, 1 × 7.5 g a.s./ha				
	Iodosulfuron-methyl-sodium			AE F075736	
FOCUS scenario	Entry route**	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]
D1 (ditch, 1st)	S	0.048	0.042	0.038	0.038
D1 (stream, 1st)	S	0.041	0.005	0.025	0.022
D2 (ditch, 1st)	D	0.097	0.044	0.589	0.199
D2 (stream, 1st)	D	0.064	0.028	0.370	0.116
D3 (ditch, 1st)	S	0.048	0.011	0.003	0.006
D4 (pond, 1st)	S	0.002	0.003	0.016	0.020
D4 (stream, 1st)	S	0.038	0.002	0.010	0.010
D5 (pond, 1st)	S	0.002	0.003	0.004	0.005
D5 (stream, 1st)	S	0.037	<0.001	0.002	0.002
D6 (ditch, 1st)	S	0.047	0.007	0.003	0.003
R1 (pond, 1st)	S	0.002	0.003	0.001	<0.001
R1 (stream, 1st)	S	0.031	0.005	0.019	0.002
R3 (stream, 1st)	R	0.100	0.018	0.032	0.003
R4 (stream, 1st)	R	0.066	0.016	0.030	0.003

* Calculation 3 - for compound specific input parameters see Table CP 9.2.5- 8
** Entry route: letters S, D, and R correspond to the dominant entry path – spray drift, drainage, and runoff

Table CP 9.2.5- 17: Higher tier calculation: Maximum PEC_{sw} and PEC_{sed} of iodosulfuron-methyl-sodium and its metabolite AE F075736 for all scenarios at Step 3 (winter cereals, 1 × 10 g a.s./ha) – Calculation 4*

Use pattern	Winter cereals, 1 × 10 g a.s./ha				
	Iodosulfuron-methyl-sodium			AE F075736	
FOCUS scenario	Entry route**	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]
D1 (ditch, 1st)	S	0.065	0.055	0.020	0.018
D1 (stream, 1st)	S	0.055	0.007	0.014	0.010
D2 (ditch, 1st)	D	0.247	0.126	0.439	0.161
D2 (stream, 1st)	D	0.162	0.075	0.288	0.094
D3 (ditch, 1st)	S	0.063	0.014	<0.001	<0.001
D4 (pond, 1st)	S	0.002	0.003	0.002	0.003
D4 (stream, 1st)	S	0.050	0.002	0.001	0.001
D5 (pond, 1st)	S	0.002	0.003	0.001	0.001
D5 (stream, 1st)	S	0.050	0.001	<0.001	<0.001
D6 (ditch, 1st)	S	0.063	0.011	0.002	0.002
R1 (pond, 1st)	R	0.002	0.005	0.001	0.001
R1 (stream, 1st)	R	0.045	0.008	0.013	0.001
R3 (stream, 1st)	R	0.159	0.028	0.021	0.002
R4 (stream, 1st)	R	0.111	0.026	0.020	0.002

* Calculation 4 - for compound specific input parameters see Table CP 9.2.5- 9
** Entry route: letters S, D, and R correspond to the dominant entry path – spray drift, drainage, and runoff

Table CP 9.2.5- 18: Higher tier calculation: Maximum PEC_{sw} and PEC_{sed} of iodosulfuron-methyl-sodium and its metabolite AE F075736 for all scenarios at Step 3 (winter cereals, 1 × 7.5 g a.s./ha) – Calculation 4*

Use pattern	Winter cereals, 1 × 7.5 g a.s./ha				
	Iodosulfuron-methyl-sodium			AE F075736	
FOCUS scenario	Entry route**	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]	PEC_{sw} [µg/L]	PEC_{sed} [µg/kg]
D1 (ditch, 1st)	S	0.048	0.042	0.015	0.013
D1 (stream, 1st)	S	0.041	0.005	0.010	0.008
D2 (ditch, 1st)	D	0.169	0.092	0.328	0.122
D2 (stream, 1st)	D	0.113	0.054	0.217	0.071
D3 (ditch, 1st)	S	0.048	0.011	<0.001	<0.001
D4 (pond, 1st)	S	0.002	0.003	0.001	0.002
D4 (stream, 1st)	S	0.038	0.002	<0.001	<0.001
D5 (pond, 1st)	S	0.002	0.003	<0.001	<0.001
D5 (stream, 1st)	S	0.037	<0.001	<0.001	<0.001
D6 (ditch, 1st)	S	0.048	0.008	0.002	0.001
R1 (pond, 1st)	R	0.002	0.004	0.001	<0.001
R1 (stream, 1st)	R	0.033	0.006	0.010	<0.001
R3 (stream, 1st)	R	0.119	0.021	0.016	0.001
R4 (stream, 1st)	R	0.083	0.020	0.015	0.002

* Calculation 4 - for compound specific input parameters see Table CP 9.2.5- 9
** Entry route: letters S, D, and R correspond to the dominant entry path – spray drift, drainage, and runoff

CP 9.3 Fate and behaviour in air

No volatility studies on the preparation have been performed. Details of volatility for the active substance are given in Document MCA Section 1. Please refer to Document MCA 7.3.2.

CP 9.3.1 Route and rate of degradation in air and transport via air

Please refer to Document MCA 7.3.2.

Predicted environmental concentrations from airborne transport
Due to the extremely low Henry's constant and the negligible vapour pressure no exposure via air is expected.

CP 9.4 Estimation of concentrations for other routes of exposure

There are no other routes of exposure to be considered if the product is used according to good agricultural practice.