FINAL REGISTRATION REPORT

Part B

Section 6

Mammalian Toxicology

Detailed summary of the risk assessment

Product code: JMD-HER 387 OD

Product name(s): Jockey 387 OD

Chemical active substances:

2,4-D, 250 g/L (as 2,4-D 2EHE, 377 g/L)

Iodosulfuron-methyl-sodium, 10 g/L

Central Zone

Zonal Rapporteur Member State: Poland

CORE ASSESSMENT

(authorization)

Applicant:

Pestila Spółka z ograniczoną odpowiedzialnością

Submission date: December 2022

MS Finalisation date: December 2023; March 2024

Version history

When	What
12.2023	Assessment by expert
03.2024	Final version of RR after commenting period

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6 Mammalian Toxicology (KCP 7)

6.1 Summary

Table 6.1-1: Information on JMD-HER 387 OD *

Product name and code	JMD-HER 387 OD
Formulation type	Oil dispersion [Code: OD]
Active substance(s) (incl. content)	2,4-D, 250 g/L (as 2,4-D 2EHE, 377 g/L) Iodosulfuron-methyl-sodium, 10 g/L
Function	herbicide
Product already evaluated as the 'representative formulation' during the approval of the active substances	No
Product previously evaluated in another MS according to Uniform Principles	No

* Information on the detailed composition of JMD-HER 387 OD can be found in the confidential dRR Part C.

Justified proposals for classification and labelling

According to the criteria given in Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008, the following classification and labelling with regard to toxicological data is proposed for the preparation:

Table 6.1-2: Justified proposals for classification and labelling for JMD-HER 387 OD according to Regulation (EC) No 1272/2008

Hazard class(es), categories	Acute Tox. 4, H302 Eye Dam. 1, H318 Skin Sens. 1, H317
Hazard pictograms or Code(s) for hazard pictogram(s)	 **GHS05** **GHS0**
Signal word	Danger
Hazard statement(s)	H302 - Harmful if swallowed. H318 - Causes serious eye damage. H317 - May cause an allergic skin reaction.
Precautionary statement(s)	P264 - Wash hands thoroughly after handling. P270 - Do not eat, drink or smoke when using this product. P280 - Wear protective gloves, protective clothing, eye protection, face protection. P301+P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell. P302+P352 - IF ON SKIN: Wash with plenty of water with soap. P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 - Immediately call a POISON CENTER or doctor. P333+P313 - If skin irritation or rash occurs: Get medical advice or attention.

	P362+P364 - Take off contaminated clothing and wash it before reuse.
Additional labelling phrases	To avoid risks to man and the environment, comply with the instructions for use. [EUH401]
	~~Contains 2,4-D 2EHE (CAS No. 1928-43-4). May produce an allergic reaction. [EUH208]~~

Table 6.1-3: Summary of risk assessment for operators, workers, residents and bystanders for JMD-HER 387 OD

	Result	PPE / Risk mitigation measures
Operators	Acceptable	Workwear (arms, body and legs covered) and protective gloves during mixing/loading and during application.
Workers	Acceptable	Workwear (arms, body and legs covered) Protective gloves - reccomended.
Residents	Acceptable	None.
Bystanders	Acceptable	

No unacceptable risk for operators, workers, residents and bystanders was identified when the product is used as intended and provided that the PPE/ risk mitigation measures stated in Table 6.1-3 are applied.

A summary of the critical uses and the overall conclusion regarding exposure for operators, workers and residents/bystanders is presented in the following table.

Table 6.1-4 Critical uses and overall conclusion of exposure assessment

1	2	3	4	5	6	7	8	9	10			
Use-No.*	**Crops and situation (e.g. growth stage of crop)**	**F, Fn, Fpn G, Gn, Gpn or I ****	**Application**		**Application rate**		**PHI (d)**	**Remarks: (e.g. safener/synergist (L/ha)) critical gap for operator, worker, resident or bystander exposure based on [Exposure model]**	**Acceptability of exposure assessment**			
			Method / Kind (incl. application technique ***	**Max. number (min. interval between applications) a) per use b) per crop/ season**	**Max. application rate kg as/ha a) iodosulfuron-methyl-sodium b) 2,4-D**	**Water L/ha min / max**			**Operator**	**Worker**	**Residents**	**Bystander**
1	Cereals (BBCH 23-31) Winter wheat Winter rye Winter triticale	F	Spraying, LCTM	1 ; 1	a) 0.01 b) 0.250 (as 2,4-D 2EHE, 377 g/L)	200 - 300	NR	Guidance on the assessment of exposure of operators, workers, residents and bystanders in risk assessment for plant protection products; EFSA Journal 2014;12(10):3874				
2	Cereals (BBCH 23-31) Spring wheat Spring triticale											
3	Cereals (BBCH 23-31) Winter wheat											

* Use number(s) in accordance with the list of all intended GAPs in Part B, Section 0 should be given in column 1

** F: professional field use, Fn: non-professional field use, Fpn: professional and non-professional field use, G: professional greenhouse use, Gn: non-professional greenhouse use, Gpn: professional and non-professional greenhouse use, I: indoor application

*** e.g. LC: low crops, HC: high crop, TM: tractor-mounted, HH: hand-held

Explanation for column 10 "Acceptability of exposure assessment"

A	Exposure acceptable without PPE / risk mitigation measures
R	Further refinement and/or risk mitigation measures required
N	Exposure not acceptable/ Evaluation not possible

Data gaps

N/A

6.2 Toxicological Information on Active Substance(s)

Information regarding classification of the active substances and on EU endpoints and critical areas of concern identified during the EU review are given in Table 6.2-1.

Table 6.2-1: Information on active substance(s)

	2,4-D	**Iodosulfuron-methyl-sodium**
Common Name	2,4-D	Iodosulfuron-methyl-sodium
CAS-No.	94-75-7	144550-36-7
Classification and proposed labelling		
With regard to toxicological endpoints (according to the criteria in Reg. 1272/2008, as amended)	Hazard classes, categories: Acute Tox. 4, H302 Eye Dam. 1, H318 Skin Sens. 1, H317 STOT SE 3, H335 Code(s) for hazard pictograms: GHS05 GHS07 Signal word: Danger Hazard statements: H302 Harmful if swallowed. H318 Causes serious eye damage. H317 May cause an allergic skin reaction. H335 May cause respiratory irritation. Precautionary statement(s): P264, P270, P280, P301+P312, P330, P305 + P351 + P338, P337 + P313, P501	Hazard classes (s), categories: Aquatic Acute 1, H400 Aquatic Chronic 1, H410 Code(s) for hazard pictogram(s): GHS09 Signal word: Warning Hazard statement(s): H400 Very toxic to aquatic life. H410 Very toxic to aquatic life with long lasting effects. Precautionary statement(s): P273, P391, P501
Additional C&L proposal	NR	**NR**
Agreed EU endpoints		
AOEL systemic	0.02 mg/kg bw/d	0.05 mg/kg bw/d (corrected for 70% oral absorption)
Reference	EFSA Journal 2014;12(9):3812	EFSA Journal 2016;14(4):4453
Conditions to take into account/critical areas of concern with regard to toxicology		
According to Commission Implementing Regulation (EU)	*Commission Implementing Regulation (EU) 2015/2033:* In this overall assessment Member States shall pay particular attention to	None. **Harmonised classification - Annex VI of Regulation (EC) No 1272/2008**

	2,4-D	Iodosulfuron-methyl-sodium
	the risk to consumers in cases of uses above 750 g/ha. **Harmonised classification - Annex VI of Regulation (EC) No 1272/2008 (CLP Regulation)** ATP Inserted / Updated: CLP00 CLP Classification (Table 3)	**(CLP Regulation)** ATP Inserted / Updated: CLP00 CLP Classification (Table 3)

6.3 Toxicological Evaluation of Plant Protection Product

A summary of the toxicological evaluation for JMD-HER 387 OD is given in the following tables. Full summaries of studies on the product that have not been previously considered within an EU peer review process are described in detail in Appendix 2.

Table 6.3-1: Summary of evaluation of the studies on acute toxicity including irritancy and skin sensitisation for JMD-HER 387 OD

Type of test, species, model system (Guideline)	Result	Acceptability	Classification (acc. to the criteria in Reg. 1272/2008)	Reference
LD_{50} oral, rat (OECD xxx)	Estimation based on composition of the product (additivity formula)	Accepted	Acute Tox. 4, H302 - Harmful if swallowed.	-
LD_{50} dermal, rat (OECD xxx)	Estimation based on composition of the product (additivity formula)	Accepted	None	-
LC_{50} inhalation, rat (OECD xxx)	Estimation based on composition of the product (additivity formula)	Accepted	None.	-
Skin irritation, model system (OECD xxx)	Estimation based on composition of the product (additivity formula)	Accepted	None.	-
Eye irritation, model system (OECD xxx)	Estimation based on composition of the product	Accepted	Eye Dam. 1, H318 - Causes serious eye damage.	-
Skin sensitisation, guinea pig/mouse (OECD xxx, Buehler (xx applications)/M&K/LLNA)	Estimation based on composition of the product	Accepted	Skin Sens. 1, H317 - May cause an allergic skin reaction.	-
Supplementary studies for combinations of plant protection products	No data – not required	-	-	-

Table 6.3-2: Additional toxicological information relevant for classification/labelling of JMD-HER 387 OD

	Substance (concentration in product, % w/w)	**Classification of the substance (acc. to the criteria in Reg. 1272/2008)**	**Reference**	**Classification of product (acc. to the criteria in Reg. 1272/2008)**
Toxicological properties of active substances (relevant for classification of product)	2,4-D as 2,4D 2EHE (CAS: 1928-43-4) c.a.35% (w/w)	Acute Tox.4, H302 (Oral) Aquatic Acute 1, H400 Aquatic Chronic 1, H410	Regulation (EC) No. 1272/2008 MSDS	Acute Tox. 4, H302 Aquatic Acute 1, H400 Aquatic Chronic 1, H410
	iodosulfuron-methyl-sodium (CAS No. 144550-36-7) c.a. 1.0% (w/w)	Aquatic Acute 1, H400 Aquatic Chronic 1, H410	Regulation (EC) No. 1272/2008 MSDS	Aquatic Acute 1, H400 Aquatic Chronic 1, H410
Toxicological properties of non-active substance(s) (relevant for classification of product)	Sodium dioctyl sulphosuccinate (CAS: 577-11-7) c.a. 10% (w/w)	Skin Irrit.2, H315 Eye Dam.1, H318	Regulation (EC) No. 1272/2008 MSDS	Eye Dam.1, H318
	Cloquintocet methylhexyl (CAS: 99607-70-2) c.a. 1.5% (w/w)	Skin Sens.1, H317 Aquatic Acute 1, H400 Aquatic Chronic 1, H410	Regulation (EC) No. 1272/2008 MSDS	Skin Sens.1, H317 Aquatic Acute 1, H400 Aquatic Chronic 1, H410
Further toxicological information	-	-	-	-

6.4 Toxicological Evaluation of Groundwater Metabolites

All 2,4-D and iodosulfuron-methyl-sodium are not predicted to occur in groundwater at concentrations below 0.1 µg/L (see dRR Part B8). Assessment of the relevance of metabolites according to the stepwise procedure of the EC guidance document SANCO/221/2000 - rev.10 is therefore not required.

6.5 Dermal Absorption (KCP 7.3)

A summary of the dermal absorption rates for the active substances in JMD-HER 387 OD are presented in the following table.

Table 6.5-1: Dermal absorption rates for active substances in JMD-HER 387 OD

	2,4-D (2,4-D 2EHE)		**Iodosulfuron-methyl-sodium**	
	Value	**Reference**	**Value**	**Reference**
Concentrate	2.9%	KCP 7.3/01 [redacted], STUDY No.: AG-G1341 New study reported in Appendix 2	70%	EFSA Journal 2017;15(6):4873 Guidance on Dermal Absorption and SANTE/2018/10591 rev.1 of 24 October 2018.
Dilution	8.5%		70%	

6.5.1 Justification for proposed values - 2,4-D

Proposed dermal absorption rates for 2,4-D (2,4-D 2EHE) are based on dermal absorption study on a formulation JMD-HER 387 OD. The study results are summarised in the following table. Full summaries of study on the dermal absorption of 2,4-D (2,4-D 2EHE)/JMD-HER 387 OD that have not previously been evaluated within an EU peer review process is described in detail in Appendix 2.

Table 6.5-2: Summary of the results of submitted dermal absorption studies for 2,4-D (2,4-D 2-EHE)

Test	Concentrate	Spray dilution (1.005 g/L)	Formulation in study	Acceptability of study	Justification provided on representativity of study formulation for current product	Acceptability of justification	Reference
In vitro (human skin)	2.9 %	8.5 %	JMD-HER 387 OD	Accepted	Study performed with the formulation JMD-HER 387 OD	Accepted	KCP 7.3/01 NABA-NITA SAM, STUDY No.: AG-G1341

6.5.2 Justification for proposed values - iodosulfuron-methyl-sodium

No data on dermal absorption for iodosulfuron-methyl-sodium in JMD-HER 387 OD is available. Justifications for default values according to Guidance on Dermal Absorption (EFSA Journal 2017;15(6):4873) and SANTE/2018/10591 rev.1 of 24 October 2018 (a corrigendum (minor modification) on EFSA Journal 2017;15(6):4873) are presented in the following table.

Table 6.5-3: Default dermal absorption rates for iodosulfuron-methyl-sodium

	Value	Justification for value	Acceptability of justification
Concentrate	70%	According to EFSA Journal 2017;15(6):4873 Guidance on Dermal Absorption a default dermal absorption value of 25% may be applied for concentrated products that are organic solvent-formulated (a) or in other (b) types of formulations. According to SANTE/2018/10591 rev.1 of 24 October 2018 a "concentrate" when the active substance is present in the plant protection product at a concentration higher than 50 g/L (or 50g/Kg or 5%).	Accepted
Dilution	70%	According to EFSA Journal 2017;15(6):4873 Guidance on Dermal Absorption a default dermal absorption value of 70% may be applied for (in use) dilutions of organic solventformulated (a) or in other (b) types of formulations. According to SANTE/2018/10591 rev.1 of 24 October 2018 a "dilution" when the active substance is present in the plant protection product at a concentration lower than or equal to 50 g/L (or 50g/Kg or 5%).	Accepted

(a): Formulation types: emulsifiable concentrate (EC), emulsion, oil in water (EW), suspo-emulsion (SE), dispersible concentrate (DC), oil miscible liquids (OL/OF), oil-based suspension concentrates (OD), emulsion for seed treatment (ES), microemulsion (ME).

(b): Formulation types: bait concentrate (CB), capsule suspension (CS), gel for direct application (GEL/GD), bait, ready for use (RB), mixture of capsule suspension and suspension concentrate (ZC), seed coated with a pesticide (PS), experimental solution of active substances in solvent (AI).

6.6 Exposure Assessment of Plant Protection Product (KCP 7.2)

Table 6.6-1: Product information and toxicological reference values used for exposure assessment

Product name and code	JMD-HER 387 OD	
Formulation type	OD	
Category	Herbicide	
Active substance(s), (incl. content)	**2,4-D,** 250 g/L (as 2,4-D 2EHE, 377 g/L)	**Iodosulfuron-methyl-sodium,** 10 g/L
AOEL systemic	0.02 mg/kg bw/d	0.05 mg/kg bw/d (corrected for 70% oral absorption)
Inhalation absorption	100%	100%
Oral absorption	100%	100%
Dermal absorption	Concentrate: 2.9% Dilution: 8.5% (1.005 g/L)	Concentrate: 70% Dilution: 70% (Default)

6.6.1 Selection of critical use(s) and justification

The critical GAP used for the exposure assessment of the plant protection product is shown in Table 6.1-4. A list of all intended uses within the zone is given in Part B, Section 0.
Justification is not relevant since intended application is on cereals only, with identical BBCH phase and application rate.

6.6.2 Operator exposure (KCP 7.2.1)

6.6.2.1 Estimation of operator exposure

A summary of the exposure model used for estimation of operator exposure to the active substances during application of JMD-HER 387 OD according to the critical use(s) is presented in Table 6.6-2. The outcome of the estimation is presented in Table 6.6-3 (long-term exposure). Detailed calculations are in Appendix 3.

Table 6.6-2: Exposure models for intended uses

Critical use	Cereals (max. 1.0 L/product/ha)
Model	**EFSA model AOEM** (Agricultural Operator Exposure Model [Guidance on the assessment of exposure of operators, workers, residents and bystanders in risk assessment for plant protection products; EFSA Journal 2014;12(10):3874; calculator version: 30/03/2015]

Table 6.6-3: Estimated operator exposure (long-term exposure)

		2,4-D		**Iodosulfuron-methyl-sodium**	
Model data	**Level of PPE**	**Total absorbed dose (mg/kg/day)**	**% of systemic AOEL**	**Total absorbed dose (mg/kg/day)**	**% of systemic AOEL**
Cereals Outdoor Downward spraying Vehicle-mounted					
Application rate		1x 0.250 kg a.s./ha		1x 0.01 kg a.s./ha	
Spray application (AOEM**;** 75th percentile) Body weight: 60 kg	Potential exposure	0.0312547	**156.27**	0.0605362	**121.07**
	Work wear (arms, body and legs covered) M/L and A	0.0197569	98.78	0.0346491	69.30
	Work wear (arms, body and legs covered) M/L and A + gloves	0.0010457	5.23	0.0011463	2.29

Conclusions

According to the model calculations, it can be concluded that the risk for the operator using JMD-HER 387 OD on intended uses presented in GAP table is acceptable when operator is equipped with work wear (arms, body and legs covered) and protective gloves during mixing/loading and during application.

6.6.2.2 Measurement of operator exposure

Since the operator exposure estimations carried out indicated that the acceptable operator exposure level (AOEL) will not be exceeded under conditions of intended uses and consideration of the above mentioned personal protective equipment (PPE), a study to provide measurements of operator exposure was not necessary and was therefore not performed.

6.6.3 Worker exposure (KCP 7.2.3)

6.6.3.1 Estimation of worker exposure

Table 6.6-4 shows the exposure models used for estimation of worker exposure after entry into a previously treated area or handling a crop treated with JMD-HER 387 OD according to the critical use(s). Outcome of the estimation is presented in Table 6.6-5 (long-term exposure). Detailed calculations are in Appendix 3.

Table 6.6-4: Exposure models for intended uses

Critical use	Cereals (max. 1.0 L/product/ha)
Models	**EFSA model AOEM** (Agricultural Operator Exposure Model [Guidance on the assessment of exposure of operators, workers, residents and bystanders in risk assessment for plant protection products; EFSA Journal 2014;12(10):3874; calculator version: 30/03/2015] **EUROPOEM II re-entry model** [Hemmen et al (2002) Post-application exposure of workers to pesticides in agriculture. Report of the re-entry working group. EUROPOEM II project. FAIR3 CT96-1406]

Table 6.6-5: Estimated worker exposure (long-term exposure)

Model data	**Level of PPE**	**2,4-D**		**Iodosulfuron-methyl-sodium**	
		Total absorbed dose (mg/kg bw/day)	**% of systemic AOEL**	**Total absorbed dose (mg/kg bw/day)**	**% of systemic AOEL**
Cereals Outdoor Downward spraying Vehicle-mounted Inspection, irrigation Work rate: 2 hours/day, DT_{50}: 30 days DFR: 3 µg/cm²/kg a.s./ha Interval between treatments: NA					
EFSA model AOEM					
Number of applications and application rate		1x 0.250 kg a.s./ha		1x 0.01 kg a.s./ha	
Body weight: 60 kg	Potential TC: 12500 cm²/person/h	0.0265625	**132.81**	0.0087500	17.50
	Work wear (arms, body and legs covered) TC: 1400 cm²/person/h	0.0029750	14.88	0.0009800	1.96
	Work wear (arms, body	-	-	-	-

	and legs covered) and gloves TC: not available				
EUROPOEM II re-entry model					
Number of applications and application rate		1x 0.250 kg a.s./ha		1x 0.01 kg a.s./ha	
Model data	**Level of PPE**	**Total absorbed dose (mg a.s./day)**	**% of systemic AOEL**	**Total absorbed dose (mg a.s./day)**	**% of systemic AOEL**
Body weight: 60 kg TC: 0.15 m^2/h	Without PPE	0.191	16.0	0.063	2.0
	With PPE (gloves)	0.038	3.0	0.013	0.0

Conclusions

Based on the calculations performed above, it can be concluded that the use of JMD-HER 387 OD according to the list of intended uses presented in GAP Table, causes no health risk for the worker assuming the workwear (arms, body and legs covered) is used. It is also recommended to use gloves during field activities.
It is forbidden to re-enter area treated with JMD-HER 387 OD containing 2,4-D and iodosulfuron-methyl-sodium until spray deposit on plant surfaces has dried. As a standard rule, it should be mentioned on the label that treated crops should not be re-entered before spray deposits on leaf surfaces have completely dried.

6.6.3.2 Refinement of generic DFR value (KCP 7.2)

Not relevant.

6.6.3.3 Measurement of worker exposure

Since the worker exposure estimations carried out indicated that the acceptable operator exposure level (AOEL) will not be exceeded under conditions of intended uses and considering above mention PPE, a study to provide measurements of worker exposure was not necessary and was therefore not performed.

6.6.4 Resident and bystander exposure (KCP 7.2.2)

6.6.4.1 Estimation of resident and bystander exposure

The acute exposure assessment for bystanders covers the exposure that a resident could reasonably be expected to incur in a single day. Therefore, there is no need for a separate acute risk assessment for residents.

No bystander risk assessment is required for PPPs that do not have significant acute toxicity or the potential to exert toxic effects after a single exposure. Exposure in this case will be determined by average exposure over a longer duration, and higher exposures on one day will tend to be offset by lower exposures on other days. Therefore, exposure assessment for residents also covers bystander exposure.

Table 6.6-6 shows the exposure models used for estimation of resident and bystander exposure to 2,4-D and iodosulfuron-methyl-sodium. The outcome of the estimation is presented in Table 6.6-7 (long-term bystander exposure). Detailed calculations are in Appendix 3.

Table 6.6-6: Exposure models for intended uses

Critical use	Cereals (max. 1.0 L/product/ha)
Models	**EFSA model AOEM** (Agricultural Operator Exposure Model [Guidance on the assessment of exposure of operators, workers, residents and bystanders in risk assessment for plant protection products; EFSA Journal 2014;12(10):3874; calculator version: 30/03/2015]

Table 6.6-7: Estimated resident exposure (long-term exposure)

Model data		2,4-D		Iodosulfuron-methyl-sodium	
		Total absorbed dose (mg/kg bw/day)	**% of systemic AOEL**	**Total absorbed dose (mg/kg bw/day)**	**% of systemic AOEL**
EFSA model AOEM					
Cereals Outdoor Downward spraying Vehicle-mounted Buffer zone: 2-3(m) Drift reduction technology: no DT_{50}: 30 days DFR: 3 µg/cm²/kg a.s./ha Interval between treatments: NA					
Number of applications and application rate		1x 0.250 kg a.s./ha		1x 0.01 kg a.s./ha	
Resident child Body weight: 10 kg	Drift (75th perc.)	0.0028765	14.38	0.0006251	1.25
	Vapour (75th perc.)	0.0010700	5.35	0.0010700	2.14
	Deposits (75th perc.)	0.0005124	2.56	0.0000442	0.09
	Re-entry (75th perc.)	0.0035859	17.93	0.0011813	2.36
	Sum (mean)	0.0058938	29.47	0.0023915	4.78
Resident adult Body weight: 60 kg	Drift (75th perc.)	0.0006846	3.42	0.0001139	0.23
	Vapour (75th perc.)	0.0002300	1.15	0.0002300	0.46
	Deposits (75th perc.)	0.0001448	0.72	0.0000196	0.04
	Re-entry (75th perc.)	0.0019922	9.96	0.0006563	1.31
	Sum (mean)	0.0022504	11.25	0.0008274	1.65

Conclusion

The reference value acutely toxic active substance (RVAAS) for 2,4-D and iodosulfuron-methyl-sodium is not allocated. Consequently, it is assumed that the estimation of bystander exposure is covered by the calculation of resident exposure towards this active substance.
All estimated values for long-term exposure to 2,4-D and iodosulfuron-methyl-sodium are below the systemic AOELs for those active substances. It can be concluded that exposure of bystander and resident (children and adult) to 2,4-D and iodosulfuron-methyl-sodium contained in the formulation JMD-HER 387 OD causes no risk to human health if the product is used in accordance with the intended uses listed in the GAP Table.

6.6.4.2 Measurement of resident and/or bystander exposure

Since the resident and/or bystander exposure estimations carried out indicated that the acceptable operator exposure level (AOEL) for 2,4-D and iodosulfuron-methyl-sodium will not be exceeded under conditions of intended uses and considering above mentioned risk mitigation measures, a study to provide measurements of resident/bystander exposure was not necessary and was therefore not performed.

6.6.5 Combined exposure

The product is a mixture of two active substances.

6.6.5.1 Exposure assessment of 2,4-D and iodosulfuron-methyl-sodium in JMD-HER 387 OD

At the first tier, combined exposure is calculated as the sum of the component exposures without regard to the mode of action or mechanism/target of toxicity. Initially, the individual Hazard Quotients (HQ) are calculated for all active substances in the PPP by assessing the exposure according to appropriate models and dividing the individual exposure levels by the respective systemic AOEL. This is equivalent to the predicted exposure as % of systemic AOEL from Tables 6.6-3, 6.6-5 and 6.6-7 converted to decimal. The Hazard Index (HI) is the sum of the individual HQs.

Table 6.6-8: Risk assessment from combined exposure (long-term exposure)

Application scenario	Active ingredient	Estimated exposure / AAOEL (HQ)
Operators - vehicle-mounted application (workwear (arms, body and legs covered) M/L and A + gloves)	2,4-D	0.0523
	iodosulfuron-methyl-sodium	0.0229
	Cumulative risk operators (HI)	**0.0725**
Workers - inspection, irrigation (workwear (arms, body and legs covered))	2,4-D	0.1488
	iodosulfuron-methyl-sodium	0.0196
	Cumulative risk workers (HI)	**0.1684**
Resident – child	2,4-D	
	Drift	0.1438
	Vapour	0.0535
	Deposits	0.0256
	Re-entry	0.1793
	Sum of all pathways	0.2947
	iodosulfuron-methyl-sodium	
	Drift	0.0125
	Vapour	0.0214
	Deposits	0.0009
	Re-entry	0.0236
	Sum of all pathways	0.0478
	Cumulative risk resident – child (HI)	
	Drift	**0.1563**
	Vapour	**0.0749**

Application scenario	Active ingredient	Estimated exposure / AAOEL (HQ)
	Deposits	**0.0265**
	Re-entry	**0.2029**
	Sum of all pathways	**0.3425**
Resident - adult	2,4-D	
	Drift	0.0342
	Vapour	0.0115
	Deposits	0.0072
	Re-entry	0.0996
	Sum of all pathways	0.1125
	iodosulfuron-methyl-sodium	
	Drift	0.0023
	Vapour	0.0046
	Deposits	0.0004
	Re-entry	0.0131
	Sum of all pathways	0.0165
	Cumulative risk resident – adult (HI)	
	Drift	**0.0365**
	Vapour	**0.0161**
	Deposits	**0.0076**
	Re-entry	**0.1127**
	Sum of all pathways	**0.129**

The Hazard Index is < 1. Thus, combined exposure to all active substances in JMD-HER 387 OD is not expected to present a risk for operators, workers, bystanders and residents. No further refinement of the assessment is required.

Appendix 1 Lists of data considered in support of the evaluation

Tables considered not relevant can be deleted as appropriate.

MS to blacken authors of vertebrate studies in the version made available to third parties/public.

List of data submitted by the applicant and relied on

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner
7.3/01	NABANITA SAM	2023	*IN VITRO* PERCUTANEOUS DERMAL ABSORPTION STUDY OF 2,4-D 2-EHE, FORMULATED AS JMD-HER 387 OD THROUGH HUMAN SKIN STUDY No.: AG-G1341 EUROFINS ADVINUS AGROSCIENCES SERVICES INDIA PRIVATE LIMITED GLP Unpublished	N	Pestila*

* Pestila Spółka z ograniczoną odpowiedzialnością.

List of data submitted or referred to by the applicant and relied on, but already evaluated at EU peer review

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner
-	-	-	-	-	-

The following tables are to be completed by MS

List of data submitted by the applicant and not relied on

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner

List of data relied on not submitted by the applicant but necessary for evaluation

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner

Appendix 2 Detailed evaluation of the studies relied upon

A 2.1 Statement on bridging possibilities

Not necessary.

A 2.2 Acute oral toxicity (KCP 7.1.1)

Comments of zRMS:	***ATE mix* = 1 385, which is below 2 000 and above 300, therefore product JMD-HER 387 OD should be classify as Category 4 - Oral toxicity: Acute Tox. 4, H302 Harmful if swallowed.**

No studies submitted with this application. Classification based on composition of the product.
According to Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 *on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006* classification of JMD-HER 387 OD for toxicological part was based on ingredients of the mixture (Additivity formula) and concentration limits. The CLP calculation method is an alternative method based on the concentration addition of all adverse substances in a mixture. The additivity approach is often accepted as a worst-case estimation of chemical interaction.
For more details, please refer to Part C.

A 2.3 Acute percutaneous (dermal) toxicity (KCP 7.1.2)

Comments of zRMS:	**Product JMD-HER 387 OD does not contain co-formulants classified for acute dermal toxicity and does not need to be classified in this category.**

No studies submitted with this application. Classification based on composition of the product.
According to Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 *on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006* classification of JMD-HER 387 OD for toxicological part was based on ingredients of the mixture (Additivity formula) and concentration limits. The CLP calculation method is an alternative method based on the concentration addition of all adverse substances in a mixture. The additivity approach is often accepted as a worst-case estimation of chemical interaction.
For more details, please refer to Part C.

A 2.4 Acute inhalation toxicity (KCP 7.1.3)

Comments of zRMS:	**Product JMD-HER 387 OD does not contain co-formulants classified for acute inhalation toxicity and does not need to be classified in this category.**

No studies submitted with this application. Classification based on composition of the product.

According to Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 *on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006* classification of JMD-HER 387 OD for toxicological part was based on ingredients of the mixture (Additivity formula) and concentration limits. The CLP calculation method is an alternative method based on the concentration addition of all adverse substances in a mixture. The additivity approach is often accepted as a worst-case estimation of chemical interaction.
For more details, please refer to Part C.

A 2.5 Skin irritation (KCP 7.1.4)

Comments of zRMS:	**∑% Category 2, Skin irritation is 9.6%, which is below 10%, therefore product JMD-HER 387 OD should not be classified in this category**.

No studies submitted with this application. Classification based on composition of the product.
According to Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 *on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006* classification of JMD-HER 387 OD for toxicological part was based on ingredients of the mixture (Additivity formula) and concentration limits. The CLP calculation method is an alternative method based on the concentration addition of all adverse substances in a mixture. The additivity approach is often accepted as a worst-case estimation of chemical interaction.
For more details, please refer to Part C.

A 2.6 Eye irritation (KCP 7.1.5)

Comments of zRMS:	**∑% Skin corrosion Sub-Category 1A, 1B, 1C or Category 1 + Serious eye damage (Category 1)[(a)] is 9.6%, which is above 3% , therefore product JMD-HER 387 OD should be classify as Category 1 - Serious eye damage: Eye Dam. 1, H318 Causes serious eye damage.**

No studies submitted with this application. Classification based on composition of the product.
According to Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 *on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006* classification of JMD-HER 387 OD for toxicological part was based on ingredients of the mixture (Additivity formula) and concentration limits. The CLP calculation method is an alternative method based on the concentration addition of all adverse substances in a mixture. The additivity approach is often accepted as a worst-case estimation of chemical interaction.
For more details, please refer to Part C.

A 2.7 Skin sensitisation (KCP 7.1.6)

Comments of zRMS:	**Category 1 - Skin Sensitization is 1.4 %, which is above 0.1 %, therefore product JMD-HER 387 OD should be classify as Category 1 - Skin Sensitization: Skin Sens. 1, H317 May cause an allergic skin reaction.**

No studies submitted with this application. Classification based on composition of the product.

According to Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 *on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006* classification of JMD-HER 387 OD for toxicological part was based on ingredients of the mixture (Additivity formula) and concentration limits. The CLP calculation method is an alternative method based on the concentration addition of all adverse substances in a mixture. The additivity approach is often accepted as a worst-case estimation of chemical interaction.
For more details, please refer to Part C.

A 2.8 Supplementary studies for combinations of plant protection products (KCP 7.1.7)

No new/additional supplementary studies were submitted.

A 2.9 Data on co-formulants (KCP 7.4)

A 2.9.1 Material safety data sheet for each co-formulant

Information regarding material safety data sheets of the co-formulants can be found in the confidential dossier of this submission (Registration Report - Part C).

A 2.9.2 Available toxicological data for each co-formulant

Available toxicological data for each co-formulant can be found in the confidential dossier of this submission (Registration Report - Part C).

A 2.10 Studies on dermal absorption (KCP 7.3)

A 2.10.1 Study 1 – 2,4-D 2EHE in product JMD-HER 387 OD

Comparative dermal absorption, *in vitro* using human skin

Comments of zRMS:	***IN VITRO* PERCUTANEOUS DERMAL ABSORPTION STUDY OF 2,4-D (2,4-D 2EHE)** **Concentrate: 2.9%** **Dilution: 8.5%**

Reference	KCP 7.3/01
Report	*IN VITRO* PERCUTANEOUS DERMAL ABSORPTION STUDY OF 2,4-D 2-EHE, FORMULATED AS JMD-HER 387 OD THROUGH HUMAN SKIN, [redacted] 2023, STUDY No.: AG-G1341
Guideline(s)	Yes, OECD guideline for the testing of chemicals: Guideline No. 428; Skin Absorption: in vitro method (April 2004) Which provides references to below guideline documents and formats; OECD guideline notes on dermal absorption, series on testing and assessment no. 156, ENV/JM/MONO (2011) 36; Guideline on dermal absorption EFSA Journal 2017;15(6):4873.
Deviations	No

GLP	Yes
Acceptability	Yes
Duplication (if vertebrate study)	No

Materials and methods

Test material	Name (Lot/Batch No.)	JMD-HER 387 OD (JMD/01/2021)
	Test preparation	Radioformulation ^{14}C-2,4-D 2-EHE
	Specific activity	3.84 MBq/mg
	Radiochemical purity	98.73%
Product	Name (Lot/Batch No.)	JMD-HER 387 OD (JMD/01/2021)
	Company code	Pestila Spółka z ograniczoną odpowiedzialnocią
	Concentration a.s.	2,4-D-2-EHE: 371.1 g/L
	Formulation type	OD
Blank product	Name (Lot/Batch No.)	JMD/01/2021/Placebo
	Concentration a.s.	-

Test System Information

Section of non-viable human skin derived from abdomen was obtained from consented four adult donors (female), through Zen Bio laboratory, who have signed an IRB validated donor consent form that specifically stated the intended uses in compliance with all legal and ethical regulations. The procured skin was transported and stored at -20°C until use. Upon thawing, the subcutaneous fat was removed, and the skin was cut to a target thickness of ca.0.2-0.4 mm (i.e. split thickness skin membrane).

Donor No.	Lot Number	Specifications	Donor No.	Lot Number	Specifications
H-1	SKIN102422A	Gender: Female, Age: 59 Location: Abdomen Diabetic: No	H-3	SKIN092022A	Gender: Female, Age: 39 Location: Abdomen Diabetic: No
H-2	SKIN102622A	Gender: Female, Age: 61 Location: Abdomen Diabetic: No	H-4	SKIN091422C	Gender: Female, Age: 34 Location: Abdomen Diabetic: No

Details of Skin Thickness and Integrity Test

Replicate	**R1**	**R2**	**R1**	**R2**	**R1**	**R2**	**R1**	**R2**
Donor No.	**H-1**	**H-1**	**H-2**	**H-2**	**H-3**	**H-3**	**H-4**	**H-4**
2,4-D 2-EHE: Dose Formulation A (Concentrate Dose)								
Cell No.	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C1**	**C2**
Skin Thickness (mm)	0.28	0.30	0.32	0.27	0.30	0.29	0.30	0.30
Permeability Coefficient (Kp) (cm.h^{-1})	1.47×10^{-3}	1.31×10^{-3}	1.39×10^{-3}	1.58×10^{-3}	1.50×10^{-3}	1.54×10^{-3}	1.49×10^{-3}	1.46×10^{-3}
2,4-D 2-EHE: Dose Formulation B (Field Dilution)								
Cell No.	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C1**	**C2**
Skin Thickness (mm)	0.28	0.31	0.27	0.28	0.31	0.31	0.31	0.31
Permeability Coefficient (Kp) (cm.h^{-1})	1.30×10^{-3}	1.36×10^{-3}	1.50×10^{-3}	1.48×10^{-3}	1.41×10^{-3}	1.40×10^{-3}	1.32×10^{-3}	1.36×10^{-3}

Pass criteria: Permeability coefficient (Kp) of the skin membranes should be $\leq 2.5\times10^{-3}$.

2,4-D 2-EHE, formulated as JMD-HER 387 OD was separately applied to the skin membranes according to the design below. The exposure time was 8 h and receptor fluid samples were collected from 0-24 h.

Test Group	Group Size	Species	Total Concentration	Mean Dose Applied (Active Ingredient)
A	4	human	372.64 $g.L^{-1}$	3726.35 $\mu g.cm^{-2}$
B	4	human	1.000 $g.L^{-1}$	10.00 $\mu g.cm^{-2}$

Dose Formulations Preparation

Test Group	Amount of ^{14}C-2,4-D 2-EHE	Amount of Test Item	Amount of Diluted Blank Formulation	Total Concentration Measured	Calculated Radioactive Concentration
A	1.20 mL (~1.8854 MBq) (~ 0.4910 mg a.i)	0.5 mL	-	372.64 ± 1.46 $g.L^{-1}$	3.7764 ± 0.01 $MBq.mL^{-1}$
B	1.23 mL (~1.9325 MBq) (~ 0.5033 mg a.i)	-	0.5 mL [a]	1.000 ± 0.0099 $g{\cdot}L^{-1}$	3.8389 ± 0.04 $MBq.mL^{-1}$

[a]375 times diluted with Milli-Q® water.

Dose formulation A (concentrate dose) was prepared by taking 1.20 mL of [^{14}C]-2,4-D 2-EHE stock solution in a 7 mL glass vial (to obtain the target amount of 3.7 MBq/mL of [^{14}C]-2,4-D 2-EHE). The solvent was evaporated under nitrogen gas until dry. To the same vial, an aliquot of 0.5 mL of non-labelled test item (JMD-HER 387 OD) was added and sonicated for 5 minutes in sonicator water bath and vortexed for 0.5 minutes. The prepared formulation was kept in mixing condition for overnight in incubator shaker at 20°C.

To prepare dose formulation B (field dilution), first 375 times diluted blank formulation was prepared by diluting 13.3 µL of blank formulation (placebo) to 5 mL with Milli-Q® water. Further, an aliquot of 1.23 mL of [^{14}C]-2,4-D 2-EHE stock solution (409.169 µg/mL) was taken in a 7 mL glass scintillation vial. To the same vial an aliquot of 0.054 mL of Iodosulfuron-methyl-sodium reference standard stock solution of 248.75 µg/mL concentration, which is equivalent to 13.4325 µg of Iodosulfuron-methyl-sodium was added. The solvent was evaporated under gentle N_2 flow till dry. Then, an aliquot of 0.5 mL (final volume) of 375 times diluted blank formulation was added to it and then slowly mixed in the vial by vortexing for 5 minutes. The formulation was sonicated for 5 minutes in water bath sonicator then kept in incubator shaker for overnight at 150 rpm and 20°C temperature.

Radiochemical Purity of Dose Formulations of 2,4-D 2-EHE

Dose Formulation A: An aliquot of 10 µL of the concentrate dose formulation of 2,4-D 2-EHE was diluted to 1000 µL using methanol and an aliquot of 10 µL was injected into radio-HPLC on 05.04.2023 and 11.04.2023. The radiochemical purity of [^{14}C]-2,4-D 2-EHE in concentrate dose formulation was found to be 100% on both the days. The retention time of 2,4-D 2-EHE in concentrate dose formulation was matching with that of 2,4-D 2-EHE reference standard which showed the presence and confirmation of 2,4-D 2-EHE.

Dose Formulation B: An aliquot of 15 µL of the field dilution dose formulation of 2,4-D 2-EHE was diluted to 1000 µL using methanol and an aliquot of 10 µL was injected into radio-HPLC on 08.04.2023 and 11.04.2023. The radiochemical purity of [^{14}C]-2,4-D 2-EHE in field dilution dose formulation was found to be 100% on both the days. The retention time of 2,4-D 2-EHE in field dilution dose formulation was matching with that of 2,4-D 2-EHE reference standard which showed the presence and confirmation of 2,4-D 2-EHE.

Test Concentrations and Homogeneity Check and Application

The concentration and homogeneity of [^{14}C]- 2,4-D 2-EHE in the dose formulations was checked by taking random aliquots in triplicate before dosing. For homogeneity, a coefficient of variation lower than 10% was considered sufficient. Random aliquots, in triplicate, were taken again after dose application.

Prior to dose application, the skin surface was dried, and the skin membranes were allowed to equilibrate with the receptor fluid for at least 10 min before dose application. For concentrate dose and field dilution dose formulation of 2,4-D 2-EHE, 6.7 µL of prepared dose formulation was applied on the skin surface (0.64 cm^2). As per exposed skin area (0.64 cm^2), 6.4 µL of field dose need to apply at the rate of 10 $\mu L.cm^{-2}$, however considering expected loss of material during the distribution over the skin surface, an additional 0.3 µL aliquot was added to the 6.4 µL to make final application volume to 6.7 µL.

Experiment Method

- Frozen skin samples were allowed to thaw at room temperature (25 ± 1°C) and extra fat layer was removed. The skin thickness was measured and then placed in Ringer solution for a minimum of 30 min.
- The skin membranes were mounted on In-Line Franz diffusion cells with an average exposed skin area of 0.64 cm^2 and receptor fluid pump rate was 1.8 mL/hour.
- After mounting the skin on franz cells, the skin membranes were hydrated for about 20 hours prior to start the exposure.
- The diffusion chamber and skin were maintained at a constant target temperature of 32 ± 1°C and humidity in the range of 45-61%.
- After ~ 20 hours of hydration, tritium water of 200 µL (17.2 kBq/mL) was loaded on each skin membrane then flow through receptor fluid samples were collected every hour up to 3 hours (0-1, 1-2, 2-3 hours).
- Remaining tritium water was removed from the cells and washed 3 times with 0.5 mL of Milli-Q® water and then the skin was dried with cotton swab. Membrane was kept overnight to allow wash out of the tritiated water from membrane.
- Solubility of 2,4-D 2-EHE in the receptor fluid was confirmed to be 10 times higher than the concentration of 2,4-D 2-EHE obtained in the receptor fluid of 24 hours cumulative samples at the end of the study.
- Test item dose formulation was prepared using both the radiolabel ([^{14}C]-2,4-D 2-EHE) and non-labelled test item to achieve the application concentration of 37 kBq (1 µCi) over 1 cm^2 area of skin application.
- The homogeneity of test item in the dose formulation was determined by analysing random aliquots in triplicate by LSC prior to application to skin membranes.
- Prior to dose application, the skin surface was dried, and the skin membrane was allowed to equilibrate with receptor fluid for at least 10 min.
- For the application rate of 10 $\mu L/cm^2$ (liquid formulations), an aliquot of 6.7 µL of dose formulations (concentrate and field dilution dose formulations) were applied topically to the skin membranes.
- Aliquots of receptor medium were collected automatically by the instrument at 0-1 h, 1-2 h, subsequently at 2 h intervals until 24 h post application.
- At the last sampling time point, the receptor medium was drawn out of the receptor chamber completely.
- After 8 h application, unabsorbed test item was removed from the application site using a mild soap solution (3%) followed by three rinses with water. The skin was dried with cotton swab.
- Next, donor chamber was removed from the skin surface and wiped at the bottom with a cotton swab soaked in the solvent followed by a dry cotton swab. The skin was wiped using two (1.wet cotton and 2.dry cotton swabs) cotton swabs.

- Each diffusion cell was dismantled to analyse the amount of test item in the different compartments. Receptor and donor compartments were washed with ethanol.
- Each skin membrane was tape striped 15 times using stripping technique with the help of tape stripping.
- Skin was removed and digested in tissue solubilizer (1.5 M KOH solution with 20% aqueous ethanol for 24 hrs).
- The mass balance of the test item was determined by collecting receptor fluid samples, skin wash and cotton swabs receptor compartment wash, donor compartment wash, tape strips, and digested skin.

Samples Collected for Mass Balance Evaluation

Twenty-four hours post application, the mass balance of the test item was determined by collecting receptor fluid, skin wash, receptor compartment wash, donor compartment wash, tape strips, and digested skin.

- Receptor fluid samples were collected during the following intervals for 0-1 h, 1-2 h, subsequently at 2 h intervals until 24 h post application with the help of PermeGear ILC07 automated system.
- Skin wash: After an exposure period of 8 hours, the unabsorbed test substance was removed from the application site using a mild soap solution (i.e. 3% Dove in water) followed by water wash and drying with cotton swabs.
- 24 hours after application, the diffusion cells were dismantled. Receptor and donor compartments were washed with ethanol.
- Each skin membrane was tape stripped 15 times using adhesive tapes. Tape strips were collected individually for further analysis by LSC.
- Skin membranes were digested in tissue solubilizer (1.5 M KOH solution with 20% aqueous ethanol for 24 hours).

Determination of Radioactivity

The radioactivity was determined in samples by liquid scintillation counting (LSC) using a PekinElmer Packard Tricarb 4910 TR scintillation counter.

Sample details in brief as follows:

Dose Formulation Samples:

Dose formulation samples (an aliquot of 10 µL in triplicate) were analysed before and after the application by adding 5 mL aliquot of Ultima Gold™ (scintillation liquid). After addition of Ultima Gold™, the vials were vorted and allowed to stabilize until analysis by LSC.

Receptor Fluid, Donor Chamber Wash, Receptor Chamber Wash:

A 5 mL aliquot of Ultima Gold (scintillation liquid) was directly added to the collected receptor fluid, donor chamber wash (2.0 mL ethanol), receptor chamber wash (2.0 mL ethanol) samples and vortexed for about 30 seconds. The samples were allowed to stabilize prior to analysis by LSC.

Skin Strips and Skin Membranes:

Skin stripping and skin membrane samples were digested using 2 mL of tissue solubilizer (1.5 M KOH in 20% aqueous ethanol) and vortexed for 30 seconds and allowed for about 24 hours at room temperature. After digestion, 5 mL of Ulitma Gold™ (scintillation liquid) was added and allowed to stabilize prior to analysis by LSC.

Skin Washing Samples with Water, Soap Wash and Cotton Swabs:

Skin washing samples with water, soap wash and cotton swabs collected at 8 h were added with 2 mL of methanol to solubilize the test item. Ultima Gold™ (5 mL) was added and vortexed the samples for about 30 seconds. The samples were allowed to stabilize for about 30 minutes prior to analysis by LSC.

The Ultima Gold™ was added to the blank receptor fluid sample and considered as negative control or blank samples.

HPLC Analysis of 2,4-D 2-EHE

Instrument	:	Shimadzu Prominence LC-20AD liquid chromatograph
Column	:	Inertsil ODS 3V, [250 mm × 4.6 mm I.D, 5µm]
Column Oven temperature	:	30°C
Sample Temperature	:	15°C
Mobile Phase A	:	0.1% Formic acid in Milli-Q® water
Mobile Phase B	:	Acetonitrile
Mobile Phase Gradient	:	80:20% v/v
Flow Rate	:	1.0 mL/min
Scint Flow	:	Active Counting Mode (ACM)
Run Time	:	10 mins
Detector	:	Photo diode array at 280 nm equipped with a radiochemical detector (B-RAM, model: 5C)

Calculation and Interpretation of the Results

The cumulative absorption of the test substance equivalents was calculated from the receptor fluid samples by the following equation:

Cumulative DPMT=DPMT +(DPMT-1…….DPM_1)
DPMT: radioactivity at sampling time T
DPMT-1: radioactivity at the sampling time preceding T
DPM_1: radioactivity at the first sampling time
For each receptor fluid sample, background values were subtracted.

The Permeability coefficient or Kp value for tritiated ($cm.h^{-1}$) was calculated as follows:

$$Kp = \text{flux constant } [\mu g.cm^{-2}.h^{-1}] / \text{applied concentration } [\mu g.cm^{-3}]$$

Using the program Microsoft excel, the slope and intercept of the virtual line through the linear portion of the absorption curve was calculated. A straight line was mathematically represented by the formula "y=slope × X + intercept", in which 'y' represents the cumulative absorption and 'x' represents time.
This formula was used to calculate the maximal flux and the lag time from the mean values of the skin preparations.

Maximal flux = slope
Lag time = -intercept/slope

For each replicate and test group, the following data was calculated:

- Percentage of the applied dose reaching the receptor fluid.
- Amount of the test substance reaching the receptor fluid.
- t0.5 Calculation: the mean relative permeation into the receptor fluid at 12 hour of sampling, amount that has permeated at the end of sampling over 24 hours.

$$t0.5 = 100\% \times \sum_{i=1}^{n} \frac{RF12_i}{RF24_i} \times \frac{1}{n}$$

Where, n = number of valid replicates

RF = Receptor fluid
RF12 = Receptor fluid 12 hours
RF24 = Receptor fluid 24 hours

- Recovery of the test substance (% of applied dose) in each compartment.
- Mass balance of the test substance.
- The total absorption (absorbed dose): the amount of compound-related radioactivity present in the receptor fluid, the receptor compartment wash, and the skin (excluding tape strips).
- The potentially absorbed dose: the amount of compound-related radioactivity present in the receptor fluid, the receptor compartment wash, the skin, and the stratum corneum (except for the first 2 tape strips).
- For the potentially absorbed dose the standard deviation was multiplied with the factor described in the EFSA Guidance on Dermal Absorption (2017) and added to the mean.
- Limits of detection (LOD) for radioactivity in receptor fluid and tape strip samples were used if the radioactivity in the measured sample was below LOD. The LOD was calculated according to the following formula:

$$LOD = \frac{(\sqrt{(\text{Counting efficiency} \times \text{average background} \times \text{counting time})}/\text{Counting time})}{(\text{Counting efficiency} \times 3 + \text{average background})}$$

where the counting efficiency was >90% (0.9) and the counting time was at least 2 min.

Results and discussions

Dermal Absorption Data Summary

Parameters	**Concentrate Dose Formulation (A)**		**Field Dilution Dose Formulation (B)**	
Concentration measured	372.64 ± 1.46 g.L^{-1}		1.000 ± 0.0099 g.L^{-1}	
Dose (µg.cm^{-2})	3726.35 ± 14.55		10.00 ± 0.099	
Replicate	8		8	
Penetration into the receptor fluid after 24h	µg.cm^{-2}	% of dose	µg.cm^{-2}	% of dose
	9.6800 ± 1.8821	0.27 ± 0.05	0.1470 ± 0.0163	1.88 ± 0.19
Maximal flux [µg.cm^{-2}.h^{-1}] Lag time [h]	0.4583 ± 0.0680 0.25 ± 0.06		0.0025 ± 0.0006 0.34 ± 0.16	
Absorbed dose [% of dose][a]	2.25 ± 0.37		6.09 ± 0.51	
Potentially absorbed dose [% of applied dose][b,c]	2.57 ± 0.40 (**2.9**)[d]		8.14 ± 0.38 (**8.5**)[d]	

[a]The absorbed dose is defined as the amount in the receptor fluid, the receptor compartment wash and skin membrane, excluding tape strips
[b] The potentially absorbed dose is defined as the amount in the receptor fluid, the receptor compartment wash, the skin and *stratum corneum* (*except* for the first two tape strips)
[c] For risk assessment, in agreement with the EFSA Guidance on Dermal Absorption (2017), since less than 75% of the absorption in the receptor fluid occurred within half the study duration, it is considered appropriate to include all tape strips (except for the first 2 tape strips) in the calculations of the total absorption values (*i.e.* the potentially absorbed dose).
[d] Approach based on the EFSA Guidance on Dermal Absorption (mean + 0.84 × SD).

Integrity of Skin Membranes

Prior to the determination of the percutaneous absorption of 2,4-D 2-EHE, the permeation coefficient (Kp) for tritiated water was determined in human skin membranes. The skin membranes with Kp values below the cut off value of 2.5×10-3 cm.h-1 were considered for the study.

Receptor Fluid Solubility

The solubility of 2,4-D 2-EHE was performed in receptor fluid (Ethanol: Milli-Q® water supplemented with 0.01% sodium azide, pH *ca.* 7.2). The solubility was tested by determining the radiolabeled 2,4-D 2-EHE in the receptor fluid and it was found to be 95.93 ± 2.98 $\mu g.mL^{-1}$. The maximum absorption of 2,4-D 2-EHE in the receptor fluid was 13.1516 µg (i.e, for donor H-1 replicate 2 of concentrate dose) in *ca.* 40 mL over 24 h, i.e. 0.3288 $\mu g.mL^{-1}$.

Since the receptor fluid solubility during the study appeared to be more than 10-fold higher than the required solubility of 2,4-D 2-EHE, the solubility in the receptor fluid was considered more than sufficient.

Furthermore, in the flow-through cells used, the volume of the receptor fluid in the receptor chamber beneath the skin was *ca.* 0.2 mL, which at a flow rate of *ca.* 1.8 $mL.h^{-1}$, was replenished continuously (9 times per hour). Thus, it was assured that the rate of diffusion into the receptor fluid did not become a rate-limiting step (i.e. sink conditions were maintained).

Percutaneous Absorption of 2,4-D 2-EHE

The radiochemical purity of [^{14}C]-2,4-D 2-EHE in stock was found to be 100%. The radiochemical purity of concentrate dose formulation and field dilution dose formulation was found to be 100% on both the days of analysis.

The homogeneity of [^{14}C]-2,4-D 2-EHE in the dose preparations was determined and the coefficients of variation (CV) was found to be 0.39% for concentrate dose formulation A and 0.99% for field dilution dose formulation B. The values of coefficient of variation were within the acceptance criteria of ≤10%.

The dermal absorption data are summarized in table above.

The mean absorption of 2,4-D 2-EHE for the concentrate dose into the receptor fluid over the 24 hours duration was 9.6800 ± 1.8821 $\mu g.cm^{-2}$, representing 0.27 ± 0.05% of the applied dose. The mean maximal flux for the absorption of fluid of through human skin was 0.4583 ± 0.0680 $\mu g.cm^{-2}.h^{-1}$ and the mean lag time was 0.25 ± 0.06 hour.

The mean absorption for field dilution into the receptor fluid after 24 hours was 0.1470 ± 0.0163 $\mu g.cm^{-2}$, representing 1.88 ± 0.19% of the applied dose. The mean maximal flux through human skin was 0.0025 ± 0.0006 $\mu g.cm^{-2}.h^{-1}$ and the mean lag time was 0.34 ± 0.16 hour.

The mean total absorption, defined as the compound-related radioactivity present in the receptor fluid, the receptor compartment wash and the skin membranes (excluding tape strips) were 2.25 ± 0.37% (concentrate dose) and 6.09 ± 0.51% (field dilution) of the applied dose. The mean potentially absorbed dose, which is defined as the compound-related radioactivity present in the receptor fluid, the receptor compartment wash, the skin membranes and the stratum corneum (except for the first 2 tape strips) was 2.57 ± 0.40% (concentrate dose) and 8.14 ± 0.38 % (field dilution) of the applied dose.

The mean recovery of 2,4-D 2-EHE in human skin was 98.54 ± 1.62% and 99.39 ± 2.54% for the concentrate dose and field dilution, respectively.

Less than 75 % of the absorption of 2,4-D 2-EHE in the receptor fluid over 24 hours occurred within half of the study duration (i.e., 12 hours) for both the concentrate dose ($t_{0.5}$ = 45.02 ± 4.41) and the field dilution ($t_{0.5}$ = 37.10 ± 4.33).

For risk assessment, in agreement with the EFSA Guidance on Dermal Absorption (2017), it is considered appropriate to include the tape strips (except the first two tape strips) in the calculations of the total absorption values (i.e., the potentially absorbed dose).

Based on the EFSA Guidance on Dermal Absorption (2017), the absorption values were corrected to account for variability. Based on the number of replicates, a multiplication of standard deviation was added to the mean value (i.e., 0.84 for 8 replicates). The potentially absorbed dose values thus calculated are 2.9% and 8.5% for the concentrate dose and field dilution dose formulation of 2,4-D 2-EHE, respectively.

Conclusion/endpoint:

2,4-D 2-EHE in the test item JMD-HER 387 OD was tested for the skin diffusion using franz cells automated diffusion system with human skin. Diffusion was quantified in terms of radioactive units (DPM).

A concentrated dose (372.64 $g.L^{-1}$) was tested and the mean total recovery of radioactivity was found to be 98.54%, validating the results obtained. **The absorption value for 2,4-D 2-EHE was 2.57 ± 0.40%, after rounding and taking into account the correction for variability, the final value was calculated to be 2.9%, according to the EFSA Guidance on Dermal Absorption (2017).**

In addition, a field dilution (1.000 $g.L^{-1}$) was tested and the mean total recovery of radioactivity was found to be 99.39%, validating the results obtained. **The absorption value for 2,4-D 2-EHE was 8.14 ± 0.38 %, after rounding and taking into account the correction for variability, the final value was calculated to be 8.5%, according to EFSA Guidance on Dermal Absorption (2017).**

A 2.11 Other/Special Studies

No other/special studies were submitted.

Appendix 3 Exposure calculations

A 3.1 Operator exposure calculations (KCP 7.2.1.1)

A 3.1.1 Calculations for 2,4D

Table A 1: Input parameters considered for the estimation of operator exposure

Formulation type	OD		Crop type	Cereals
Application rate (AR)	0.25	kg a.s./ha	Application method	Downward spraying
Area treated per day (A)	50	ha	Application equipment	Vehicle-mounted
Dermal absorption (DA)	2.9	% (concentr.)	Indoor/outdoor	Outdoor
	8.5	% (dilution)	Closed cabin	No
Inhalation absorption (IA)	100	%	Drift reduction	No
Body weight (BW)	60	kg/person	Cultivation	Normal
AOEL	0.02	mg/kg bw/d	Water soluble bag	No
AAOEL	-	mg/kg bw/d	-	-

Table A 2: Estimation of long-term operator exposure towards active substance according to EFSA guidance

Operator exposure for JMD-HER 387 OD outdoor spray applications

Application rate of active substance	0,25 kg a.s./ha	*i_AppRate*
Assumed area treated	50 ha/day	*d_AreaTreated*
Amount of active substance applied	12,5 kg a.s./day	*i_AmoutAS*
Dermal absorption of the product	2,90%	*i_AbsorpProduct*
Dermal absorption of in-use dilution	8,50%	*i_AbsorInuse*
Formulation type	Soluble concentrates, emulsifiable concentrate, etc.	
Indoor or Outdoor application	Outdoor	
Application method	Downward spraying	
Application equipment	Vehicle-mounted	
Season	not relevant	

OutdoorSoluble concentrates, emulsifiable concentrate, etc.Downward sprayingVehicle-mounted

	Exposure values	µg exposure/day mixed and loaded 75th centile	95th centile	Reference	Comment
Mixing and loading	Hands	33946	127188	AOEM	
	Body	21056	150023	AOEM	
	Head	649	3557	AOEM	
	Protected hands (gloves)	178	2476	AOEM	
	Protected body (workwear or protective garment and sturdy footwear)	223	1828	AOEM	
	Protected head (hood and face shield)	10	201	AOEM	
	Inhalation	8	30	AOEM	
	Protective Equipment	Select for inclusion		Penetration factor	Inhalation Protection factor
	Gloves	No			
	Clothing	Work wear - arms, body and legs covered		Incl. in AOEM model	
	Head and respiratory PPE	None		1	1
	Water soluble bag	No		1	

	Exposure values	µg exposure/day applied 75th centile	95th centile	Reference	Comment
Application	Hands	1854	14573	AOEM	
	Body	1037	5344	AOEM	
	Head	49	148	AOEM	
	Protected hands (gloves)	167	4475	AOEM	
	Protected body (workwear or protective garment and sturdy footwear)	28	70	AOEM	
	Inhalation	4	12	AOEM	
	Protective Equipment	Select for inclusion		Penetration factor	Inhalation Protection factor
	Gloves	No			
	Clothing	Work wear - arms, body and legs covered		Incl. in AOEM model	
	Head and respiratory PPE	None		1	1
	Closed cab	No		vehicle mounted upward spraying only	

1. Total

	Without RPE/PPE	With RPE/PPE	
Longer term			
Total systemic exposure from mixing, loading and application (mg a.s./day)	1,8752800	1,1854164	
Total systemic exposure from mixing, loading and application per kg body weight (mg/kg bw/day)	0,0312547	0,0197569	
% of RVNAS	156,27%	98,78%	

Operator exposure for JMD-HER 387 OD outdoor spray applications

Application rate of active substance	0,25 kg a.s./ha		*i_AppRate*
Assumed area treated	50 ha/day		*d_AreaTreated*
Amount of active substance applied	12,5 kg a.s./day		*i_AmoutAS*
Dermal absorption of the product	2,90%		*i_AbsorpProduct*
Dermal absorption of in-use dilution	8,50%		*i_AbsorInuse*
Formulation type	Soluble concentrates, emulsifiable concentrate, etc.		
Indoor or Outdoor application	Outdoor		
Application method	Downward spraying		
Application equipment	Vehicle-mounted		
Season	not relevant		

OutdoorSoluble concentrates, emulsifiable concentrate, etc.Downward sprayingVehicle-mounted

	Exposure values	µg exposure/day mixed and loaded		Reference	Comment
		75th centile	95th centile		
Mixing and loading	Hands	33946	127188	AOEM	
	Body	21056	150023	AOEM	
	Head	649	3557	AOEM	
	Protected hands (gloves)	178	2476	AOEM	
	Protected body (workwear or protective garment and sturdy footwear)	223	1828	AOEM	
	Protected head (hood and face shield)	10	201	AOEM	
	Inhalation	8	30	AOEM	
	Protective Equipment	Select for inclusion		Penetration factor	Inhalation Protection factor
	Gloves	Yes		Incl. in AOEM model	
	Clothing	Work wear - arms, body and legs covered		Incl. in AOEM model	
	Head and respiratory PPE	None		1	1
	Water soluble bag	No		1	

	Exposure values	µg exposure/day applied		Reference	Comment
		75th centile	95th centile		
Application	Hands	1854	14573	AOEM	
	Body	1037	5344	AOEM	
	Head	49	148	AOEM	
	Protected hands (gloves)	167	4475	AOEM	
	Protected body (workwear or protective garment and sturdy footwear)	28	70	AOEM	
	Inhalation	4	12	AOEM	
	Protective Equipment	Select for inclusion		Penetration factor	Inhalation Protection factor
	Gloves	Yes		Incl. in AOEM model	
	Clothing	Work wear - arms, body and legs covered		Incl. in AOEM model	
	Head and respiratory PPE	None		1	1
	Closed cab	No		vehicle mounted upward spraying only	

1. Total

	Without RPE/PPE	With RPE/PPE	
Longer term			
Total systemic exposure from mixing, loading and application (mg a.s./day)	1,8752800	0,0627413	
Total systemic exposure from mixing, loading and application per kg body weight (mg/kg bw/day)	0,0312547	0,0010457	
% of RVNAS	156,27%	5,23%	

A 3.1.2 Calculations for iodosulfuron-methyl-sodium

A 3.1.3 Calculations iodosulfuron-methyl-sodium

Table A 3: Input parameters considered for the estimation of operator exposure

Formulation type	OD		Crop type	Cereals
Application rate (AR)	0.01	kg a.s./ha	Application method	Downward spraying
Area treated per day (A)	50	ha	Application equipment	Vehicle-mounted
Dermal absorption (DA)	70	% (concentr.)	Indoor/outdoor	Outdoor
	70	% (dilution)	Closed cabin	No
Inhalation absorption (IA)	100	%	Drift reduction	No
Body weight (BW)	60	kg/person	Cultivation	Normal
AOEL	0.05	mg/kg bw/d	Water soluble bag	No
AAOEL	-	mg/kg bw/d	-	-

Table A 4: Estimation of long-term operator exposure towards active substance according to EFSA guidance

Operator exposure for JMD-HER 387 OD outdoor spray applications

Application rate of active substance	0,01 kg a.s./ha	*i_AppRate*
Assumed area treated	50 ha/day	*d_AreaTreated*
Amount of active substance applied	0,5 kg a.s./day	*i_AmoutAS*
Dermal absorption of the product	70,00%	*i_AbsorpProduct*
Dermal absorption of in-use dilution	70,00%	*i_AbsorInuse*
Formulation type	Soluble concentrates, emulsifiable concentrate, etc.	
Indoor or Outdoor application	Outdoor	
Application method	Downward spraying	
Application equipment	Vehicle-mounted	
Season	not relevant	

OutdoorSoluble concentrates, emulsifiable concentrate, etc.Downward sprayingVehicle-mounted

	Exposure values	µg exposure/day mixed and loaded 75th centile	95th centile	Reference	Comment
Mixing and loading	Hands	2849	10374	AOEM	
	Body	2191	58887	AOEM	
	Head	26	142	AOEM	
	Protected hands (gloves)	22	99	AOEM	
	Protected body (workwear or protective garment and sturdy footwear)	13	73	AOEM	
	Protected head (hood and face shield)	0	8	AOEM	
	Inhalation	3	28	AOEM	
	Protective Equipment	Select for inclusion		Penetration factor	Inhalation Protection factor
	Gloves	No			
	Clothing	Work wear - arms, body and legs covered		Incl. in AOEM model	
	Head and respiratory PPE	None		1	1
	Water soluble bag	No		1	

	Exposure values	µg exposure/day applied 75th centile	95th centile	Reference	Comment
Application	Hands	74	1379	AOEM	
	Body	41	214	AOEM	
	Head	2	6	AOEM	
	Protected hands (gloves)	29	3074	AOEM	
	Protected body (workwear or protective garment and sturdy footwear)	1	3	AOEM	
	Inhalation	1	2	AOEM	
	Protective Equipment	Select for inclusion		Penetration factor	Inhalation Protection factor
	Gloves	No			
	Clothing	Work wear - arms, body and legs covered		Incl. in AOEM model	
	Head and respiratory PPE	None		1	1
	Closed cab	No		vehicle mounted upward spraying only	

1. Total

	Without RPE/PPE	With RPE/PPE	
Longer term			
Total systemic exposure from mixing, loading and application (mg a.s./day)	3,6321716	2,0789430	
Total systemic exposure from mixing, loading and application per kg body weight (mg/kg bw/day)	0,0605362	0,0346491	
% of RVNAS	121,07%	69,30%	

Operator exposure for JMD-HER 387 OD outdoor spray applications

Application rate of active substance	0,01 kg a.s./ha		*i_AppRate*
Assumed area treated	50 ha/day		*d_AreaTreated*
Amount of active substance applied	0,5 kg a.s./day		*i_AmoutAS*
Dermal absorption of the product	70,00%		*i_AbsorpProduct*
Dermal absorption of in-use dilution	70,00%		*i_AbsorInuse*
Formulation type	Soluble concentrates, emulsifiable concentrate, etc.		
Indoor or Outdoor application	Outdoor		
Application method	Downward spraying		
Application equipment	Vehicle-mounted		
Season	not relevant		

OutdoorSoluble concentrates, emulsifiable concentrate, etc.Downward sprayingVehicle-mounted

Mixing and loading

Exposure values	µg exposure/day mixed and loaded 75th centile	95th centile	Reference	Comment
Hands	2849	10374	AOEM	
Body	2191	58887	AOEM	
Head	26	142	AOEM	
Protected hands (gloves)	22	99	AOEM	
Protected body (workwear or protective garment and sturdy footwear)	13	73	AOEM	
Protected head (hood and face shield)	0	8	AOEM	
Inhalation	3	28	AOEM	
Protective Equipment	Select for inclusion		Penetration factor	Inhalation Protection factor
Gloves	Yes		Incl. in AOEM model	
Clothing	Work wear - arms, body and legs covered		Incl. in AOEM model	
Head and respiratory PPE	None		1	1
Water soluble bag	No		1	

Application

Exposure values	µg exposure/day applied 75th centile	95th centile	Reference	Comment
Hands	74	1379	AOEM	
Body	41	214	AOEM	
Head	2	6	AOEM	
Protected hands (gloves)	29	3074	AOEM	
Protected body (workwear or protective garment and sturdy footwear)	1	3	AOEM	
Inhalation	1	2	AOEM	
Protective Equipment	Select for inclusion		Penetration factor	Inhalation Protection factor
Gloves	Yes		Incl. in AOEM model	
Clothing	Work wear - arms, body and legs covered		Incl. in AOEM model	
Head and respiratory PPE	None		1	1
Closed cab	No		vehicle mounted upward spraying only	

1. Total

	Without RPE/PPE	With RPE/PPE	
Longer term			
Total systemic exposure from mixing, loading and application (mg a.s./day)	3,6321716	0,0687801	
Total systemic exposure from mixing, loading and application per kg body weight (mg/kg bw/day)	0,0605362	0,0011463	
% of RVNAS	121,07%	2,29%	

A 3.2 Worker exposure calculations (KCP 7.2.3.1)

A 3.2.1 Calculations for 2,4-D

Table A 5: Input parameters considered for the estimation of worker exposure

Intended use(s)	Cereals, inspection, irrigation/outdoor		Dislodgeable foliar residue (DFR)	3	µg/cm²/kg a.s./ha
Application rate (AR)	0.25	kg a.s./ha	Dermal absorption (DA)	8.5	% (worst case)
Number of applications (NA)	1		Inhalation absorption (IA)	100	%
Interval between applications	NA	days	Work rate per day (WR)	2	h/d
Half-life of active substance	30	days	TC dermal (potential)	12500	cm²/h
Multiple application factor (MAF)	NA		TC dermal (work wear)	1400	cm²/h
Body weight (BW)	60	kg/person	TC dermal (work wear, gloves)	NA	cm²/h
AOEL	0.02	mg/kg bw/d	Task specific factor inhalation	NA	ha/h x 10^{-3}
AAOEL	-	mg/kg bw/d	-	-	-

Table A 6: Estimation of acute worker exposure towards active substance according to EFSA guidance

Worker exposure from residues on foliage for JMD-HER 387 OD

Crop type	Cereals		
Indoor or outdoor	Outdoor		
Application method	Downward spraying		
Application equipment	Vehicle-mounted		
Worker's task	Inspection, irrigation		
Main body parts in contact with foliage	Hand and body		
Application rate of active substance	0,25	kg a.s./ha	*i_AppRate*
Number of applications	1		*i_AppNo*
Interval between multiple applications	365	days	*i_AppInt*
Half-life of active substance	30	days	*d_HalflifeAS*
Multiple application factor	1,0		*d_MAF*
Dermal absorption of the product	2,90%		*i_AbsorpProduct*
Dermal absorption of the in-use dilution	8,50%		*i_AbsorpInuse*
Dislodgeable foliar residue (i_AppRate*i_DFR)	0,75	µg a.s./cm²	*d_DFR*
Working hours	2	hr	*d_WorkHr*
Dermal transfer coefficient - Total potential exposure	12500	cm²/hr	*d_DermTcUCV*
Dermal transfer coefficient - arms, body and legs covered	1400	cm²/hr	*d_DermTcCV1*
Dermal transfer coefficient - hands, arms, body and legs covered	no TC available for this assessment	cm²/hr	*d_DermTcCV2*
Inhalation transfer coefficient for automated applications	NA	ha/hr*10^(-3)	*d_InhalTcAut*
Inhalation transfer coefficient for cutting ornamentals	NA	ha/hr*10^(-3)	*d_InhalTcCut*
Inhalation transfer coefficient for sorting / bundling ornamentals	NA	ha/hr*10^(-3)	*d_InhalTcSort*

1. Total

	Potential exposure	Work wear - arms, body and legs covered	Working wear and gloves	Comments
Total systemic exposure (mg a.s./day)	1,5937500	0,1785000	no TC available for this assessment	
Total systemic exposure per kg body weight (mg/kg bw/day)	0,0265625	0,0029750		
% of RVNAS	132,81%	14,88%		

2. Details

	Systemic exposure [mg a.s. /day]	Systemic exposure [mg a.s./kg bw/day]	Formula	Comments
Dermal - Potential	1,5937500	0,0265625	*d_DermTcUCV*d_WorkHr*i_DFR*i_MAF/1000*i_AbsorpInuse*	
Dermal - Work wear - arms, body and legs covered	0,1785000	0,0029750	*d_DermTcCV1*d_WorkHr*d_DFR*d_MAF/1000*i_AbsorpInuse*	
Dermal - Working wear and gloves	no TC available for this assessment		*d_DermTcCV2*d_WorkHr*d_DFR*d_MAF/1000*i_AbsorpInuse*	
Inhalation				Na for outdoor activities

WORKER EXPOSURE			EUROPOEM II MODEL	
form	JMD-HER 387 OD		Re-entry in the field	
a.s.	2,4-D			
Parameter		**Value**	**Unit**	**References, comments**
Re-entry activities in the field				
AR	Application rate	0,25	kg a.s./ha	summary of intended uses
Worker				
Duration				
T		2	hours / day	default: 6 h (Europoem II)
Inhalation Exposure				w ithout PPE
	no model available	-		
Dermal Exposure				
DFR	Dislodgeable foliar residue	30	mg a.s./m2/kg a.s./ha	default (Europoem II)
TC	Transfer coefficient	0,15	m2/ hour	vegetable (field): 0.25; ornamentals: 0.5; small fruit: 0.3; large fruit: 0.45 (Europoem II)
Dermal Exposure		**2,25**	mg a.s./ day	DE = DFR x AR x TC x T
Internal exposure				
DA	Dermal Absorption	8,5	%	
	PPE-factor dermal	5		gloves*
	AOEL	1,2	mg a.s./ day	based on 60 kg bw
		Without PPE	**With PPE**	
	Internal exposure	[mg a.s./ day]	[mg a.s./ day]	
	Inhalation	-	-	no model available
	Dermal	0,191	0,038	DE(int) = DE x (DA/100)
	Total	**0,191**	**0,038**	**sum**
	% AOEL			
	Inhalation	-	-	no model available
	Dermal	16	3	%AOEL = 100 x DE(int) / AOEL
	Total	**16**	**3**	**sum**

* It is assumed in the used TC values, that body exposure is already reduced by (protective) clothing. The use of gloves will result in an extra reduction factor of 5.

A 3.2.2 Calculations for iodosulfuron-methyl-sodium

Table A 7: Input parameters considered for the estimation of worker exposure

Intended use(s)	Cereals, inspection, irrigation/outdoor		Dislodgeable foliar residue (DFR)	3	µg/cm²/kg a.s./ha
Application rate (AR)	0.01	kg a.s./ha	Dermal absorption (DA)	70	% (worst case)
Number of applications (NA)	1		Inhalation absorption (IA)	100	%
Interval between applications	NA	days	Work rate per day (WR)	2	h/d
Half-life of active substance	30	days	TC dermal (potential)	12500	cm²/h
Multiple application factor (MAF)	NA		TC dermal (work wear)	1400	cm²/h
Body weight (BW)	60	kg/person	TC dermal (work wear, gloves)	NA	cm²/h
AOEL	0.05	mg/kg bw/d	Task specific factor inhalation	NA	ha/h x 10^{-3}
AAOEL	-	mg/kg bw/d	-	-	-

Table A 8: Estimation of acute worker exposure towards active substance according to EFSA guidance

Worker exposure from residues on foliage for JMD-HER 387 OD

Crop type	Cereals		
Indoor or outdoor	Outdoor		
Application method	Downward spraying		
Application equipment	Vehicle-mounted		
Worker's task	Inspection, irrigation		
Main body parts in contact with foliage	Hand and body		
Application rate of active substance	0,01	kg a.s./ha	*i_AppRate*
Number of applications	1		*i_AppNo*
Interval between multiple applications	365	days	*i_AppInt*
Half-life of active substance	30	days	*d_HalflifeAS*
Multiple application factor	1,0		*d_MAF*
Dermal absorption of the product	70,00%		*i_AbsorpProduct*
Dermal absorption of the in-use dilution	70,00%		*i_AbsorpInuse*
Dislodgeable foliar residue (i_AppRate*i_DFR)	0,03	µg a.s./cm²	*d_DFR*
Working hours	2	hr	*d_WorkHr*
Dermal transfer coefficient - Total potential exposure	12500	cm²/hr	*d_DermTcUCV*
Dermal transfer coefficient - arms, body and legs covered	1400	cm²/hr	*d_DermTcCV1*
Dermal transfer coefficient - hands, arms, body and legs covered	no TC available for this assessment	cm²/hr	*d_DermTcCV2*
Inhalation transfer coefficient for automated applications	NA	ha/hr*10^(-3)	*d_InhalTcAut*
Inhalation transfer coefficient for cutting ornamentals	NA	ha/hr*10^(-3)	*d_InhalTcCut*
Inhalation transfer coefficient for sorting / bundling ornamentals	NA	ha/hr*10^(-3)	*d_InhalTcSort*

1. Total

	Potential exposure	Work wear - arms, body and legs covered	Working wear and gloves	Comments
Total systemic exposure (mg a.s./day)	0,5250000	0,0588000	no TC available for this assessment	
Total systemic exposure per kg body weight (mg/kg bw/day)	0,0087500	0,0009800		
% of RVNAS	17,50%	1,96%		

2. Details

	Systemic exposure [mg a.s. /day]	Systemic exposure [mg a.s./kg bw/day]	Formula	Comments
Dermal - Potential	0,5250000	0,0087500	*d_DermTcUCV*d_WorkHr*i_DFR*i_MAF/1000*i_AbsorpInuse*	
Dermal - Work wear - arms, body and legs covered	0,0588000	0,0009800	*d_DermTcCV1*d_WorkHr*d_DFR*d_MAF/1000*i_AbsorpInuse*	
Dermal - Working wear and gloves	no TC available for this assessment		*d_DermTcCV2*d_WorkHr*d_DFR*d_MAF/1000*i_AbsorpInuse*	
Inhalation				Na for outdoor activities

WORKER EXPOSURE			EUROPOEM II MODEL	
form	JMD-HER 387 OD		Re-entry in the field	
a.s.	Iodosulfuron-methyl-sodium			
Parameter		**Value**	**Unit**	**References, comments**
Re-entry activities in the field				
AR	Application rate	0,01	kg a.s./ha	summary of intended uses
Worker				
Duration				
T		2	hours / day	default: 6 h (Europoem II)
Inhalation Exposure				without PPE
	no model available	-		
Dermal Exposure				
DFR	Dislodgeable foliar residue	30	mg a.s./m2/kg a.s./ha	default (Europoem II)
TC	Transfer coefficient	0,15	m2/ hour	vegetable (field): 0.25; ornamentals: 0.5; small fruit: 0.3; large fruit: 0.45 (Europoem II)
Dermal Exposure		**0,09**	mg a.s./ day	DE = DFR x AR x TC x T
Internal exposure				
DA	Dermal Absorption	70	%	
	PPE-factor dermal	5		gloves*
	AOEL	3	mg a.s./ day	based on 60 kg bw
		Without PPE	**With PPE**	
	Internal exposure	[mg a.s./ day]	[mg a.s./ day]	
	Inhalation	-	-	no model available
	Dermal	0,063	0,013	DE(int) = DE x (DA/100)
	Total	**0,063**	**0,013**	**sum**
	% AOEL			
	Inhalation	-	-	no model available
	Dermal	2	0	%AOEL = 100 x DE(int) / AOEL
	Total	**2**	**0**	**sum**

* It is assumed in the used TC values, that body exposure is already reduced by (protective) clothing. The use of gloves will result in an extra reduction factor of 5.

A 3.3 Resident and bystander exposure calculations (KCP 7.2.2.1)

A 3.3.1 Calculations for 2,4-D

Table A 9: Input parameters considered for the estimation of longer term resident exposure

Resident exposure for JMD-HER 387 OD			
Croptype	Cereals		
Application method	Downward spraying		
Application equipment	Vehicle-mounted		*i_AppEquip*
Formulation type	Soluble concentrates, emulsifiable concentrate, etc.		*i_FormVal*
Buffer strip	2-3	m	*i_Buffer*
Application rate of the product	0,25	kg a.s./ha	*i_AppRate*
Concentration of active substance (in-use dilution for liquid applications)	1,25	g a.s./l	*d_ConcAS*
Dermal absorption of product	2,90%		*i_AbsorpProduct*
Dermal absorption of in-use dilution	8,50%		*i_AbsorpInuse*
Oral absorption	100,00%		*i_AbsorpOralInuse*
Dislodgeable foliar residue (i_AppRate*i_DFR)	0,75	µg a.s./cm^2	*d_DFR*
Vapour pressure of in-use dilution	low volatile substances having a vapour pressure of <5*10-3Pa	Pa	*i_Volat*
Concentration in air	0,001	mg/m^3	*d_AirCon*
Resident dermal spray drift exposure 75th percentile - adult	0,47	ml spray dilution/person	
Resident dermal spray drift exposure 75th percentile - child	0,327	ml spray dilution/person	
Resident inhal. spray drift exposure 75th percentile - adult	0,00010	ml spray dilution/person	
Resident inhal. spray drift exposure 75th percentile - child	0,00022	ml spray dilution/person	
Resident dermal spray drift exposure mean - adult	0,22318	ml spray dilution/person	
Resident dermal spray drift exposure mean - child	0,18	ml spray dilution/person	
Resident inhal. spray drift exposure mean - adult	0,00009	ml spray dilution/person	
Resident inhal. spray drift exposure mean - child	0,00017	ml spray dilution/person	
Exposure duration dermal	2	hours	*d_ReExpDur*
Exposure duration inhalation	24	hours	*d_ReExpDurInhal*
Exposure duration entry into treated crops	0,25	hours	*d_ExpDurTreatCrop*
Light clothing adjustment factor	18,0%		*d_ClothAF*
Breathing rate adult	0,23	m^3/day/kg	*d_BreathRAd*
Breathing rate child (1-3 year old)	1,07	m^3/day/kg	*d_BreathRCh*
Drift percentage on surface (75th percentile)	5,60%		
Drift percentage on surface (mean)	4,10%		
Turf transferable residues percentage	5,00%		*d_Turf*
Transfer coeff. of surface deposits-adult	7300	cm^2/hour	*d_ReTCAd*
Transfer coeff. of surface deposits-child (1-3 year old)	2600	cm^2/hour	*d_ReTCCh*
Saliva extraction percentage	50,00%		*d_SalExt*
Surface area of hands mouthed	20	cm^2	*d_AreaHM*
Frequency of hand to mouth activity	9,5	events/hour	*d_ReFreqHM*
Ingestion rate for mouthing of grass per day	25	cm^2	*d_MouthGrass*
Dislodgeable residues percentage transferability for object to mouth	20,00%		*d_DRP*
Transfer coefficient for entry into treated crops (75th percentile) - ad	7500	cm^2/h	*d_TcEntryAd*
Transfer coefficient for entry into treated crops (75th percentile) - chi	2250	cm^2/h	*d_TcEntryCh*
Transfer coefficient for entry into treated crops (mean) - adult	5980	cm^2/h	*d_TcEntryAd*
Transfer coefficient for entry into treated crops (mean) - child	1794	cm^2/h	*d_TcEntryCh*

Table A 10: Estimation of longer term resident exposure towards 2,4-D according to EFSA guidance

1. Total

1.1 1-3 year old child

	Spray drift (75th percentile)	Vapour (75th percentile)	Surface deposits (75th percentile)	Entry into treated crops (75th percentile)	All pathways (mean)
Total systemic exposure (mg a.s./day)	0,0287649	0,0107000	0,0051240	0,0358594	0,0589384
Total systemic exposure per kg body weight (mg/kg bw/day)	0,0028765	0,0010700	0,0005124	0,0035859	0,0058938
% of RVNAS	14,38%	5,35%	2,56%	17,93%	29,47%

1.2 Adult

	Spray drift	Vapour	Surface deposits	Entry into treated crops	All pathways (mean)
Total systemic exposure (mg a.s./day)	0,0410738	0,0138000	0,0086870	0,1195313	0,1350234
Total systemic exposure per kg body weight (mg/kg bw/day)	0,0006846	0,0002300	0,0001448	0,0019922	0,0022504
% of RVNAS	3,42%	1,15%	0,72%	9,96%	11,25%

2. Resident exposure 75th Percentile

	Systemic exposure [mg a.s. /day]	Systemic exposure [mg a.s./kg bw/day]	Formula	Comments
1-3 year old child				
Spray drift	0,0287649	0,0028765	*((C16*i_AbsorpInuse*(1-d_ClothAF))+C18)*d_ConcAS*	
Vapour	0,0107000	0,0010700	*d_AirCon*d_BreathRCh*d_BwChild*	
Surface deposits				
Dermal	0,0030940	0,0003094	*(i_AppRate/100)*C29*d_Turf*d_ReTCCh*d_ReExpDur*MAX(i_AbsorpProduct,i_AbsorpInuse)*d_MAF*IF(i_AppEquip = "Vehicle-mounted-Drift Reduction",0.5,1))*	
Hand to mouth	0,0013300	0,0001330	*(i_AppRate/100)*C29*d_Turf*d_SalExt*d_AreaHM*d_ReFreqHM*d_ReExpDur*i_AbsorpOralInuse*d_MAF*	
Object to mouth	0,0007000	0,0000700	*(i_AppRate/100)*C29*d_DRP*d_MouthGrass*i_AbsorpOralInuse*d_MAF*	
Entry into treated crops				
Dermal	0,0358594	0,0035859	*(d_TcEntryCh*0.25*d_DFR*d_MAF)/1000*MAX(i_AbsorpProduct,i_AbsorpInuse)*	
Hand to mouth			*(i_AppRate/100)*d_Turf*d_MAF*d_SalExt*d_AreaHM*d_ReFreqHM*d_ReExpDur*i_AbsorpOralInuse*	Considered only for application on grassland and lawns and for application on golf course, turf or other sports lawns.
Object to mouth			*(i_AppRate/100)*d_DRP*d_MouthGrass*i_AbsorpOralInuse*d_MAF*	Considered only for application on grassland and lawns and for application on golf course, turf or other sports lawns.
Adult				
Spray drift	0,0410738	0,0006846	*(C15*i_AbsorpInuse*(1-d_ClothAF))+C17)*d_ConcAS*	
Vapour	0,0138000	0,0002300	*d_AirCon*d_BreathRAd*d_BwAdult*	
Surface deposits (dermal)	0,0086870	0,0001448	*(i_AppRate/100)*C30*d_Turf*d_ReTCAd*d_ReExpDur*i_AbsorpInuse*	
Entry into treated crops (dermal)	0,1195313	0,0019922	*(d_TcEntryAd*0.25*d_DFR*d_MAF)/1000*MAX(i_AbsorpProduct,i_AbsorpInuse)*	

3. Summing of exposure pathways mean

	Systemic exposure [mg a.s. /day]	Systemic exposure [mg a.s./kg bw/day]	Formula	Comments
1-3 year old child				
Spray drift	0,0158950	0,0015895	*((C20*i_AbsorpInuse*(1-d_ClothAF))+C22)*d_ConcAS*	
Vapour	0,0107000	0,0010700	*d_AirCon*d_BreathRCh*d_BwChild*	
Surface deposits				
Dermal	0,0022653	0,0002265	*(i_AppRate/100)*C30*d_Turf*d_ReTCCh*d_ReExpDur*MAX(i_AbsorpProduct,i_AbsorpInuse)*d_MAF*IF(i_AppEquip = "Vehicle-mounted-Drift Reduction",0.5,1))*	
Hand to mouth	0,0009738	0,0000974	*(i_AppRate/100)*C30*d_Turf*d_SalExt*d_AreaHM*d_ReFreqHM*d_ReExpDur*i_AbsorpOralInuse*d_MAF*	
Object to mouth	0,0005125	0,0000513	*(i_AppRate/100)*C30*d_DRP*d_MouthGrass*i_AbsorpOralInuse*d_MAF*	
Entry into treated crops				
Dermal	0,0285919	0,0028592	*(d_TcEntryMeanCh*0.25*d_DFR*d_MAF)/1000*MAX(i_AbsorpProduct,i_AbsorpInuse))*	
Hand to mouth			*(i_AppRate/100)*1*d_Turf*d_MAF*d_SalExt*d_AreaHM*d_ReFreqHM*d_ReExpDur*i_AbsorpOralInuse*	Considered only for application on grassland and lawns and for application on golf course, turf or other sports lawns.
Object to mouth			*(i_AppRate/100)*1*d_DRP*d_MouthGrass*i_AbsorpOralInuse*d_MAF*	Considered only for application on grassland and lawns and for application on golf course, turf or other sports lawns.
Adult				
Spray drift	0,0195571	0,0003260	*"(C19*i_AbsorpInuse*(1-d_ClothAF))+C21)*d_ConcAS"*	
Vapour	0,0138000	0,0002300	*d_AirCon*d_BreathRAd*d_BwAdult*	
Surface deposits (dermal)	0,0063601	0,0001060	*(i_AppRate/100)*C30*d_Turf*d_ReTCAd*d_ReExpDur*MAX(i_AbsorpProduct,i_AbsorpInuse)*d_MAF*IF(i_AppEquip = "Vehicle-mounted-Drift Reduction",0.5,1)*	
Entry into treated crops (dermal)	0,0953063	0,0015884	*(d_TcEntryMeanAd*0.25*d_DFR*d_MAF)/1000*MAX(i_AbsorpProduct,i_AbsorpInuse)*	

A 3.3.2 Calculations for iodosulfuron-methyl-sodium

Table A 11: Input parameters considered for the estimation of longer term resident exposure

Resident exposure for JMD-HER 387 OD			
Croptype	Cereals		
Application method	Downward spraying		
Application equipment	Vehicle-mounted		*i_AppEquip*
Formulation type	Soluble concentrates, emulsifiable concentrate, etc.		*i_FormVal*
Buffer strip	5	m	*i_Buffer*
Application rate of the product	0,01	kg a.s./ha	*i_AppRate*
Concentration of active substance (in-use dilution for liquid applications)	0,05	g a.s./l	*d_ConcAS*
Dermal absorption of product	70,00%		*i_AbsorpProduct*
Dermal absorption of in-use dilution	70,00%		*i_AbsorpInuse*
Oral absorption	70,00%		*i_AbsorpOralInuse*
Dislodgeable foliar residue (i_AppRate*i_DFR)	0,03	µg a.s./cm^2	*d_DFR*
Vapour pressure of in-use dilution	low volatile substances having a vapour pressure of <5*10-3Pa	Pa	*i_Volat*
Concentration in air	0,001	mg/m^3	*d_AirCon*
Resident dermal spray drift exposure 75th percentile - adult	0,23798	ml spray dilution/person	
Resident dermal spray drift exposure 75th percentile - child	0,2175	ml spray dilution/person	
Resident inhal. spray drift exposure 75th percentile - adult	0,00009	ml spray dilution/person	
Resident inhal. spray drift exposure 75th percentile - child	0,00017	ml spray dilution/person	
Resident dermal spray drift exposure mean - adult	0,12278	ml spray dilution/person	
Resident dermal spray drift exposure mean - child	0,12	ml spray dilution/person	
Resident inhal. spray drift exposure mean - adult	0,00008	ml spray dilution/person	
Resident inhal. spray drift exposure mean - child	0,00014	ml spray dilution/person	
Exposure duration dermal	2	hours	*d_ReExpDur*
Exposure duration inhalation	24	hours	*d_ReExpDurInhal*
Exposure duration entry into treated crops	0,25	hours	*d_ExpDurTreatCrop*
Light clothing adjustment factor	18,0%		*d_ClothAF*
Breathing rate adult	0,23	m^3/day/kg	*d_BreathRAd*
Breathing rate child (1-3 year old)	1,07	m^3/day/kg	*d_BreathRCh*
Drift percentage on surface (75th percentile)	2,30%		
Drift percentage on surface (mean)	1,80%		
Turf transferable residues percentage	5,00%		*d_Turf*
Transfer coeff. of surface deposits-adult	7300	cm^2/hour	*d_ReTCAd*
Transfer coeff. of surface deposits-child (1-3 year old)	2600	cm^2/hour	*d_ReTCCh*
Saliva extraction percentage	50,00%		*d_SalExt*
Surface area of hands mouthed	20	cm^2	*d_AreaHM*
Frequency of hand to mouth activity	9,5	events/hour	*d_ReFreqHM*
Ingestion rate for mouthing of grass per day	25	cm^2	*d_MouthGrass*
Dislodgeable residues percentage transferability for object to mouth	20,00%		*d_DRP*
Transfer coefficient for entry into treated crops (75th percentile) - ad	7500	cm^2/h	*d_TcEntryAd*
Transfer coefficient for entry into treated crops (75th percentile) - chi	2250	cm^2/h	*d_TcEntryCh*
Transfer coefficient for entry into treated crops (mean) - adult	5980	cm^2/h	*d_TcEntryAd*
Transfer coefficient for entry into treated crops (mean) - child	1794	cm^2/h	*d_TcEntryCh*

Table A 12: Estimation of longer term resident exposure towards 2,4-D according to EFSA guidance

1. Total

1.1 1-3 year old child

	Spray drift (75th percentile)	Vapour (75th percentile)	Surface deposits (75th percentile)	Entry into treated crops (75th percentile)	All pathways (mean)
Total systemic exposure (mg a.s./day)	0,0062508	0,0107000	0,0004419	0,0118125	0,0239154
Total systemic exposure per kg body weight (mg/kg bw/day)	0,0006251	0,0010700	0,0000442	0,0011813	0,0023915
% of RVNAS	1,25%	2,14%	0,09%	2,36%	4,78%

1.2 Adult

	Spray drift	Vapour	Surface deposits	Entry into treated crops	All pathways (mean)
Total systemic exposure (mg a.s./day)	0,0068345	0,0138000	0,0011753	0,0393750	0,0496426
Total systemic exposure per kg body weight (mg/kg bw/day)	0,0001139	0,0002300	0,0000196	0,0006563	0,0008274
% of RVNAS	0,23%	0,46%	0,04%	1,31%	1,65%

2. Resident exposure 75th Percentile

	Systemic exposure [mg a.s. /day]	Systemic exposure [mg a.s./kg bw/day]	Formula	Comments
1-3 year old child				
Spray drift	0,0062508	0,0006251	*((C16*i_AbsorpInuse*(1-d_ClothAF))+C18)*d_ConcAS*	
Vapour	0,0107000	0,0010700	*d_AirCon*d_BreathRCh*d_BwChild*	
Surface deposits				
Dermal	0,0004186	0,0000419	*(i_AppRate/100)*C29*d_Turf*d_ReTCCh*d_ReExpDur*MAX(i_AbsorpProduct,i_AbsorpInuse)*d_MAF*IF(i_AppEquip = "Vehicle-mounted-Drift Reduction",0.5,1))*	
Hand to mouth	0,0000153	0,0000015	*(i_AppRate/100)*C29*d_Turf*d_SalExt*d_AreaHM*d_ReFreqHM*d_ReExpDur*i_AbsorpOralInuse*d_MAF*	
Object to mouth	0,0000081	0,0000008	*(i_AppRate/100)*C29*d_DRP*d_MouthGrass*i_AbsorpOralInuse*d_MAF*	
Entry into treated crops				
Dermal	0,0118125	0,0011813	*(d_TcEntryCh*0.25*d_DFR*d_MAF)/1000*MAX(i_AbsorpProduct,i_AbsorpInuse)*	
Hand to mouth			*(i_AppRate/100)*d_Turf*d_MAF*d_SalExt*d_AreaHM*d_ReFreqHM*d_ReExpDur*i_AbsorpOralInuse*	Considered only for application on grassland and lawns and for application on golf course, turf or other sports lawns.
Object to mouth			*(i_AppRate/100)*d_DRP*d_MouthGrass*i_AbsorpOralInuse*d_MAF*	Considered only for application on grassland and lawns and for application on golf course, turf or other sports lawns.
Adult				
Spray drift	0,0068345	0,0001139	*(C15*i_AbsorpInuse*(1-d_ClothAF))+C17)*d_ConcAS*	
Vapour	0,0138000	0,0002300	*d_AirCon*d_BreathRAd*d_BwAdult*	
Surface deposits (dermal)	0,0011753	0,0000196	*(i_AppRate/100)*C30*d_Turf*d_ReTCAd*d_ReExpDur*i_AbsorpProduct*d_MAF*	
Entry into treated crops (dermal)	0,0393750	0,0006563	*(d_TcEntryAd*0.25*d_DFR*d_MAF)/1000*MAX(i_AbsorpProduct,i_AbsorpInuse)*	

3. Summing of exposure pathways mean

	Systemic exposure [mg a.s. /day]	Systemic exposure [mg a.s./kg bw/day]	Formula	Comments
1-3 year old child				
Spray drift	0,0034510	0,0003451	*((C20*i_AbsorpInuse*(1-d_ClothAF))+C22)*d_ConcAS*	
Vapour	0,0107000	0,0010700	*d_AirCon*d_BreathRCh*d_BwChild*	
Surface deposits				
Dermal	0,0003276	0,0000328	*(i_AppRate/100)*C30*d_Turf*d_ReTCCh*d_ReExpDur*MAX(i_AbsorpProduct,i_AbsorpInuse)*d_MAF*IF(i_AppEquip = "Vehicle-mounted-Drift Reduction",0.5,1))*	
Hand to mouth	0,0000120	0,0000012	*(i_AppRate/100)*C30*d_Turf*d_SalExt*d_AreaHM*d_ReFreqHM*d_ReExpDur*i_AbsorpOralInuse*d_MAF*	
Object to mouth	0,0000063	0,0000006	*(i_AppRate/100)*C30*d_DRP*d_MouthGrass*i_AbsorpOralInuse*d_MAF*	
Entry into treated crops				
Dermal	0,0094185	0,0009419	*(d_TcEntryMeanCh*0.25*d_DFR*d_MAF)/1000*MAX(i_AbsorpProduct,i_AbsorpInuse))*	
Hand to mouth			*(i_AppRate/100)*1*d_Turf*d_MAF*d_SalExt*d_AreaHM*d_ReFreqHM*d_ReExpDur*i_AbsorpOralInuse*	Considered only for application on grassland and lawns and for application on golf course, turf or other sports lawns.
Object to mouth			*(i_AppRate/100)*1*d_DRP*d_MouthGrass*i_AbsorpOralInuse*d_MAF*	Considered only for application on grassland and lawns and for application on golf course, turf or other sports lawns.
Adult				
Spray drift	0,0035278	0,0000588	*"(C19*i_AbsorpInuse*(1-d_ClothAF))+C21)*d_ConcAS"*	
Vapour	0,0138000	0,0002300	*d_AirCon*d_BreathRAd*d_BwAdult*	
Surface deposits (dermal)	0,0009198	0,0000153	*(i_AppRate/100)*C30*d_Turf*d_ReTCAd*d_ReExpDur*MAX(i_AbsorpProduct,i_AbsorpInuse)*d_MAF*IF(i_AppEquip = "Vehicle-mounted-Drift Reduction",0.5,1)*	
Entry into treated crops (dermal)	0,0313950	0,0005233	*(d_TcEntryMeanAd*0.25*d_DFR*d_MAF)/1000*MAX(i_AbsorpProduct,i_AbsorpInuse)*	

A 3.4 Combined exposure calculations for 2,4-D and iodosulfuron-methyl-sodium

Table A 13: Risk assessment from combined exposure (longer term exposure)

Application scenario	Active ingredient	Estimated exposure / AAOEL (HQ)
Operators - vehicle-mounted application (work wear (arms, body and legs covered) M/L and A + gloves)	2,4-D	0.0523
	iodosulfuron-methyl-sodium	0.0229
	Cumulative risk operators (HI)	**0.0725**
Workers - inspection, irrigation (workwear and gloves - reccomended)	2,4-D	0.1488
	iodosulfuron-methyl-sodium	0.0196
	Cumulative risk workers (HI)	**0.1684**
Resident – child	2,4-D	
	Drift	0.1438
	Vapour	0.0535
	Deposits	0.0256
	Re-entry	0.1793
	Sum of all pathways	0.2947
	iodosulfuron-methyl-sodium	
	Drift	0.0125
	Vapour	0.0214
	Deposits	0.0009
	Re-entry	0.0236
	Sum of all pathways	0.0478
	Cumulative risk resident – child (HI)	
	Drift	**0.1563**
	Vapour	**0.0749**
	Deposits	**0.0265**
	Re-entry	**0.2029**
	Sum of all pathways	**0.3425**
Resident - adult	2,4-D	
	Drift	0.0342
	Vapour	0.0115
	Deposits	0.0072
	Re-entry	0.0996
	Sum of all pathways	0.1125
	iodosulfuron-methyl-sodium	
	Drift	0.0023
	Vapour	0.0046
	Deposits	0.0004

Application scenario	Active ingredient	Estimated exposure / AAOEL (HQ)
	Re-entry	0.0131
	Sum of all pathways	0.0165
	Cumulative risk resident – adult (HI)	
	Drift	**0.0365**
	Vapour	**0.0161**
	Deposits	**0.0076**
	Re-entry	**0.1127**
	Sum of all pathways	**0.129**

Appendix 4 Detailed evaluation of exposure and/or DFR studies relied upon (KCP 7.2, KCP 7.2.1.1, KCP 7.2.2.1, KCP 7.2.3.1)

Not relevant.