Appendix to:

EFSA (European Food Safety Authority), 2020. Conclusion on the peer review of the pesticide risk assessment of the active substance abamectin. EFSA Journal 2020;18(8):6227, 134 pp. doi:10.2903/j.efsa.2020.6227

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Appendix A – List of end points for the active substance and the representative formulation

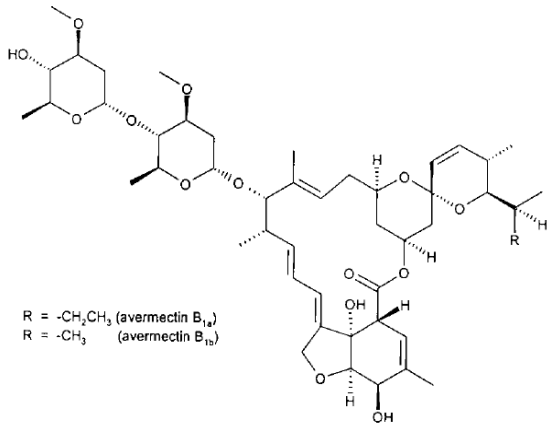
Identity, Physical and Chemical Properties, Details of Uses, Further Information (Regulation (EU) N° 283/2013, Annex Part A, points 1.3 and 3.2)

Active substance (ISO Common Name)	Abamectin
Function (*eg.* fungicide)	Insecticide, acaricide

Rapporteur Member State	Austria
Co-rapporteur Member State	Malta

Identity (Regulation (EU) N° 283/2013, Annex Part A, point 1)

Chemical name (IUPAC)	**avermectin B_{1a}** (10*E*,14*E*,16*E*)-(1*R*,4*S*,5′*S*,6*S*,6′*R*,8*R*,12*S*,13*S*,20*R*,21*R*,24*S*)-6′-[(*S*)-*sec*-butyl]-21,24-dihydroxy-5′,11,13,22-tetramethyl-2-oxo-(3,7,19-trioxatetracyclo[15.6.1.$1^{4,8}$.$0^{20,24}$]pentacosa-10,14,16,22-tetraene)-6-spiro-2′-(5′,6′-dihydro-2′*H*-pyran)-12-yl 2,6-dideoxy-4-*O*-(2,6-dideoxy-3-*O*-methyl-α-L-*arabino*-hexopyranosyl)-3-*O*-methyl-α-L-*arabino*-hexopyranoside **avermectin B_{1b}** (10*E*,14*E*,16*E*)-(1*R*,4*S*,5′*S*,6*S*,6′*R*,8*R*,12*S*,13*S*,20*R*,21*R*,24*S*)-21,24-dihydroxy-6′-isopropyl-5′,11,13,22-tetramethyl-2-oxo-(3,7,19-trioxatetracyclo[15.6.1.$1^{4,8}$.$0^{20,24}$]pentacosa-10,14,16,22-tetraene)-6-spiro-2′-(5′,6′-dihydro-2′*H*-pyran)-12-yl 2,6-dideoxy-4-*O*-(2,6-dideoxy-3-*O*-methyl-α-L-*arabino*-hexopyranosyl)-3-*O*-methyl-α-L-*arabino*-hexopyranoside
Chemical name (CA)	Abamectin: avermectin B_1 avermectin B_{1a}: 5-*O*-demethyl-avermectin A_{1a} avermectin B_{1b}: 5-*O*-demethyl-25-de(1-methylpropyl)-25-(1-methylethyl)-avermectin A_{1a}
CIPAC No	495 (Abamectin)
CAS No	71751-41-2 (abamectin) 65195-55-3 (avermectin B_{1a}) 65195-56-4 (avermectin B_{1b})
EC No (EINECS or ELINCS)	265-610-3 (avermectin B_{1a})

	265-611-9 (avermectin B_{1b})
FAO Specification (including year of publication)	Not available
Minimum purity of the active substance as manufactured	The minimum purity of abamectin as manufactured should not be less than min. 850 g/kg abamectin (sum of avermectin B_{1a} and avermectin B_{1b}), min. 800 g/kg avermectin B_{1a} and max. 200 g/kg avermectin B_{1b} (as proposed in the amendment of the definition in ISO 1750 by the main notifier).
Identity of relevant impurities (of toxicological, environmental and/or other significance) in the active substance as manufactured	Abamectin technical does not contain significant amounts of impurities or by-products of particular toxicological, environmental or ecotoxicological concern.
Molecular formula	$C_{48}H_{72}O_{14}$ (avermectin B_{1a}) $C_{47}H_{70}O_{14}$ (avermectin B_{1b})
Molecular mass	873.1 g/mol (avermectin B_{1a}) 859.1 g/mol (avermectin B_{1b})
Structural formula	

Physical and chemical properties (Regulation (EU) N° 283/2013, Annex Part A, point 2)

Melting point (state purity)	161.8 - 169.4°C (96.7%)
Boiling point (state purity)	Boiling point: not determined, due to thermal decomposition during melting of Abamectin
Temperature of decomposition (state purity)	Not available
Appearance (state purity)	Purified active substance is a white powder (25ºC) and the odour of the active substance was not determined (due to health protection of laboratory stuff) (96.7%)
Vapour pressure (state temperature, state purity)	< 3.7×10^{-6} Pa at 25°C (96.7%)
Henry's law constant (state temperature)	< 0.159 Pa·m^3/mol at 20°C
Solubility in water (state temperature, state purity and pH)	20.31 µg/L at 20°C (the pH dependency of the water solubility was not investigate as the hydrolysis of the test item is not pH dependent) (97.06%)
Solubility in organic solvents (state temperature, state purity)	at 25°C (96.7%) in: acetone: 72 g/L dichloromethane: 470 g/L ethyl acetate: 160 g/L hexane: 0.11 g/L methanol: 13 g/L octanol: 83 g/L toluene: 23 g/L
Surface tension (state concentration and temperature, state purity)	52.4 mN/m (90 % saturated solution) (96.7%) at 20°C
Partition coefficient (state temperature, pH and purity)	log K_{ow} = 4.4 ± 0.03 (96.7%) at room temperature, pH 7.2
Dissociation constant (state purity)	No dissociation or spectral changes were observed in the 1 - 12 pH range
UV/VIS absorption (max.) incl. ε (state purity, pH)	UV/VIS (96.6%) No absorption maximum observed between 290 and 750 nm Neutral (ε) = 32549 L × mol^{-1} × cm^{-1} at 245 nm (ε) = 18983 L × mol^{-1} × cm^{-1} at 255 nm Acidic (ε) = 34515 L × mol^{-1} × cm^{-1} at 245 nm (ε) = 20977 L × mol^{-1} × cm^{-1} at 255 nm Basic (ε) = 29551 L × mol^{-1} × cm^{-1} at 245 nm Acceptable ^{1}H-NMR, ^{13}C-NMR, IR and MS spectra were submitted
Flammability (state purity)	Abamectin is not highly flammable (96.7%)
Explosive properties (state purity)	Abamectin was considered not thermally, shock or friction sensitive (96.7%)
Oxidising properties (state purity)	Abamectin is not classified as an oxidizing substance (96.7%)

Summary of representative uses evaluated, for which all risk assessments needed to be completed (name of active substance or the respective variant) (Regulation (EU) N° 284/2013, Annex Part A, points 3, 4)

Crop and/or situation (a)	Member State or Country	Product name	F G or I (b)	Pests or Group of pests controlled (c)	Preparation		Application				Application rate per treatment			PHI (days) (m)	Remarks
					Type (d-f)	Conc. a.s. (i)	method kind (f-h)	range of growth stages & season (j)	number min-max (k)	Interval between application (min)	kg a.s /hL min-max (l)	Water L/ha min-max	kg a.s./ha min-max (l)		
Tomato LYPES	Northern, central, southern EU	Abamectin 1.8% EC	G*	*Tetranychus urticae* TETRUR *Liriomyza* spp. LIRISP *Aculops lycopersici* VASALY *Tuta absoluta* GNORAB	EC	18 g/L	Spray (Back sprayer)	At infestation BBCH 10-89 (excluding November to February)	1-3	7 days	0.0009-0.0018	300-1000	0.0027-0.018	3	mL product/hL (min-max): 50-100 treated Leaf Wall Area: 0.43 L per 10000 m² tLWA Assumptions**: Canopy height:2.3 m Row distance: 2 m max. tLWA: 23000m²/ha
Strawberry FRAAN	Northern, central, southern EU	Abamectin 1.8% EC	G*	*Tetranychus urticae* TETRUR *Liriomyza trifolii* LIRITR *Phytonemus pallidus* TARSPA	EC	18 g/L	Spray (Back sprayer)	At infestation BBCH 10-89 (excluding November to February)	1-2	7 days	0.0009-0.0018	300-1000	0.0027-0.018	3	mL product/hL (min-max): 50-100

*closed walk-in structures with soil bound crops (Glasshouse, greenhouse and walk-in tunnel)

(a) For crops, the EU and Codex classifications (both) should be taken into account; where relevant, the use situation should be described (e.g. fumigation of a structure)

(b) Outdoor or field use (F), greenhouse application (G) or indoor application (I)

(c) *e.g.* biting and sucking insects, soil born insects, foliar fungi, weeds

(d) *e.g.* wettable powder (WP), emulsifiable concentrate (EC), granule (GR)

(i) g/kg or g/L. Normally the rate should be given for the active substance (according to ISO) and not for the variant in order to compare the rate for same active substances used in different variants (e.g. fluoroxypyr). **In certain cases, where only one variant is synthesised, it is more appropriate to give the rate for the variant (e.g. benthiavalicarb-isopropyl).**

(e) CropLife International Technical Monograph no 2, 6th Edition. Revised May 2008. Catalogue of pesticide (f) All abbreviations used must be explained (g) Method, e.g. high volume spraying, low volume spraying, spreading, dusting, drench (h) Kind, *e.g.* overall, broadcast, aerial spraying, row, individual plant, between the plant- type of equipment used must be indicated	(j) Growth stage range from first to last treatment (BBCH Monograph, Growth Stages of Plants, 1997, Blackwell, ISBN 3-8263-3152-4), including where relevant, information on season at time of application (k) Indicate the minimum and maximum number of applications possible under practical conditions of use (l) The values should be given in g or kg whatever gives the more manageable number (e.g. 200 kg/ha instead of 200 000 g/ha or 12.5 g/ha instead of 0.0125 kg/ha (m) PHI - minimum pre-harvest interval

Summary of additional intended uses for which MRL applications have been made, that in addition to the uses above, have also been considered in the consumer risk assessment (name of active substance or the respective variant)
Regulation (EC) N° 1107/2009 Article 8.1(g))

Important note: efficacy, environmental risk and risk to humans by exposure other than via their diet have not been assessed for these uses

Crop and/or situation (a)	Member State or Country	Product name	F G or I (b)	Pests or Group of pests controlled (c)	Preparation		Application				Application rate per treatment			PHI (days) (m)	Remarks
					Type (d-f)	Conc. a.s. (i)	method kind (f-h)	range of growth stages & season (j)	number min-max (k)	Interval between application (min)	kg a.s /hL min-max (l)	Water L/ha min-max	kg a.s./ha min-max (l)		
MRL Application (according to Article 8.1(g) of Regulation (EC) No 1107/2009)															
Not applicable															

(a) For crops, the EU and Codex classifications (both) should be taken into account; where relevant, the use situation should be described (e.g. fumigation of a structure)

(b) Outdoor or field use (F), greenhouse application (G) or indoor application (I)

(c) *e.g.* biting and sucking insects, soil born insects, foliar fungi, weeds

(d) *e.g.* wettable powder (WP), emulsifiable concentrate (EC), granule (GR)

(e) CropLife International Technical Monograph no 2, 6th Edition. Revised May 2008. Catalogue of pesticide

(f) All abbreviations used must be explained

(g) Method, e.g. high volume spraying, low volume spraying, spreading, dusting, drench

(h) Kind, *e.g.* overall, broadcast, aerial spraying, row, individual plant, between the plant- type of equipment used must be indicated

(i) g/kg or g/L. Normally the rate should be given for the active substance (according to ISO) and not for the variant in order to compare the rate for same active substances used in different variants (e.g. fluoroxypyr). **In certain cases, where only one variant is synthesised, it is more appropriate to give the rate for the variant (e.g. benthiavalicarb-isopropyl).**

(j) Growth stage range from first to last treatment (BBCH Monograph, Growth Stages of Plants, 1997, Blackwell, ISBN 3-8263-3152-4), including where relevant, information on season at time of application

(k) Indicate the minimum and maximum number of applications possible under practical conditions of use

(l) The values should be given in g or kg whatever gives the more manageable number (e.g. 200 kg/ha instead of 200 000 g/ha or 12.5 g/ha instead of 0.0125 kg/ha

(m) PHI - minimum pre-harvest interval

Further information, Efficacy

Effectiveness (Regulation (EU) N° 284/2013, Annex Part A, point 6.2)

The efficacy of the representative uses has already been evaluated under Uniform Principles for national registration. The applicant provided an efficacy summary:

The most challenging target is considered to be *Tetranychus urticae* (TETRUR). Trials data supporting effectiveness against this target comprise 7 trials were conducted on strawberries and tomatoes. Efficacy at a dose of 0.9-1.8 g a.s/hl (the actually applied dose per ha or tLWA was not indicated) was 84-96 %.

Efficacy trials are also available against *Liriomyza* sp. in tomatoes and lettuce (according to the EPPO extrapolation tables for minor uses, trials in lettuce can be used to reduce the required data set in tomato). Trials were conducted under protected and field conditions. Efficacy was 77-82 % on tomato (83-87 % on lettuce).

Efficacy against *Tuta absoluta* on tomatoes is shown from 2 trials with the very similar formulation Abamectin 1.8% EW. Trials were conducted under protected and field conditions. Efficacy was 63-83 %.

Adverse effects on field crops (Regulation (EU) N° 284/2013, Annex Part A, point 6.4)

The crop safety of the representative uses has already been evaluated under Uniform Principles for national registration. The applicant provided a summary on crop safety:

Crop safety has been considered in the effectiveness trials. Abamectin 1.8% EC is very well tolerated by the target crops.

The possibly impact on the quality of yield, processing, or the amount of yield was not addressed.

Observations on other undesirable or unintended side-effects (Regulation (EU) N° 284/2013, Annex Part A, point 6.5)

The representative uses have already been evaluated under Uniform Principles for national registration.

Since abamectin is degraded in soil very quickly and since it has no herbicidal properties, a negative impact on succeeding or adjacent crops is very unlikely. No negative effects of abamectin applications on succeeding crops were seen. Undesirable or unintended side-effects are not expected.

Groundwater metabolites: Screening for biological activity (SANCO/221/2000-rev.10-final Step 3 a Stage 1)

Activity against target organism	Not required, PEC_{GW} modelling leads to concentrations below the regulatory threshold of 0.1 µg/L for all metabolites and uses considered.

Methods of Analysis

Analytical methods for the active substance (Regulation (EU) N° 283/2013, Annex Part A, point 4.1 and Regulation (EU) N° 284/2013, Annex Part A, point 5.2)

Technical a.s. (analytical technique)	The content of of avermectin B_{1a} and avermectin B_{1b} in technical grade abamectin was determined by dissolving the test substance in methanol/THF (9:1, v/v). HPLC-UV/DAD was used for the determination of avermectin B_{1a} and avermectin B_{1b}.
Impurities in technical a.s. (analytical technique)	HPLC-UV HPLC with G1311C pump, G1316A oven, G1329B auto sampler, G1315D DAD detector, G1311C degasser and controlled by chemstation software.
Plant protection product (analytical technique)	Formulated product APACHE (Abamectin 1.8% w/v EC) The analytical method for the determination of abamectin in the formulated product was done by High Performance Liquid Chromatograph (HPLC) with UV detection.

Analytical methods for residues (Regulation (EU) N° 283/2013, Annex Part A, point 4.2 & point 7.4.2)

Residue definitions for monitoring purposes

Food of plant origin	sum of avermectin B_{1a}, [8,9-Z]-isomer of avermectin B_{1a}, and avermectin B_{1b}, expressed as avermectin B_{1a}
Food of animal origin	Avermectin B_{1a}, covered by legal provisions in force for abamectin from veterinary uses
Honey	sum of avermectin B_{1a}, [8,9-Z]-isomer of avermectin B_{1a}, and avermectin B_{1b}, expressed as avermectin B_{1a}
Soil	Avermectin B_{1a}, avermectin B_{1b}, 8a-oxo-avermectin B_{1a} (NOA448111), 8a-hydroxy-avermectin B_{1a} (NOA448112), 4”-oxo-avermectin B_{1a} (NOA426289), 4,8a-dihydroxy-avermectin B_{1a} (NOA457464), 8a-oxo-4-hydroxy-avermectin B_{1a} (NOA457465)
Water surface drinking ground	Avermectin B_{1a}, avermectin B_{1b}, 8a-oxo-avermectin B_{1a} (NOA448111), 8a-hydroxy-avermectin B_{1a} (NOA448112), 4”-oxo-avermectin B_{1a} (NOA426289), 4,8a-dihydroxy-avermectin B_{1a} (NOA457464), 8a-oxo-4-hydroxy-avermectin B_{1a} (NOA457465)
Air	Avermectin B_{1a}, avermectin B_{1b} (by default)
Body fluids and tissues	sum of avermectin B_{1a}, [8,9-Z]-isomer of avermectin B_{1a}, and avermectin B_{1b}, expressed as avermectin B_{1a}

Monitoring/Enforcement methods

Food/feed of plant origin (analytical technique and LOQ for methods for monitoring purposes)	Dry content (wheat grains), high water content (tomatoes), high acid content (strawberry) and high oil content (olives) Abamectin was determined as avermectin B_{1a}, abermectin B_{1b} and 8,9-Z-avermectin B_{1a} by HPLC-MS/MS ESI monitoring two mass transitions. The sample were extracted with acetonitrile and purification by liquid-liquid partition in the presence of sodium chloride (QuEChERS multi-residue analytical method) LOQ = 0.002 mg/kg ILV is available.
Food/feed of animal origin (analytical technique and LOQ for methods for monitoring purposes)	Animal matrices (milk, eggs, muscle, fat and kidney) Abamectin was determined as avermectin B_{1a}, abermectin B_{1b} and 8,9-Z-avermectin B_{1a} by HPLC-MS/MS ESI monitoring two mass transitions. The sample were extracted with acetonitrile and purification by liquid-liquid partition in the presence of sodium chloride (QuEChERS multi-residue analytical method) LOQ = 0.002 mg/kg ILV is available.
Soil (analytical technique and LOQ)	Loamy soil Abamectin and metabolites were determined by HPLC-MS/MS ESI monitoring two mass transitions. The sample were extracted with acetonitrile and purification by liquid-liquid partition in the presence of sodium chloride LOQ = 0.002 mg/kg for all analytes **Note by RMS :** This method for monitoring in soil does not cover 4''-oxo-avermectin B_{1a} (Metabolite of abamectin), which is included in the residue definition for soil for monitoring. However, the applicant has submitted a validated method for 4''-oxo-avermectin B_{1a} (Metabolite of abamectin) in soil for the risk assessment (see B.5.1.2.1. Methods in soil, water, sediment, air and any additional matrices used in support of environmental fate studies, Persch (2017) S16-02007, KCA 7.1.3.1.2/03). All other metabolites are covered by the methods.

Water (analytical technique and LOQ)	Surface, drinking and ground water Abamectin and metabolites were determined by HPLC-MS/MS, ESI monitoring two mass transitions. The samples were extracted with acetonitrile and purification by liquid-liquid partition in the presence of sodium chloride LOQ = 0.10 µg/L for all analytes The metabolites are covered by the methods. ILV for drinking water is available. Data gap: method for the enforcement of the relevant limits based on the lowest effect concentrations for aquatic invertebrates.
Air (analytical technique and LOQ)	Avermectin B_{1a} and avermectin B_{1b} were determined by HPLC-MS/MS ESI monitoring two mass transitions. The air is sampled in a climate-controlled room at constant temperature and humidity. The cartridge content is subjected to air stream and then extracted with acetonitrile and analysed by LC-MS/MS. LOQ = 0.05 µg/m^3
Body fluids and tissues (analytical technique and LOQ)	Body fluid: (blood) Abamectin was determined as avermectin B_{1a}, abermectin B_{1b} and 8,9-Z-avermectin B_{1a} by HPLC-MS/MS ESI monitoring two mass transitions. The sample were extracted with acetonitrile and purification by liquid-liquid partition in the presence of sodium chloride (QuEChERS multi-residue analytical method) LOQ = 0.002 mg/kg

Classification and labelling with regard to physical and chemical data (Regulation (EU) N° 283/2013, Annex Part A, point 10)

Substance :	Abamectin
Harmonised classification according to Regulation (EC) No 1272/2008 and its Adaptations to Technical Process [Table 3.1 of Annex VI of Regulation (EC) No 1272/2008 as amended][1] :	No harmonised classification available
According to the Peer review, the criteria for classification may be met for:	None

1 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. OJ L 353, 31.12.2008, 1-1355.

Impact on Human and Animal Health

Absorption, distribution, metabolism and excretion (toxicokinetics) (Regulation (EU) N° 283/2013, Annex Part A, point 5.1)

Rate and extent of oral absorption/systemic bioavailability	Approximately 86% (based on urinary excretion after oral or intravenous administration).
Toxicokinetics	Maximum blood concentration within 4-8 h.
Distribution	Distributed throughout all major organs and tissues.
Potential for bioaccumulation	No potential for accumulation upon repeated oral administration.
Rate and extent of excretion	Rapidly eliminated, almost exclusively in the faeces (more than 92%).
Metabolism in animals	Major pathways in rats and human include demethylation, hydroxylation, cleavage of the oleandrosyl ring and oxidation reactions.
In vitro metabolism	Rat and human metabolism are similar and no unique human metabolite was identified.
Toxicologically relevant compounds (animals and plants)	Parent and [8,9-Z]-isomer of avermectin B_{1a} (photodegradation product)
Toxicologically relevant compounds (environment)	Parent and [8,9-Z]-isomer of avermectin B_{1a} (photodegradation product)

Acute toxicity (Regulation (EU) N° 283/2013, Annex Part A, point 5.2)

Rat LD_{50} oral	LD_{50} = 8.7 – 12.8 mg/kg bw	Cat 2 H300
Rat LD_{50} dermal	LD_{50} = 1914 mg/kg bw	Cat 4 H312
Rat LC_{50} inhalation (4h, nose only)	LC_{50} = < 0.21 mg/L	Cat 1 H330
Skin irritation	Non-irritant	
Eye irritation	Non-irritant	
Skin sensitisation	Non-sensitizing (Magnusson Kligman maximiation assay)	
Phototoxicity	Not required	

Short-term toxicity (Regulation (EU) N° 283/2013, Annex Part A, point 5.3)

Target organ / critical effect	Rats: clinical signs, bw loss stomach *(inflammatory changes.* Dogs: central nervous system toxicity tremors, ataxia and mydriasis, absent or decreased pupil reflex, liver.	

Relevant oral NOAEL	90-day rat: 1.6 mg/kg bw⁄ per day 18-week and 53-week, dog: 0.25 mg/kg bw⁄ per day	H372
Relevant dermal NOAEL	No data – not required	
Relevant inhalation NOAEL	30-day, rat: 0.577 µg/L (based on the increased incidence in clinical signs and reduced motor activity in females)	

Genotoxicity (Regulation (EU) N° 283/2013, Annex Part A, point 5.4)

In vitro studies	Ames test, 3 studies: negative Mammalian gene mutation, 2 studies: negative Chromosome aberration, 1 study: negative	
In vivo studies	In vivo Chromosome aberration, "in vivo mouse bone marrow cytogenetics assay of Avermectin B1", negative	
Photomutagenicity	Not required	
Potential for genotoxicity	Abamectin is unlikely to be genotoxic. Data gap for assessment of aneugenicity profile.	

Long-term toxicity and carcinogenicity (Regulation (EU) N°283/2013, Annex Part A, point 5.5)

Long-term effects (target organ/critical effect)	Rat: CNS toxicity e.g. tremors Mouse: increased mortality (m), extramedullary hematopoiesis in the spleen (m), reduced bw gain	
Relevant long-term NOAEL	1.5 mg/kg bw⁄ per day (2 year rat) 4 mg/kg bw⁄ per day (90-wk mouse)	
Carcinogenicity (target organ, tumour type)	Abamectin is unlikely to be carcinogenic in humans	
Relevant NOAEL for carcinogenicity	1.5 mg/kg bw⁄ per day (104-wk rat) 4 mg/kg bw⁄ per day (94-wk mouse)	

Reproductive toxicity (Regulation (EU) N° 283/2013, Annex Part A, point 5.6)

Reproduction toxicity

Reproduction target / critical effect	Rat multigeneration: Parent: no treatment-related effects Fertility: no treatment-related effects Offspring: increased pup mortality, , retarded body weight gain, and transient retinal anomalies in the eyes	
Relevant parental NOAEL	0.4 mg/kg bw per day	
Relevant reproductive NOAEL	0.4 mg/kg bw per day	

Relevant offspring NOAEL	0.12 mg/kg bw per day	

Developmental toxicity

Developmental target / critical effect	Rat: a absence of effects in the highest dose group in rats. Cleft palate, effects on the sex ratio, lumbar rib and lumbar count variation (in the absence of maternal toxicity in pups. Maternal: absence of effects in the highest dose group in rats Rabbit: In pups: cleft palate, omphaloceles, clubbed forefeet and delayed ossification (at maternally toxic dose) increased incidence clubbed forefoot at 1 and 2 mg/kg bw and increased number of resorptions, delayed ossification and excess incidences of cleft palate, omphalocele and at 2.0 mg/kg bw per day. Maternal: decreased water and food consumption and weight loss during gestation in rabbits.	H361
Relevant maternal NOAEL	Rat: 1.6 mg/kg bw per day Rabbit: 1.0 mg/kg bw per day	
Relevant developmental NOAEL	Rat: 0.8 mg/kg bw per day Rabbit: 0.5 mg/kg bw per day	

Neurotoxicity (Regulation (EU) N° 283/2013, Annex Part A, point 5.7)

Acute neurotoxicity	NOAEL 0.5 mg/kg bw (rat, reduced splay reflex)	
Repeated neurotoxicity	Combined 90-day neurotoxicity rat: NOAEL for neurotoxicity 1.6 mg/kg bw per day (clinical signs: irregular breathing, upward curvature of the spine, reduced righting reflex, reduced splay reflex and sides pinched in)	
Additional studies (e.g. delayed neurotoxicity, developmental neurotoxicity)	Developmental neurotoxicity, rat (2): Maternal NOAEL: 0.4 mg/kg bw per day (increased body weight, food consumption) Develop-mental neurotoxicity LOAEL: 0.12 mg/kg bw per day (decreased body weight, delay in vaginal opening)	

Other toxicological studies (Regulation (EU) N° 283/2013, Annex Part A, point 5.8)

Supplementary studies on the active substance	Exploratory oral toxicity studies in CF-1 / CD-1 mice and rats: increased sensitivity of animals lacking or showing decreased expression of p-glycoprotein. CF-1 mouse is more sensitive to abamectin toxicity, the studies with the unique polymorphic CF-1 mouse are not relevant for human risk assessment. Impact of ABCB1 (P-glycoprotein) polymorphisms on abamectin toxicity in humans showed no evidence for mutations of the ABCB1 gene in the human population; most common haplotypes were found to have equal functionality. Oral toxicity and plasma level study in monkeys: NOAEL: 1.0 mg/kg bw≠ per day At birth about 50% P-glycoprotein of adult levels were detected, increasing with postnatal maturation and reaching adult levels at 3-6 months of age
Endocrine disrupting properties	Abamectin does not meet ED criteria
Studies performed on metabolites or impurities	[8,9-Z]-isomer of avermectin B_{1a} :Toxicity lower or comparable to abamectin: - oral LD_{50} 217 mg/kg bw (CD-1 mice) - Developmental study with CD-1 mice: maternal NOAEL 3.0 mg/kg bw per d (highest dose), foetal NOAEL < 0.75 mg/kg bwper d (cleft palate) - Developmental study with rats: maternal NOAEL 1.0 mg/kg bw per day, foetal NOAEL 1.0 mg/kg bw per d (no effects at the highest dose) - One generation study with rats: maternal and reproductive NOAEL 0.40 mg/kg bw per d (highest dose), offspring NOAEL 0.4 mg/kg bw per d (highest dose) - Ames test negative. The reference values derived for abamectin are applicable also for the [8,9-Z]-isomer. Aneugenicity is a data gap. -24-hydroxymethyl-avermectin B1: Genotoxicity/General toxicity covered by the parent. Aneugenicity is a data gap. -Monosaccharide of avermectin B1 [NOA 419150]: Genotoxicity/General toxicity covered by parent. Aneugenicity is a data gap.

Medical data (Regulation (EU) N° 283/2013, Annex Part A, point 5.9)

No adverse health effects from manufacturing. Severely poisoned patients showed a predominantly uneventful recovery from typical symptoms of avermectin toxicity, a single case of myoclonus and polyneuropathy was reported.

Summary[1] (Regulation (EU) N°1107/2009, Annex II, point 3.1 and 3.6)

	Value (mg/kg bw (per day))	Study	Uncertainty factor
Acceptable Daily Intake (ADI)	0.0012	Developmental neurotoxicity, rat	100
Acute Reference Dose (ARfD)	0.0012	Developmental neurotoxicity, rat	100
Acceptable Operator Exposure Level (AOEL)	0.0012	Developmental neurotoxicity, rat	100
Acute Acceptable Operator Exposure Level (AAOEL)	0.0012	Developmental neurotoxicity, rat	100

The previous reference values (European Commission, 2008) are: The acceptable daily intake (ADI) and acceptable operator exposure level (AOEL) are 0.0025 mg/kg bw/day based on the short term dog studies, whereas the acute reference dose (ARfD) is 0.005 mg/kg bw based on the acute neurotoxicity study.

Dermal absorption (Regulation (EU) N° 284/2013, Annex Part A, point 7.3)

Representative formulation (Abamectin 1.8% EC)	*in vitro* study with human skin: Concentrate: 11% Spray dilution: 4.8% (dilution 1:10, 1.82 g/L)

Exposure scenarios (Regulation (EU) N° 284/2013, Annex Part A, point 7.2)

Operators	Tomato and strawberries, glasshouse/greenhouse uses, walk-in tunnel, professional back sprayer, upwards and downwards spraying, 0.018 kg as/ha
	Exposure estimates (model): % of AOEL
	Dutch model, upward or downward spraying
	Without PPE: 493
	PPE (gloves during mixing/loading and application): 69
	ECPA model, upward spraying
	Without PPE: 65.5
	PPE (gloves during mixing and loading only): 59
	PPE (gloves during mixing/loading and application and coverall): 33
	ECPA model, downward spraying
	Without PPE: 20.5
	PPE (gloves during mixing and loading only): 16
	PPE (gloves during mixing/loading and application and coverall): 10

[1] If available include also reference values for metabolites

Workers	EFSA model Without PPE: 222 PPE (gloves): 56
Bystanders and residents	Refined exposure-assessment for residents and bystander (considering vapour exposure only) Resident child: 89 Resident adult: 19 Bystander child: 89 Bystander adult: 9

Classification with regard to toxicological data (Regulation (EU) N° 283/2013, Annex Part A, Section 10)

Substance :	Abamectin
Harmonised classification according to Regulation (EC) No 1272/2008 and its Adaptations to Technical Process [Table 3.1 of Annex VI of Regulation (EC) No 1272/2008 as amended][1] :	Repr. 2 (H361d) Acute Tox. 1 (H330 Fatal if inhaled) Acute Tox. 2 (H300 Fatal if swallowed) STOT RE 1 (H372, nervous system)
According to the Peer review, the criteria for classification may be met for:	Repr. 2 (H361d) Acute Tox. 2 (H300 Fatal if swallowed) Acute Tox. 4 (H312 Harmful in contact with skin) Acute Tox. 1 (H330 Fatal if inhaled) STOT RE 1 (H372, nervous system)

[1] 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. OJ L 353, 31.12.2008, 1-1355.

Residues in or on treated products food and feed

Metabolism in plants (Regulation (EU) N° 283/2013, Annex Part A, points 6.2.1, 6.5.1, 6.6.1 and 6.7.1)

Primary crops (Plant groups covered) **OECD Guideline 501**	**Crop groups**	**Crop(s)**	**Application(s)**	**DAT** (days)
	Fruit crops	Tomato	Foliar spray, GH 1) 5x26.4 g/ha (7d), 2.44 N	0 DAT3, 0, 3, 7, 14, 28
			2) 3x280.8 g/ha (14d), 15.6N	0, 3, 7, 14, 28
			Foliar spray, F 1) 5x26 g/ha (7d), 2.4N	0 DAT1, 0 DAT2, 0, 3, 7, 14, 28
			2) 5x246 g/ha (14d), 22.8N	7, 28
		Citrus (orange, lemon, grapefruit)	Fruit direct application 1) 4 µg/fruit 2) 40 µg/fruit	0, 7, 14, 28, 56, 84
	Leafy crops	Celery	Foliar 1a) 4 × 0.017 kg a.s./ha 1b) 4 × 0.011 kg a.s./ha 1c) 4 × 0.111 kg a.s./ha	0, 7, 14, 29, 43
			2a) 10 × 0.017 kg a.s./ha 2b) 10 × 0.011 kg a.s./ha 2b) 10 × 0.111 kg a.s./ha	0, 1, 3, 7, 15, 22
	Pulses/Oilseeds	Cotton	Foliar 1) 100 µg/leaf	0, 0.25, 1, 2, 4, 8
			2) 2 × 0.020 kg a.s./ha	60
			3) 3 × 0.024 kg a.s./ha 4) 2 × 0.224 kg a.s./ha	21
	Due to a different study design it was not possible to state the comparability of the metabolic routes among the different crop groups, but as photolysis is the main mechanism involved in the metabolism of avermectin B1a the metabolism is qualitatively similar for all crop groups.			

Rotational crops (metabolic pattern) **OECD Guideline 502**	**Crop groups**	**Crop(s)**	**PBI** (days)	**Comments**
	Root/tuber crops	Carrots Turnips	14/29/31 120/123	-
	Leafy crops	Lettuce	365	
	Cereal (small grain)	Sorghum		
Rotational crop and primary crop metabolism similar?	Yes			

Processed commodities (standard hydrolysis study) **OECD Guideline 507**	**Conditions**	Avermectin B1a	Monosaccharid of avermectin B1a		
	20 min, 90°C, pH 4	62-65%	16-20% TRR		
	60 min, 100°C, pH 5	67-71%	13-15% TRR		
	20 min, 120°C, pH 6	69-73%	9.7-11% TRR		
Residue pattern in processed commodities similar to residue pattern in raw commodities?	Not exactly the same from a chemical point of view. The same from a toxicological point of view. 30-40% avermectin B1a is degraded. The major degradation product was the monosaccharide of avermectin B1a.				

Plant residue definition for monitoring (RD-Mo) **OECD Guidance, series on pesticides No 31**	sum of avermectin B_{1a}, [8,9-Z]-isomer of avermectin B_{1a}, and avermectin B_{1b}, expressed as avermectin B_{1a}
Plant residue definition for risk assessment (RD-RA)	sum of avermectin B_{1a}, [8,9-Z]-isomer of avermectin B_{1a}, and avermectin B_{1b}, expressed as avermectin B_{1a}
Conversion factor (monitoring to risk assessment)	none

Metabolism in livestock (Regulation (EU) N° 283/2013, Annex Part A, points 6.2.2, 6.2.3, 6.2.4, 6.2.5 6.7.1)

OECD Guideline 503 and **SANCO/11187/2013 rev. 3** (fish) **Animals covered**	**Animal**	**Dose** (mg/kg bw/d)	**Duration** (days)	**N rate/comment**
	Laying hen	-		
	Goat/Cow	0.000125, 0.00125 and 0.025	10	Not applicable: no residues expected in feed from the intended crops
	Pig	-		
	Fish	-		
	Residues of abamectin were readily excreted. Main residue identified in excreta was unchanged avermectin B1a. Representative crops are commonly not used for the formulation of aquaculture diets.			

Time needed to reach a plateau concentration in milk and eggs (days)	Milk: 4-7 days Eggs: no data available
Animal residue definition for monitoring (RD-Mo) **OECD Guidance, series on pesticides No 31**	Avermectin B1a, covered by legal provisions in force for Abamectin from veterinary uses
Animal residue definition for risk assessment (RD-RA)	Avermectin B1a, covered by legal provisions in force for Abamectin from veterinary uses
Conversion factor (monitoring to risk assessment)	No

Metabolism in rat and ruminant similar (Yes/No)	Yes
Fat soluble residues (Yes/No) **(FAO, 2009)**	Yes (log P_{ow}= 4.4)

Residues in succeeding crops (Regulation (EU) N° 283/2013, Annex Part A, point 6.6.2)

Confined rotational crop study (Quantitative aspect) **OECD Guideline 502**	Abamectin residue levels in rotational commodities are not expected to exceed 0.01 mg/kg
Field rotational crop study **OECD Guideline 504**	Not deemed necessary

Stability of residues (Regulation (EU) N° 283/2013, Annex Part A, point 6.1)

OECD Guideline 506

Plant products (Category)	**Commodity**	**T** (°C)	**Stability** (Month)			
			Avermectin B1a	Avermectin B1a [8,9-Z]-isomer	Avermectin B1b	
High water content	Pears	-20ºC	35	35	35	
	Celery	-18ºC	24	24	24	
	Tomato	-18ºC	24	24	24	
High oil content	Sunflower seeds	-18ºC	24	24	24	
	Orange peel	-18ºC	12	12	12	
High protein content	Runner bean	-18ºC	24	24	24	
High starch content	Potato	-18ºC	24	24	24	
High acid content	Strawberries	-20ºC	24	24	24	
Processed products	Orange pulp	-18ºC	12	12	12	
Abamectin is stable up to 12 months in all commodity groups when stored at ≤-18 ºC						

Animal	**Animal commodity**	**T** (°C)	**Stability** (Month/Year)			
	Muscle					
	Liver					
	Kidney					
	Milk					

	Egg					
Storage stability data in animal commodities are not required, since no significant residues are expected and no feeding studies were performed.						

Summary of residues data from the supervised residue trials (Regulation (EU) N° 283/2013, Annex Part A, point 6.3) OECD Guideline 509, OECD Guidance, series on pesticides No 66 and OECD MRL calculator

Crop	**Region/ Indoor** (a)	**Residue levels** (mg/kg) **observed in the supervised residue trials relevant to the supported GAPs** (b)	**Recommendations/comments** (OECD calculations)	**MRL** proposals (mg/kg) (e)	**HR** (mg/kg) (c)	**STMR** (mg/kg) (d)
Representative uses						
Tomato	Indoor (South)	6 × < 0.01, 2 × 0.01	OECD: 0.0152 mg/kg	0.015	0.01	0.01
	Indoor (North)	Data gap				
Strawberry	Indoor (South)	1 × <0.01, 0.014, 0.017, 0.019, 0.02, 0.021, 2 × 0.041	OECD: 0.07 mg/kg	0.07	0.041	0.02
	Indoor (North)	Data gap				
Summary of the data on formulation equivalence OECD Guideline 509						
Crop	**Region**	**Residue data** (mg/kg)	**Recommendations/comments**			
Summary of data on residues in pollen and bee products (Regulation (EU) No 283/2013, Annex Part A, point 6.10.1)						
Product(s)	**Region**	**Residue data** (mg/kg)	**Recommendations/comments**			

(a): **NEU** or **SEU** for northern or southern **outdoor** trials in EU member states (**N+SEU** if both zones), **Indoor** for glasshouse/protected crops, **Country** if non-EU location.
(b): Residue levels in trials conducted according to GAP reported in ascending order (*e.g.* 3x <0.01, 0.01, 6x 0.02, 0.04, 0.08, 3x 0.10, 2x 0.15, 0.17). When residue definition for monitoring and risk assessment differs, use **Mo/RA** to differentiate data expressed according to the residue definition for **Mo**nitoring and **R**isk **A**ssessment.
(c): **HR**: Highest residue. When residue definition for monitoring and risk assessment differs, HR according to residue definition for monitoring reported in brackets (HR_{Mo}).
(d): **STMR:** Supervised Trials Median Residue. When residue definition for monitoring and risk assessment differs, STMR according to definition for monitoring reported in brackets ($STMR_{Mo}$).
(e): MRL calculated (OECD calculator) in this dossier are below the ones already set in Reg. (EU) No 2016/1003. It is not proposed to change any of the set EU-MRLs.

Inputs for animal burden calculations

Not relevant.

Residues from livestock feeding studies (Regulation (EU) N° 283/2013, Annex Part A, points 6.4.1, 6.4.2, 6.4.3 and 6.4.4)

OECD Guideline 505 and OECD Guidance, series on pesticides No 73

MRL calculations	**Ruminant**				**Pig/Swine**		**Poultry**		**Fish**	
Highest expected intake (mg/kg bw/d)	Beef cattle	-	Ram/Ewe	-	Breeding	-	Broiler	-	Carp	-
(mg/kg DM for fish)	Dairy cattle	-	Lamb	-	Finishing	-	Layer	-	Trout	-
							Turkey	-	Fish intake >0.1 mg/kg DM	
Intake >0.004 mg/kg bw	No		No		No		No		No	
Feeding study submitted	No		No		No		No		No	
Representative feeding level (mg/kg bw/d, mg/kg DM for fish) and **N rates**	Level	Beef: N Dairy: N	Level	Lamb: N Ewe: N	Level	N rate Breed/Finish	Level	B or T: N Layer: N	Level	N rate Carp/Trout
	Estimated HR[(a)] at 1N	**MRL** proposals	Estimated HR[(a)] at 1N	**MRL** proposals	Estimated HR[(a)] at 1N	**MRL** proposals	Estimated HR[(a)] at 1N	**MRL** proposals	Estimated HR[(a)] at 1N	**MRL** proposals
Muscle										
Fat										
Meat[(b)]										
Liver										
Kidney										
Milk[(a)]										
Eggs										
Method of calculation[(c)]										

[(a)]: Estimated HR calculated at 1N level (**estimated mean level for milk**).
[(b)]: HR in meat calculated for mammalian on the basis of 20% fat + 80% muscle and 10% fat + 90% muscle for poultry
[(c)]: The OECD guidance document on residues in livestock (series on pesticides 73) recommends three different approaches to derive MRLs for animal products; by applying a transfer factor (Tf), by intrapolation (It) or by linear regression (Ln). Fill in method(s) considered to derive the MRL proposals.

STMR calculations	**Ruminant**				**Pig/Swine**		**Poultry**		**Fish**	
Median expected intake (mg/kg bw/d) (mg/kg DM for fish)	Beef cattle	-	Ram/Ewe	-	Breeding	-	Broiler	-	Carp	-
	Dairy cattle	-	Lamb	-	Finishing	-	Layer	-	Trout	-
							Turkey	-		
Representative feeding level (mg/kg bw/d, mg/kg DM for fish) and **N rates**	Level	Beef: N Dairy: N	Level	Lamb : N Ewe: N	Level	N rate Breed/Finish	Level	B or T: N Layer: N	Level	N rate Carp/Trout
	Mean level in feeding level	Estimated **STMR**[(b)] at 1N	Mean level in feeding level	Estimated **STMR**[(b)] at 1N	Mean level in feeding level	Estimated **STMR**[(b)] at 1N	Mean level in feeding level	Estimated **STMR**[(b)] at 1N	Mean level in feeding level	Estimated **STMR**[(b)] at 1N
Muscle										
Fat										
Meat[(a)]										
Liver										
Kidney										
Milk										
Eggs										
Method of calculation[(c)]										

[(a)]: STMR in meat calculated for mammalian on the basis of 20% fat + 80% muscle and 10% fat + 90% muscle for poultry
[(b)]: When the mean level is set at the LOQ, the STMR is set at the LOQ.
[(c)]: The OECD guidance document on residues in livestock (series on pesticide 73) recommends three different approaches to derive MRLs for animal products; by applying a transfer factor (Tf), by intrapolation (It) or by linear regression (Ln). Fill in method(s) considered to derive the MRL proposals.

Processing factors (Regulation (EU) N° 283/2013, Annex Part A, points 6.5.2 and 6.5.3)

OECD Guideline 508 and OECD Guidance, series on testing and assessment No 96

Crop (RAC)/Edible part or Crop (RAC)/Processed product	Number of trials[(a)]	Processing Factor (PF)		Conversion Factor (CF_P) for RA[(b)]
		Individual values	Median PF	
Representative uses				
Tomato/ raw juice	4	0.32, 0.28, 0.14, 0.58	0.30	-
Tomato/ pasteurised juice	6	0.29, 0.30, 0.21, 0.31, 0.12, 0.53	0.30	-
Tomato/ raw puree	4	1.63, 1.68, 0.23, 1.84	1.66	-
Tomato/ pasteurised puree	6	1.58, 1.81, 1.07, 1.56, 0.23, 1.53	1.55	-
Tomato/ raw paste	2	0.30, 2.61	1.46	-
Tomato/ pasteurised paste	2	0.34, 2.42	1.38	-
Tomato/preserves	4	0.21, 0.19, 0.15, 0.23	0.20	-

[(a)]: Studies with residues in the RAC at or close to the LOQ should be disregarded (unless concentration)
[(b)]: When the residue definition for risk assessment differs from the residue definition for monitoring

Consumer risk assessment (Regulation (EU) N° 283/2013, Annex Part A, point 6.9)

Including all uses (representative uses).

ADI	0.0012 mg/kg bw per day
TMDI according to EFSA PRIMo 2	Highest TMDI: 2.71 % ADI (WHO Cluster diet B)
NTMDI, according to (to be specified)	Highest NTMDI: no refinement needed
IEDI (% ADI), according to EFSA PRIMo 3.1	Highest IEDI: 3% ADI (GEMS/Food G06)
NEDI (% ADI), according to (to be specified)	Not relevant
Factors included in the calculations	
ARfD	0.0012 mg/kg bw
IESTI (% ARfD), according to EFSA PRIMo 2	Highest IESTI: 53.3% ARfD (Strawberry) 48.5% ARfD (Tomato) 4.4% ARfD (Tomato juice)
IESTI (% ARfD), according to EFSA PRIMo 3.1	Highest IESTI: 56% ARfD (Strawberry) 48% ARfD (Tomato)
NESTI (% ARfD), according to (to be specified)	Not relevant
Factors included in IESTI and NESTI	

Proposed MRLs (Regulation (EU) No 283/2013, Annex Part A, points 6.7.2 and 6.7.3)

Code[(a)]	Commodity/Group	MRL/Import tolerance[(b)] (mg/kg) and Comments	
Plant commodities			
Representative uses			
0231010	Tomato	0.09	No change of MRL proposed
0152000	Strawberry	0.15	No change of MRL proposed
Animal commodities Not relevant			
-	-		
-	-		

(a): Commodity code number, as listed in Annex I of Regulation (EC) No 396/2005
(b): MRLs proposed at the LOQ, should be annotated by an asterisk (*) after the figure.

Environmental fate and behaviour

The fate and behaviour of the B_{1b} component of abamectin in soil water and air is expected to be comparable to that of the B_{1a} component due to the small difference in the structure resulting from an ethyl or a methyl functional group substitution in a compound with a molecular mass of >850 (assessment of B_{1a} is considered to cover B_{1b} and both their consequent [8,9-Z] isomers) (EFSA, 2016)[4].

Route of degradation (aerobic) in soil (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.1.1)

Mineralisation after 100 days	20 °C: 4.1-14.0 % after 91 d, [23-^{14}C]-avermectin B_{1a} (n^5 = 6) 10 °C: 1.4 % after 91 d, [23-^{14}C]- avermectin B_{1a} (n = 1)
Non-extractable residues after 100 days	20 °C: 17.0-39.1 % after 91 d, [23-^{14}C]- avermectin B_{1a} (n = 9) 10 °C: 11.7-17.0 % after 91 d, [23-^{14}C]- avermectin B_{1a} (n = 2)
Metabolites requiring further consideration - name and/or code, % of applied (range and maximum)	8a-oxo-avermectin B_{1a} (NOA448111): 20 °C: 3.8-17.0 % at 62 d (n = 9) 10 °C: 10.8-17.0 % at 90 d (n = 2) 8a-hydroxy-avermectin B_{1a} (NOA448112): 20 °C: 0.9-22.0 % at 62 d (n = 9) 10 °C: 12.0-15.0 % at 90 d (n = 2) 4”-oxo-avermectin B_{1a} (NOA426289): 20 °C: 1.0-12.0 % at 21 d (n = 4) 10 °C: 11.0 % at 90 d (n = 1) 4,8-dihydroxy-avermectin B1a (NOA457464, M6): 20 °C: 0.5-9.9 % at 90 d (n = 5) 10 °C: 7.1 % at 90 d (n = 1) 8a-oxo-4-hydroxy-avermectin B1a (NOA457465): 20 °C: 3.9-9.9 % at 168 d (n = 5) 10 °C: 4.4 % at 90 d (n = 1) 8-carboxy-6-hydroxy-avermectin B1a (M4): 20 °C: 2.0-9.0 % at 90 d (n = 4) 10 °C: 3.0 % at 90 d (n = 1) All metabolites were labelled at [23-^{14}C]

Route of degradation (anaerobic) in soil (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.1.2)

Mineralisation after 100 days	2.7 % after 91 d, [23-^{14}C] -avermectin B_{1a} (n = 1)
Non-extractable residues after 100 days	24.8 % after 91 d, [23-^{14}C] -avermectin B_{1a} (n = 1)

[4] EFSA Journal 2016;14(5):4491
[5] n corresponds to the number of soils.

Metabolites that may require further consideration for risk assessment - name and/or code, % of applied (range and maximum)	8a-oxo-avermectin B_{1a} (NOA448111): 9.9 % at 14 d (n = 1) 8a-hydroxy-avermectin B_{1a} (NOA448112): 14.2 % at 3 d (n = 1)

Route of degradation (photolysis) on soil (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.1.3)

Metabolites that may require further consideration for risk assessment - name and/or code, % of applied (range and maximum)	8a-oxo-avermectin B_{1a} (NOA448111): 5.7 % at 21 d (n = 1) 8a-hydroxy-avermectin B_{1a} (NOA448112): 4.0 % at 10 d (n = 1)
Mineralisation at study end	7.6 % after 28 d, [23-^{14}C] -avermectin B_{1a} (n = 1)
Non-extractable residues at study end	25.9 % after 28 d, [23-^{14}C] -avermectin B_{1a} (n = 1)

Rate of degradation in soil (aerobic) laboratory studies active substance (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.2.1.1 and Regulation (EU) N° 284/2013, Annex Part A, point 9.1.1.1)

Abamectin B_{1a}	Dark aerobic conditions					
Soil type (Study; Kinetic evaluation)	**pH[a)]**	**T °C / % MWHC**	**DT_{50} /DT_{90} (d)** ***Biphasic parameters***	**DT_{50} (d) 20 °C pF2/10kPa[b)]**	**St. (χ^2)**	**Method of calculation[d)] for best-fit / modelling endpoints**
Gartenacker, loam (Nicollier, 2001; RMS AT)	7.3	20 °C / 40 %	15.1 / 88.7 *α = 1.627* *β = 28.43*	26.7[c)]	2.65	FOMC
Gartenacker, silt loam (Adam, 2001a; RMS AT)	7.2	20 °C / 40 %	19.5 / 90.2 *α = 2.674* *β = 66.01*	27.1 [c)]	3.67	FOMC
Pappelacker, loamy sand (Phaff, 2003; RMS AT)	7.4	20 °C / 40 %	23.5 / 77.9	23.5	6.6	SFO
18-Acres, sandy clay loam (Phaff, 2003; RMS AT)	5.8	20 °C / 40 %	15.9 / 52.7	15.9	17.3	SFO
Marsillagues, silty clay loam (Phaff, 2003; RMS AT)	7.9	20 °C / 40 %	**49.3** / **164**	38.5	3.47	SFO
LUFA 2.2, loamy sand (Hellstern, 2009a; Serrano, 2016)	5.7	20 °C / 45 %	12.4 / 151.6 *α = 0.798* *β = 8.97*	45.7 [c)]	10.12	FOMC
LUFA 2.1, loamy sand (Hellstern, 2009b; Serrano, 2016)	5.67	20 °C / 45 %	18.6 / 61.7	18.6	4.31	SFO
LUFA 2.3, sandy loam (Hellstern, 2009b; Serrano, 2016)	6.87	20 °C / 45 %	27.2 / 90.5	21.1	1.97	SFO
LUFA 5M, sandy loam (Hellstern, 2009b; Serrano, 2016)	7.22	20 °C / 45 %	27.8 / 85.6	22.8	3.79	SFO
Geometric mean (n = 9)				**25.3**		
pH dependence				No		
Gartenacker, silt loam (Adam, 2001a; RMS AT)	7.2	10 °C / 40 %	57.6 / 191	-	2.24	SFO
LUFA 2.2, loamy sand (Hellstern, 2009c; Serrano, 2016)	5.73	10 °C / 45 %	28.9 / 125.8	-	5.55	DFOP

[a)] Measured in water
[b)] Normalised using a Q_{10} of 2.58 and Walker equation coefficient of 0.7
[c)] DT_{50} = FOMC-DT_{90} / 3.32
[d)] when two methods mentioned: 1st for persistence endpoint, 2nd for modelling endpoint

Rate of degradation in soil (aerobic) laboratory studies transformation products (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.2.1.2 and Regulation (EU) N° 284/2013, Annex Part A, point 9.1.1.1)

8a-oxo-avermectin B_{1a} (NOA448111)	Dark aerobic conditions, the precursor from which the f.f. was derived was abamectin B_{1a}						
Soil type	**pH[a)]**	**T °C / % MWHC**	**DT_{50}/ DT_{90} (d)**	**f. f. k_f / k_{dp}**	**DT_{50} (d) 20 °C pF2/10kPa[b)]**	**St. (χ^2)**	**Method of calculation**
Gartenacker, loam	7.3	20 °C / 40 %	52.5 / 174	0.196	52.5	14.5	$FOMC_P \rightarrow SFO_M$
Gartenacker, silt loam	7.2	20 °C / 40 %	53.9 / 179	0.224	53.9	13.5	$FOMC_P \rightarrow SFO_M$
Pappelacker, loamy sand	7.4	20 °C / 40 %	43.9 / 146	0.180	43.9	14.4	$SFO_P \rightarrow SFO_M$
8-Acres, sandy clay loam	5.8	20 °C / 40 %	68.4 / 227	n/a	68.4	11.8	$SFO_P \rightarrow SFO_M$
Marsillagues, silty clay loam	7.9	20 °C / 40 %	71.3 / 237	0.138	55.6	12.9	$SFO_P \rightarrow SFO_M$
LUFA 2.2, loamy sand	5.7	20 °C / 45 %	47.0 / 156	0.284	47.0	14.8	$FOMC_P \rightarrow SFO_M$
Geometric mean (n = 6)					**53.0**		
Arithmetic mean (n = 5)				**0.204**			
pH dependence					No		
Gartenacker, sandy loam	7.2	10 °C / 40 %	114 / 379	0.235	-	16.1	$SFO_P \rightarrow SFO_M$
LUFA 2.2, loamy sand	5.73	10 °C / 45 %	83.2 / 276	0.309	-	13.6	$DFOP_P \rightarrow SFO_M$

a) Measured in water
b) Normalised using a Q_{10} of 2.58 and Walker equation coefficient of 0.7

8a-hydroxy-avermectin B_{1a} (NOA448112)	Dark aerobic conditions, the precursor from which the f.f. was derived was abamectin B_{1a}						
Soil type	**pH[a)]**	**T °C / % MWHC**	**DT_{50}/ DT_{90} (d)**	**f. f. k_f / k_{dp}**	**DT_{50} (d) 20 °C pF2/10kPa[b)]**	**St. (χ^2)**	**Method of calculation**
Gartenacker, loam	7.3	20 °C / 40 %	37.6 / 125	0.330	37.6	4.86	$FOMC_P \rightarrow SFO_M$
Gartenacker, silt loam	7.2	20 °C / 40 %	35.3 / 117	0.306	35.3	4.46	$FOMC_P \rightarrow SFO_M$
Pappelacker, loamy sand	7.4	20 °C / 40 %	27.1 / 90.1	0.314	27.1	10.6	$SFO_P \rightarrow SFO_M$
18-Acres, sandy clay loam	5.8	20 °C / 40 %	22.5 / 74.6	n/a	22.5	7.19	$SFO_P \rightarrow SFO_M$
Marsillagues, silty clay loam	7.9	20 °C / 40 %	45.7 / 152	0.264	35.7	7.05	$SFO_P \rightarrow SFO_M$
LUFA 2.2, loamy sand	5.7	20 °C / 45 %	35.8 / 119	0.162	35.8	21.1	$FOMC_P \rightarrow SFO_M$
LUFA 2.1, loamy sand	5.67	20 °C / 45 %	16.9 / 56.0	0.329	16.9	13.9	$SFO_P \rightarrow SFO_M$
LUFA 2.3, sandy loam	6.87	20 °C / 45 %	57.3 / 190	0.410	44.4	7.47	$SFO_P \rightarrow SFO_M$
LUFA 5M, sandy loam	7.22	20 °C / 45 %	52.8 / 175	0.325	46.7	12.5	$SFO_P \rightarrow SFO_M$
Geometric mean (n = 9)					**32.1**		
Arithmetic mean (n = 8)				**0.305**			
pH dependence					No		
Gartenacker, sandy loam	7.2	10 °C / 40 %	38.5 / 128	0.556	-	7.45	$SFO_P \rightarrow SFO_M$
LUFA 2.2, loamy sand	5.73	10 °C / 45 %	81.7 / 272	0.203	-	20.0	$DFOP_P \rightarrow SFO_M$

a) Measured in water
b) Normalised using a Q_{10} of 2.58 and Walker equation coefficient of 0.7

4,8-dihydroxy-avermectin B_{1a} (NOA457464, M6)	Dark aerobic conditions, the precursor from which the f.f. was derived was 8a-hydroxy-avermectin B_{1a} (NOA448112)						
Soil type	**pH[a)]**	**t. °C / % MWHC**	**DT_{50}/ DT_{90} (d)**	**f. f. k_f / k_{dp}**	**DT_{50} (d) 20 °C pF2/10kPa[b)]**	**St. (χ^2)**	**Method of calculation**
Gartenacker, loam	7.3	20 °C / 40 %	74.0 / 246	0.719	74.0	14.4	$SFO_P \rightarrow SFO_M$
Gartenacker, silt loam	7.2	20 °C / 40 %	44.5 / 148	0.943	44.5	7.39	$SFO_P \rightarrow SFO_M$
Pappelacker, loamy sand	7.4	20 °C / 40 %	61.6 / 205	0.560	61.6	10.2	$SFO_P \rightarrow SFO_M$
Marsillagues, silty clay loam	7.9	20 °C / 40 %	46.0 / 153	0.505	35.9	32.6	$SFO_P \rightarrow SFO_M$
Geometric mean (n = 4)					**51.9**		
Arithmetic mean (n = 4)				**0.682**			
pH dependence					No		

a) Measured in water
b) Normalised using a Q_{10} of 2.58 and Walker equation coefficient of 0.7

8a-oxo-4-hydroxy-avermectin B_{1a} (NOA457465)	Dark aerobic conditions, the precursor from which the f.f. was derived was 8a-oxo-avermectin B_{1a} (NOA448111)						
Soil type	**pH[a)]**	**t. °C / % MWHC**	**DT_{50}/ DT_{90} (d)**	**f. f. k_f / k_{dp}**	**DT_{50} (d) 20 °C pF2/10kPa[b)]**	**St. (χ^2)**	**Method of calculation**
Gartenacker, loam	7.3	20 °C / 40 %	181 / 602	0.841	181	7.26	$SFO_P \rightarrow SFO_M$
Gartenacker, silt loam	7.2	20 °C / 40 %	65.3 / 217	1.0	65.3	12.5	$SFO_P \rightarrow SFO_M$
Pappelacker, loamy sand	7.4	20 °C / 40 %	122 / 405	0.995	122	13.3	$SFO_P \rightarrow SFO_M$
Marsillagues, silty clay loam	7.9	20 °C / 40 %	50.5 / 168	1.0	39.4	34.9	$SFO_P \rightarrow SFO_M$
Geometric mean (n = 4)					**86.8**		
Arithmetic mean (n = 4)				**0.959**			
pH dependence					No		

a) Measured in water
b) Normalised using a Q_{10} of 2.58 and Walker equation coefficient of 0.7

4"-oxo-avermectin B_{1a} (NOA426289)	Dark aerobic conditions, the precursor from which the f.f. was derived was abamectin B_{1a}						
Soil type	**pH[a)]**	**t. °C / % MWHC**	**DT_{50}/ DT_{90} (d)**	**f. f. k_f / k_{dp}**	**DT_{50} (d) 20 °C pF2/10kPa[b)]**	**St. (χ^2)**	**Method of calculation**
LUFA 2.2, loamy sand	5.7	20 °C / 45 %	35.0 / 116	0.233	35.0	14.6	$FOMC_P \rightarrow SFO_M$
LUFA 2.1, loamy sand	5.67	20 °C / 45 %	5.5 / 18.2	0.294	5.5	15.0	$SFO_P \rightarrow SFO_M$
Geometric mean (n = 2)					**13.9** [d)]		
Arithmetic mean (n = 2)				**0.264** [d)]			
pH dependence					No		
LUFA 2.2, loamy sand[c)]	5.73	10 °C / 45 %	46.4 / 154	0.254	-	15.6	$DFOP_P \rightarrow SFO_M$

a) Measured in water
b) Normalised using a Q_{10} of 2.58 and Walker equation coefficient of 0.7
c) 10 °C experimental data considered as additional soil for deriving persistence endpoints
d) A data gap was identified for soil incubation to address the degradation rate of 4"-oxo-avermectin B1a (NOA 426289) in one additional soil.

8-carboxy-6-hydroxy-avermectin B_{1a} (M4)	Dark aerobic conditions, the precursor from which the f.f. was derived was 8a-hydroxy-avermectin B_{1a} (NOA448112)						
Soil type	**pH[a)]**	**T °C / % MWHC**	**DT_{50}/ DT_{90} (d)**	**f. f. k_f / k_{dp}**	**DT_{50} (d) 20 °C pF2/10kPa[b)]**	**St. (χ^2)**	**Method of calculation**
LUFA 2.3, sandy loam	6.87	20 °C / 45 %	31.9 / 106	1.0	24.7	7.51	$SFO_P \rightarrow SFO_M$
LUFA 5M, sandy loam	7.22	20 °C / 45 %	31.3 / 104	0.823	27.7	22.2	$SFO_P \rightarrow SFO_M$
LUFA 2.2, loamy sand [c)]	5.73	10 °C / 45 %	31.4 / 104	1.0	9.43	27.0	$SFO_P \rightarrow SFO_M$
Geometric mean (n = 3)					**18.6**		
Arithmetic mean (n = 3)				**0.941**			
pH dependence					No		

a) Measured in water
b) Normalised using a Q_{10} of 2.58 and Walker equation coefficient of 0.7
c) 10 °C study, normalised to reference conditions (20 °C, pF 2) using correction factors for temperature and moisture of 0.3876 and 0.775, respectively

Rate of degradation field soil dissipation studies (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.2.2.1 and Regulation (EU) N° 284/2013, Annex Part A, point 9.1.1.2.1)

Abamectin B_{1a}	Aerobic conditions							
Soil type (indicate if bare or cropped soil was used)	**Location (country or USA state)**	**pH[a)]**	**Depth (cm)**	**DT_{50} (d) actual**	**DT_{90} (d) actual**	**St. (χ^2)**	**DT_{50} (d) Norm[b)]**	**Method of calculation**
Silty loam, bare soil	Neu-Ulm, Germany	7.6	30	0.32	3.51	3.0	-	DFOP
Silt, bare soil	Wissembourg, France	5.7	30	0.53	1.74	4.6	-	SFO
Loam, bare soil	Juzancourt, France	6.3	10	0.26	0.86	26.3	-	SFO
Clayey loam, bare soil	Herrentierbach, Germany	6.3	30	1.70	5.63	22.5	-	SFO
Silt loam, bare soil	Mauchenheim, Germany	7.6	30	**0.677**	**15.5**	13.0	-	FOMC
Geometric mean (if not pH dependent)							-	
pH dependence				No				

a) Measured in water; except for Wallersdorf-See (measured in KCl)
b) Normalised using a Q_{10} of 2.58 and Walker equation coefficient of 0.7

Combined laboratory and field kinetic endpoints for modelling (when not from different populations)*

Rate of degradation in soil active substance, normalised geometric mean (if not pH dependent)	Not relevant	
Rate of degradation in soil transformation products, normalised geometric mean (if not pH dependent)	Not relevant	Not relevant
Kinetic formation fraction (f. f. k_f / k_{dp}) of transformation products, arithmetic mean	Not relevant	Not relevant

* Only relevant after implementation of the published EFSA guidance describing how to amalgamate laboratory and field endpoints.

Soil accumulation (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.2.2.2 and Regulation (EU) N° 284/2013, Annex Part A, point 9.1.1.2.2)

Soil accumulation and plateau concentration	No study submitted

Rate of degradation in soil (anaerobic) laboratory studies active substance (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.2.1.3 and Regulation (EU) N° 284/2013, Annex Part A, point 9.1.1.1)

Abamectin B_{1a}	Dark anaerobic conditions					
Soil type	**pH[a)]**	**T °C / % MWHC**	**DT_{50} / DT_{90} (d)**	**DT_{50} (d) 20 °C[b)]**	**St. (χ^2)**	**Method of calculation**
Gartenacker, loam	7.3	20 °C / flooded	80 / 353	-	2.70	DFOP
Geometric mean (if not pH dependent)				-		

a) Measured in water
b) Normalised using a Q_{10} of 2.58

Rate of degradation in soil (anaerobic) laboratory studies transformation products (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.2.1.4 and Regulation (EU) N° 284/2013, Annex Part A, point 9.1.1.1)

8a-oxo-avermectin B_{1a} (NOA448111)	Dark anaerobic conditions, metabolite dosed or the precursor from which the f.f. was derived was abamectin B_{1a}						
Soil type	**pH[a)]**	**T °C / % MWHC**	**DT_{50}/ DT_{90} (d)**	**f. f. k_f / k_{dp}**	**DT_{50} (d) 20°C[b)]**	**St. (χ^2)**	**Method of calculation**
Gartenacker, loam	7.3	20 °C / flooded	175 / 581	n/a	-	9.94	$DFOP_P \rightarrow SFO_M$
Geometric mean (if not pH dependent)					-		
Arithmetic mean				-			

a) Measured in water
b) Normalised using a Q_{10} of 2.58

8a-hydroxy-avermectin B_{1a} (NOA448112)	Dark anaerobic conditions, metabolite dosed or the precursor from which the f.f. was derived was abamectin B_{1a}						
Soil type	**pH[a)]**	**T °C / % MWHC**	**DT_{50}/ DT_{90} (d)**	**f. f. k_f / k_{dp}**	**DT_{50} (d) 20°C[b)]**	**St. (χ^2)**	**Method of calculation**
Gartenacker, loam	7.3	20 °C / flooded	100 / 332	n/a	-	11.4	$DFOP_P \rightarrow SFO_M$
Geometric mean (if not pH dependent)					-		
Arithmetic mean				-			

a) Measured in water
b) Normalised using a Q_{10} of 2.58

4,8-dihydroxy-avermectin B_{1a} (NOA457464, M6)	Dark anaerobic conditions, metabolite dosed or the precursor from which the f.f. was derived was 8a-hydroxy-avermectin B_{1a} (NOA448112)						
Soil type	**pH[a)]**	**T °C / % MWHC**	**DT_{50}/ DT_{90} (d)**	**f. f. k_f / k_{dp}**	**DT_{50} (d) 20°C[b)]**	**St. (χ^2)**	**Method of calculation**
Gartenacker, loam	7.3	20 °C / flooded	177 / 589	n/a	-	15.9	$DFOP_P \rightarrow SFO_M$
Geometric mean (if not pH dependent)					-		
Arithmetic mean				-			

a) Measured in water
b) Normalised using a Q_{10} of 2.58

Rate of degradation on soil (photolysis) laboratory active substance (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.1.3

Abamectin B_{1a}	Soil photolysis				
Soil type	**pH[a)]**	**T °C / % MWHC**	**DT_{50} / DT_{90} (d) calculated at 30-50 °N**	**St. (χ^2)**	**Method of calculation**
Gartenacker, sandy loam	7.1	24.5 / 75 % FC	21.0 / 69.6	8.85	SFO

a) Measured in water

Soil adsorption active substance (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.3.1.1 and Regulation (EU) N° 284/2013, Annex Part A, point 9.1.2.1)

Abamectin B_{1a}							
Soil Type	**OC %[a)]**	**Soil pH[b)]**	**K_d (mL/g)**	**K_{doc} (mL/g)**	**K_F (mL/g)**	**K_{Foc} (mL/g)**	**1/n**
Borstel (DE), lS	1.51	5.8	-	-	87.2	5701	0.961
Pappelacker (CH), lS	0.99	7.6	-	-	77.3	7893	0.961
Schwaderloch (CH), sL	1.28	7.4	-	-	76.8	6004	0.950
Gartenacker (CH), uL	2.61	7.1	-	-	178	6875	1.001
Vetroz (CH), uL	4.99	7.2	-	-	334	6682	1.013
Geometric mean (if not pH dependent)					125.2	**6588**	
Arithmetic mean (if not pH dependent)							**0.977**
pH dependence			No				

[a)] Calculated as OC = OM × 0.58
[b)] Measured in water

Soil adsorption transformation products (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.3.1.2 and Regulation (EU) N° 284/2013, Annex Part A, point 9.1.2.1)

8a-oxo-avermectin B_{1a} (NOA448111)							
Soil Type	**OC % [a)]**	**Soil pH[b)]**	**K_d (mL/g)**	**K_{doc} (mL/g)**	**K_F (mL/g)**	**K_{Foc} (mL/g)**	**1/n**
Pappelacker (CH), lS	0.99	7.56	-	-	38.3	3912	0.835
Gartenacker (CH), uL	2.61	7.13	-	-	78.4	3027	0.826
18 Acres (UK), scL	2.49	5.83	-	-	128	5052	0.827
Geometric mean (if not pH dependent)*					72.7	**3911**	
Arithmetic mean (if not pH dependent)							**0.829**
pH dependence			No				

[a)] Calculated as OC = OM × 0.58
[b)] Measured in water

8a-hydroxy-avermectin B_{1a} (NOA448112)							
Soil Type	**OC % [a)]**	**Soil pH[b)]**	**K_d (mL/g)**	**K_{doc} (mL/g)**	**K_F (mL/g)**	**K_{Foc} (mL/g)**	**1/n**
Pappelacker (CH), lS	0.99	7.56	-	-	15.9	1626	0.857
Gartenacker (CH), uL	2.61	7.13	-	-	28.4	1098	0.796
18 Acres (UK), scL	2.49	5.83	-	-	78.9	3104	0.961
Geometric mean (if not pH dependent)*					32.9	**1770**	
Arithmetic mean (if not pH dependent)							**0.871**
pH dependence			No				

a) Calculated as OC = OM × 0.58
b) Measured in water

Soil adsorption of 8-carboxy-6-hydroxy avermectin B_{1a} (M4) were taken from 8a-hydroxy-avermectin B_{1a} (NOA448112) due to their similar molecular properties and lack of experimental data (i.e., K_{fOC} = 1770 L/kg, 1/n = 0.871).

4,8-dihydroxy-avermectin B_{1a} (NOA457464, M6)							
Soil Type	**OC % [a)]**	**Soil pH[b)]**	**K_d (mL/g)**	**K_{doc} (mL/g)**	**K_F (mL/g)**	**K_{Foc} (mL/g)**	**1/n**
Pappelacker (CH), lS	0.99	7.56	-	-	16.9	1690	0.890
Gartenacker (CH), uL	2.61	7.13	-	-	28.0	1082	0.902
18 Acres (UK), scL	2.49	5.83	-	-	61.3	2423	0.944
Geometric mean (if not pH dependent)*					30.7	**1642**	
Arithmetic mean (if not pH dependent)							**0.912**
pH dependence			No				

a) Calculated as OC = OM × 0.58
b) Measured in water

8a-oxo-4-hydroxy-avermectin B_{1a} (NOA457465)							
Soil Type	**OC % [a)]**	**Soil pH[b)]**	**K_d (mL/g)**	**K_{doc} (mL/g)**	**K_F (mL/g)**	**K_{Foc} (mL/g)**	**1/n**
Pappelacker (CH), lS	0.99	7.56	-	-	32.7	3338	0.791
Gartenacker (CH), uL	2.61	7.13	-	-	66.6	2573	1.005
18 Acres (UK), scL	2.49	5.83	-	-	148	5813	1.011
Geometric mean (if not pH dependent)*					68.6	**3682**	
Arithmetic mean (if not pH dependent)							**0.936**
pH dependence			No				

a) Calculated as OC = OM × 0.58
b) Measured in water

4"-oxo-avermectin B_{1a} (NOA426289)							
Soil Type	**OC %**	**Soil pH[a)]**	**K_d (mL/g)**	**K_{doc} (mL/g)**	**K_F (mL/g)**	**K_{Foc} (mL/g)**	**1/n**
LUFA 2.2 (DE), lS	1.57	5.65	-	-	27.9	1778	0.93
LUFA 2.3 (DE), sL	0.64	6.07	-	-	39.3	6142	1.085
LUFA 2.4 (DE), L	2.13	7.51	-	-	30.4	1427	0.876
Lowest individual value[b)]					30.4	**1427**	
Value corresponding to lowest K_{Foc}[b)]							**0.876**
pH dependence			No				

a) Measured in $CaCl_2$

b) Due to uncertainties in the reliability of the available adsorption measurements, experts agreed that the lowest measured adsorption value of 1427 mL/g and the corresponding 1/n of 0.876 shall be used as endpoint for exposure assessment

8-carboxy-6-hydroxy avermectin B_{1a} (M4)							
Soil Type	**OC %**	**Soil pH[a)]**	**K_d (mL/g)**	**K_{doc} (mL/g)**	**K_F (mL/g)**	**K_{Foc} (mL/g)**	**1/n**
No experimental data (data gap)[a)]							
Geometric mean (if not pH dependent)						**1082** [a)]	
Arithmetic mean (if not pH dependent)							**1.0** [a)]
pH dependence			No				

a) As no experimental data were available a data gap was identified; however experts agreed that the lowest measured K_{Foc} value from all compounds (1082 L/kg) and a default 1/n of 1 shall be used as a reasonably conservative estimate endpoint for exposure assessment

Mobility in soil column leaching active substance (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.4.1.1 and Regulation (EU) N° 284/2013, Annex Part A, point 9.1.2.1)

Column leaching	Not relevant
	Not relevant

Mobility in soil column leaching transformation products (Regulation (EU) N° 283/2013, Annex Part A, point 7.1.4.1.2 and Regulation (EU) N° 284/2013, Annex Part A, point 9.1.2.1)

Column leaching	Not relevant
	Not relevant

Lysimeter / field leaching studies (Regulation (EU) N° 283/2013, Annex Part A, points 7.1.4.2 / 7.1.4.3 and Regulation (EU) N° 284/2013, Annex Part A, points 9.1.2.2 / 9.1.2.3)

Lysimeter/ field leaching studies	Not relevant

Hydrolytic degradation (Regulation (EU) N° 283/2013, Annex Part A, point 7.2.1.1

Hydrolytic degradation of the active substance and metabolites > 10 %	pH 5: Abamectin (Avermectin B_{1a}) stable No data on metabolites
	pH 7: Abamectin (Avermectin B_{1a}) stable No data on metabolites
	pH 9: $DegT_{50,hydrolysis}$ at 25 °C: 206.1 d (SFO, χ^2=0.5) No metabolites > 10 % AR

Aqueous photochemical degradation (Regulation (EU) N° 283/2013, Annex Part A, points 7.2.1.2 / 7.2.1.3)

Photolytic degradation of active substance and metabolites above 10 %	$DegT_{50,photolysis}$: 1.41 d (n = 2) Natural light, 30 – 50 °N; DT_{50} 1.5 days [8,9-Z]-Avermectin B_{1a} (NOA427011): max. 8.2 % at 0.54 d $DegT_{50,photolysis}$: 0.437 d (n = 1)
Quantum yield of direct phototransformation in water at Σ > 290 nm	0.0347 mol · Einstein $^{-1}$ (summer)

'Ready biodegradability' (Regulation (EU) N° 283/2013, Annex Part A, point 7.2.2.1)

Readily biodegradable (yes/no)	No (based on data)

Aerobic mineralisation in surface water (Regulation (EU) N° 283/2013, Annex Part A, point 7.2.2.2 and Regulation (EU) N° 284/2013, Annex Part A, point 9.2.1)

Abamectin B_{1a}										
System identifier (indicate fresh, estuarine or marine)	**pH water phase**	**pH sed** [a]	**T °C** [b]	**DT_{50} /DT_{90} whole sys. (suspended sediment test)**		**St. (χ^2)**	**DT_{50} / DT_{90} Water (pelagic test)** [d]		**St. (χ^2)**	**Method of calculation**
				At study temp	Normalised to 20 °C [c]		At study temp	Normalised to 20 °C [c]		
Fresh water	8.18	-	20	-	-	-	35.4 / 118	-	9.35	SFO

[a] Measured in [medium to be stated, usually calcium chloride solution or water]
[b] Temperature of incubation=temperature that the environmental media was collected or std temperature of 20°C
[c] Normalised using a Q_{10} of 2.58 to the temperature of the environmental media at the point of sampling.
[d] Only the high dose endpoints are presented

8a-hydroxy-Avermectin B_{1a} (NOA448112)	Max in total system 17.1 % after 32 days									
System identifier (indicate fresh, estuarine or marine)	**pH water phase**	**pH sed** [a]	**T °C** [b]	**DT_{50} /DT_{90} whole sys. (suspended sediment test)**		**St. (χ^2)**	**DT_{50} / DT_{90} Water (pelagic test)** [d]		**St. (χ^2)**	**Method of calculation**
				At study temp	Normalised to 20 °C [c]		At study temp	Normalised to 20 °C [c]		
Fresh water	8.18	-	20	-	-	-	26.9 / 89.3	-	14.1	SFO

[a] Measured in [medium to be stated, usually calcium chloride solution or water]
[b] Temperature of incubation=temperature that the environmental media was collected or std temperature of 20°C
[c] Normalised using a Q10 of 2.58 to the temperature of the environmental media at the point of sampling.
[d] Only the high dose endpoints are presented

Mineralisation and non extractable residues (for parent dosed experiments)					
System identifier (indicate fresh, estuarine or marine)	**pH water phase**	**pH sed**	**Mineralisation x % after n d. (end of the study).**	**Non-extractable residues. max x % after n d (suspended sediment test)**	**Non-extractable residues. max x % after n d (end of the study) (suspended sediment test)**
Fresh water	8.18	-	2.2 % after 60 d	n/a (pelagic test)	n/a (pelagic test)

Water / sediment study (Regulation (EU) N° 283/2013, Annex Part A, point 7.2.2.3 and Regulation (EU) N° 284/2013, Annex Part A, point 9.2.2)

Abamectin B_{1a}	Distribution (max. in sediment 82.8 % after 14 d)									
Water / sediment system	**pH water phase**	**pH sed** [a]	**T °C**	**$DegT_{50}$ / $DegT_{90}$ whole sys.** [b]	**St. (χ^2)**	**$DissT_{50}$ / $DissT_{90}$ water** [c]	**St. (χ^2)**	**$DissT_{50}$ / $DissT_{90}$ sed** [c]	**St. (χ^2)**	**Method of calculation**
Rhine river, lS	8.13	7.2	20	86.3 / 289	3.8	0.82 / 18.1	4.6	86.9 / 289	5.2	SFO / SFO / SFO
Rotenfluh (pond), cL	8.03	7.1	20	91.0 / 302	1.8	1.81 / 24.6	4.8	111 / 370	1.9	SFO / HS /SFO
Dentelbach (creek), S	8.12	7.5	20	20.5 / 68.0	5.1	8.2 / 38.4	6.5	23.4 / 99.7	4.0	SFO / DFOP / FOMC
Illingen (pond), uC	8.13	7.7	20	37.3 / 167	5.3	4.85 / 45.7	6.9	86.3 / 287	3.6	SFO / HS / SFO
Geometric mean at 20°C[d]				**51.7 / 177**		2.77 / 29.7		66.4 / 235		

[a] Measured in $CaCl_2$
[b] Modelling endpoint
[c] Persistence endpoint
[d] Normalised using a Q_{10} of 2.58

8a-oxo-Avermectin B_{1a} (NOA448111)	Distribution: max. water 8 % after 7 d, max. sed 9 % after 117 d, max. in total system 16 % after 74 days kinetic formation fraction (k_f/k_{dp}): n/a (Metabolite was fitted as parent)[f]									
Water / sediment system	**pH water phase**	**pH sed** [a]	**T °C**	**$DegT_{50}$ / $DegT_{90}$ whole sys.** [b]	**St. (χ^2)**	**$DissT_{50}$ / $DissT_{90}$ water** [c]	**St. (χ^2)**	**$DissT_{50}$ / $DissT_{90}$ sed** [c]	**St. (χ^2)**	**Method of calculation**
Dentelbach (creek), S	8.12	7.5	20	95.0 / >1000	9.5	-	-	971 / >1000	6.6	SFO / FOMC
Illingen (pond), uC	8.13	7.7	20	126 / 418	16.2	-	-	-	-	SFO
Geometric mean at 20°C[d]				**109 / n/a**[e]						

[a] Measured in $CaCl_2$
[b] Modelling endpoint
[c] Persistence endpoint
[d] Normalised using a Q_{10} of 2.58
[e] Mean $DegT_{90}$ can not be calculated
[f] A worst-case formation fraction of 1.0 should be used for modelling

8a-hydroxy-Avermectin B_{1a} (NOA448112)	Distribution: max. water 3 % after 62 d, max. sed 7 % after 97 d, max. in total system 9 % after 97 days kinetic formation fraction (k_f/k_{dp}): 0.098 from parent (total system value, n = 1)									
Water / sediment system	**pH water phase**	**pH sed** [a]	**T °C**	**DT_{50} /DT_{90} whole sys.**	**St. (χ^2)**	**DT_{50} /DT_{90} water**	**St. (χ^2)**	**DT_{50} /DT_{90} sed**	**St. (χ^2)**	**Method of calculation**
Dentelbach (creek), S	8.12	7.5	20	45.0 / 149	8.0	-	-	-	-	SFO
Geometric mean at 20°C[b]				**45.0 / 149**						

[a] Measured in [medium to be stated, usually calcium chloride solution or water]
[b] Normalised using a Q_{10} of 2.58

4"-oxo-Avermectin B_{1a} (NOA426289)	Distribution: max. water 6 % after 29 d, max. sed 7 % after 29 d, max. in total system 12 % after 29 days kinetic formation fraction (k_f/k_{dp}): 0.098 from parent (total system value, n = 1)									
Water / sediment system	**pH water phase**	**pH sed** [a]	**T °C**	**$DegT_{50}$ / $DegT_{90}$ whole sys.** [b]	**St. (χ^2)**	**$DissT_{50}$ / $DissT_{90}$ water** [c]	**St. (χ^2)**	**$DissT_{50}$ / $DissT_{90}$ sed** [c]	**St. (χ^2)**	**Method of calculation**
Dentelbach (creek), S	8.12	7.5	20	18.5 / 61.4	12.6	24.7 / 82.2	17.8	60.4 / 201	16.2	SFO / SFO / SFO
Illingen (pond), uC	8.13	7.7	20	58.9 / 196	8.2	-	-	-	-	SFO
Geometric mean at 20°C[d]				**33.0 / 110**						

[a] Measured in $CaCl_2$
[b] Modelling endpoint
[c] Persistence endpoint
[d] Normalised using a Q_{10} of 2.58

Mineralisation and non extractable residues (from parent dosed experiments)					
Water / sediment system	**pH water phase**	**pH sed**	**Mineralisation x % after the end of the study**	**Non-extractable residues in sed. max x % after n d**	**Non-extractable residues in sed. max x % after the end of the study**
Rhine river, lS	8.13	7.2	3.0 % after 100 d	20.4 % after 100 d	20.4 % after 100 d
Rotenfluh (pond), cL	8.03	7.1	3.2 % after 100 d	23.2 % after 100 d	23.2 % after 100 d
Dentelbach (creek), S	8.12	7.5	7 % after 117 d	16 % after 117 d	16 % after 117 d
Illingen (pond), uC	8.13	7.7	6 % after 117 d	19 % after 117 d	19 % after 117 d

Fate and behaviour in air (Regulation (EU) N° 283/2013, Annex Part A, point 7.3.1)

Direct photolysis in air	Not studied – no data requested
Photochemical oxidative degradation in air	$DT_{50,air}$ < 1 h derived by the Atkinson method.
Volatilisation	from plant surfaces (BBA guideline): No information provided; vapour pressure of < 10^{-6} Pa (20 °C) below trigger for volatilization
	from soil surfaces (BBA guideline): No information provided; vapour pressure of < 10^{-6} Pa (20 °C) below trigger for volatilization
Metabolites	No data

Residues requiring further assessment (Regulation (EU) N° 283/2013, Annex Part A, point 7.4.1)

Environmental occurring residues requiring further assessment by other disciplines (toxicology and ecotoxicology) and or requiring consideration for groundwater exposure	**Soil:** Avermectin B_{1a}, Avermectin B_{1b}, 8a-oxo-Avermectin B_{1a} (NOA448111), 8a-hydroxy-Avermectin B_{1a} (NOA448112), 4,8-dihydroxy-Avermectin B_{1a} (NOA457464, M6), 8a-oxo-4-hydroxy-Avermectin B_{1a} (NOA457465), 4”-oxo-Avermectin B_{1a} (NOA426289), and 8-carboxy-6-hydroxy-Avermectin B_{1a} (M4) **Surface water:** Avermectin B_{1a}, Avermectin B_{1b}, 8a-oxo-Avermectin B_{1a} (NOA448111), 8a-hydroxy-Avermectin B_{1a} (NOA448112), 4,8-dihydroxy-Avermectin B_{1a} (NOA457464, M6), 8a-oxo-4-hydroxy-Avermectin B_{1a} (NOA457465), 4”-oxo-Avermectin B_{1a} (NOA426289), and 8-carboxy-6-hydroxy-Avermectin B_{1a} (M4) **Sediment:** Avermectin B_{1a}, Avermectin B_{1b}, 8a-oxo-Avermectin B_{1a} (NOA448111), 8a-hydroxy-Avermectin B_{1a} (NOA448112), 4,8-dihydroxy-Avermectin B_{1a} (NOA457464, M6), 8a-oxo-4-hydroxy-Avermectin B_{1a} (NOA457465), 4”-oxo-Avermectin B_{1a} (NOA426289), and 8-carboxy-6-hydroxy-Avermectin B_{1a} (M4) **Groundwater:** Avermectin B_{1a}, Avermectin B_{1b}, 8a-oxo-Avermectin B_{1a} (NOA448111), 8a-hydroxy-Avermectin B_{1a} (NOA448112), 4,8-dihydroxy-Avermectin B_{1a} (NOA457464, M6), 8a-oxo-4-hydroxy-Avermectin B_{1a} (NOA457465), 4”-oxo-Avermectin B_{1a} (NOA426289), and 8-carboxy-6-hydroxy-Avermectin B_{1a} (M4) **Air:** Avermectin B_{1a} and Avermectin B_{1b} (by default)

Definition of the residue for monitoring (Regulation (EU) N° 283/2013, Annex Part A, point 7.4.2)

See section 5, Ecotoxicology

Monitoring data, if available (Regulation (EU) N° 283/2013, Annex Part A, point 7.5

Soil (indicate location and type of study)	No information provided

Surface water (indicate location and type of study)	Public monitoring data available from France and the Netherlands (2008-2019). Detections > 0.1 µg/L in 101 out of 19.598 (0.51%) in the Netherlands.
Ground water (indicate location and type of study)	Public monitoring data available from France and the Netherlands (2008-2019). No findings > 0.1 µg/L.
Air (indicate location and type of study)	No information provided

PEC soil (Regulation (EU) N° 284/2013, Annex Part A, points 9.1.3 / 9.3.1)

Abamectin B_{1a} Method of calculation	DT_{50} / DT_{90} (d): 0.677 / 15.5 days Kinetics: FOMC (α = 0.577, β = 0.291) Field or Lab: Representative worst-case from field dissipation studies (n = 5)
Application data	Crop: tomato, strawberry Depth of soil layer (mixing): tomato: 5cm; strawberry: 5cm Soil bulk density: 1.5g/cm^3 % plant interception: tomato: 50 % (BBCH 10); strawberry: 30 % (BBCH 10) Number of applications: tomato: 3; strawberry: 2 Interval (d): 7 (tomato and strawberry) Application rates: 18 g a.s./ha (tomato and strawberry)

$PEC_{(s)}$ (mg/kg)		Single application Actual **(crop: tomato)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.012		0.015	
Short term	24h	0.005	0.010	0.008	0.012
	2d	0.004	0.008	0.007	0.010
	4d	0.003	0.006	0.005	0.009
Long term	7d	0.002	0.004	0.004	0.007
	28d	0.001	0.001	0.002	0.005
	50d	0.001	0.000	0.002	0.004
	100d	0.000	0.000	0.001	0.003
Plateau concentration		0.0002 mg/kg after 5 yr			

PEC$_{(s)}$ (mg/kg)		Single application Actual **(crop: strawberry)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.017		0.019	
Short term	24h	0.007	0.012	0.010	0.015
	2d	0.005	0.009	0.007	0.013
	4d	0.004	0.007	0.006	0.010
Long term	7d	0.003	0.005	0.004	0.008
	28d	0.001	0.003	0.002	0.005
	50d	0.001	0.002	0.002	0.004
	100d	0.001	0.001	0.001	0.003
Plateau concentration		0.0003 mg/kg after 5 yr			

8a-oxo-avermectin B1a (NOA448111)	
Method of calculation	Molecular weight relative to the parent: 1.016 DT_{50} (d): 71.3 days Kinetics: SFO Field or Lab: Representative worst-case from lab studies (n = 9)
Application data	Application rate assumed: 3.11 g a.s./ha (assumed 8a-oxo-avermectin B_{1a} is formed at a maximum of 17 % of the applied dose)

PEC$_{(s)}$ (mg/kg)		Single application Actual **(crop: tomato)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.002		0.006	
Short term	24h	0.002	0.002	0.006	0.006
	2d	0.002	0.002	0.006	0.006
	4d	0.002	0.002	0.006	0.006
Long term	7d	0.002	0.002	0.005	0.006
	28d	0.002	0.002	0.004	0.006
	50d	0.001	0.002	0.004	0.005
	100d	0.001	0.001	0.002	0.004
Plateau concentration		0.0 mg/kg after 5 yr			

PEC$_{(s)}$ (mg/kg)		Single application Actual **(crop: strawberry)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.003		0.006	
Short term	24h	0.003	0.003	0.006	0.006
	2d	0.003	0.003	0.006	0.006
	4d	0.003	0.003	0.005	0.006
Long term	7d	0.003	0.003	0.005	0.005
	28d	0.003	0.003	0.004	0.005
	50d	0.002	0.002	0.003	0.004
	100d	0.001	0.002	0.002	0.004
Plateau concentration		0.0002 mg/kg after 2 yr			

8a-hydroxy-avermectin B1a (NOA448112)	
Method of calculation	Molecular weight relative to the parent: 1.018 DT_{50} (d): 57.3 days Kinetics: SFO Field or Lab: Representative worst-case from lab studies (n = 9)
Application data	Application rate assumed: 4.03 g a.s./ha (assumed 8a-hydroxy-avermectin B_{1a} is formed at a maximum of 22 % of the applied dose)

PEC$_{(s)}$ (mg/kg)		Single application Actual **(crop: tomato)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.003		0.007	
Short term	24h	0.003	0.003	0.007	0.007
	2d	0.003	0.003	0.007	0.007
	4d	0.003	0.003	0.007	0.007
Long term	7d	0.002	0.003	0.007	0.007
	28d	0.002	0.002	0.005	0.006
	50d	0.001	0.002	0.004	0.006
	100d	0.001	0.002	0.002	0.004
Plateau concentration		0.0 mg/kg after 5 yr			

PEC$_{(s)}$ (mg/kg)		Single application Actual **(crop: strawberry)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.004		0.007	
Short term	24h	0.004	0.004	0.007	0.007
	2d	0.004	0.004	0.007	0.007
	4d	0.004	0.004	0.007	0.007
Long term	7d	0.003	0.004	0.007	0.007
	28d	0.003	0.003	0.005	0.006
	50d	0.002	0.003	0.004	0.005
	100d	0.001	0.002	0.002	0.004
Plateau concentration		0.0 mg/kg after 5 yr			

4,8a-dihydroxy-avermectin B1a (NOA457464, M6)	
Method of calculation	Molecular weight relative to the parent: 1.037 DT_{50} (d): 74.0 days Kinetics: SFO Field or Lab: Representative worst-case from lab studies (n = 4)
Application data	Application rate assumed: 1.85 g a.s./ha (assumed 4,8a-dihydroxy-avermectin B_{1a} is formed at a maximum of 9.9 % of the applied dose)

PEC$_{(s)}$ (mg/kg)		Single application Actual **(crop: tomato)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.001		0.003	
Short term	24h	0.001	0.001	0.003	0.003
	2d	0.001	0.001	0.003	0.003
	4d	0.001	0.001	0.003	0.003
Long term	7d	0.001	0.001	0.003	0.003
	28d	0.001	0.001	0.003	0.003
	50d	0.001	0.001	0.002	0.003
	100d	0.000	0.001	0.001	0.002
Plateau concentration		0.0 mg/kg after 5 yr			

PEC$_{(s)}$ (mg/kg)		Single application Actual **(crop: strawberry)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.002		0.003	
Short term	24h	0.002	0.002	0.003	0.003
	2d	0.002	0.002	0.003	0.003
	4d	0.002	0.002	0.003	0.003
Long term	7d	0.002	0.002	0.003	0.003
	28d	0.001	0.002	0.003	0.003
	50d	0.001	0.001	0.002	0.003
	100d	0.001	0.001	0.001	0.002
Plateau concentration		0.0 mg/kg after 5 yr			

8a-oxo-4-hydroxy-avermectin B1a (NOA457465)	
Method of calculation	Molecular weight relative to the parent: 1.034 DT_{50} (d): 181 days Kinetics: SFO Field or Lab: Representative worst-case from lab studies (n = 4)
Application data	Application rate assumed: 1.847 g a.s./ha (assumed 8a-oxo-4-hydroxy-avermectin B_{1a} is formed at a maximum of 9.9 % of the applied dose)

PEC$_{(s)}$ (mg/kg)		Single application Actual **(crop: tomato)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.001		0.004	
Short term	24h	0.001	0.001	0.004	0.004
	2d	0.001	0.001	0.004	0.004
	4d	0.001	0.001	0.004	0.004
Long term	7d	0.001	0.001	0.003	0.004
	28d	0.001	0.001	0.003	0.003
	50d	0.001	0.001	0.003	0.003
	100d	0.001	0.001	0.002	0.003
Plateau concentration		0.0001 mg/kg after 2 yr			

PEC$_{(s)}$ (mg/kg)		Single application Actual **(crop: strawberry)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.002		0.003	
Short term	24h	0.002	0.002	0.003	0.003
	2d	0.002	0.002	0.003	0.003
	4d	0.002	0.002	0.003	0.003
Long term	7d	0.002	0.002	0.003	0.003
	28d	0.002	0.002	0.003	0.003
	50d	0.001	0.002	0.003	0.003
	100d	0.001	0.001	0.002	0.003
Plateau concentration		0.0006 mg/kg after 2 yr			

4"-oxo-avermectin B1a (NOA426289)

Method of calculation	Molecular weight relative to the parent: 0.998 DT_{50} (d): 35.0 days Kinetics: SFO Field or Lab: Representative worst-case from lab studies (n = 3)
Application data	Application rate assumed: 2.16 g a.s./ha (assumed 4"-oxo-avermectin B_{1a} is formed at a maximum of 12 % of the applied dose)

PEC$_{(s)}$ (mg/kg)		Single application Actual **(crop: tomato)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.001		0.004	
Short term	24h	0.001	0.001	0.004	0.004
	2d	0.001	0.001	0.004	0.004
	4d	0.001	0.001	0.003	0.004
Long term	7d	0.001	0.001	0.003	0.004
	28d	0.001	0.001	0.002	0.003
	50d	0.001	0.001	0.001	0.002
	100d	0.000	0.001	0.001	0.002
Plateau concentration		0.0 mg/kg after 5 yr			

PEC$_{(s)}$ (mg/kg)		Single application Actual **(crop: strawberry)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.002		0.004	
Short term	24h	0.002	0.002	0.004	0.004
	2d	0.002	0.002	0.004	0.004
	4d	0.002	0.002	0.003	0.004
Long term	7d	0.002	0.002	0.003	0.004
	28d	0.001	0.002	0.002	0.003
	50d	0.001	0.001	0.001	0.002
	100d	0.000	0.001	0.001	0.002
Plateau concentration		0.0 mg/kg after 5 yr			

8-carboxy-6-hydroxy-avermectin B1a (M4)	
Method of calculation	Molecular weight relative to the parent: 1.036 DT_{50} (d): 31.9 days Kinetics: SFO Field or Lab: Representative worst-case from lab studies (n = 3)
Application data	Application rate assumed: 1.68 g a.s./ha (assumed 8-carboxy-6-hydroxy-avermectin B_{1a} is formed at a maximum of 9.0 % of the applied dose)

PEC$_{(s)}$ (mg/kg)		Single application Actual **(crop: tomato)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.001		0.003	
Short term	24h	0.001	0.001	0.003	0.003
	2d	0.001	0.001	0.003	0.003
	4d	0.001	0.001	0.003	0.003
Long term	7d	0.001	0.001	0.002	0.003
	28d	0.001	0.001	0.002	0.002
	50d	0.000	0.001	0.001	0.002
	100d	0.000	0.000	0.000	0.001
Plateau concentration		0.0 mg/kg after 5 yr			

PEC$_{(s)}$ (mg/kg)		Single application Actual **(crop: strawberry)**	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.002		0.003	
Short term	24h	0.002	0.002	0.003	0.003
	2d	0.001	0.002	0.003	0.003
	4d	0.001	0.002	0.003	0.003
Long term	7d	0.001	0.001	0.003	0.003
	28d	0.001	0.001	0.002	0.002
	50d	0.001	0.001	0.001	0.002
	100d	0.000	0.001	0.000	0.001
Plateau concentration		0.0 mg/kg after 5 yr			

PEC ground water (Regulation (EU) N° 284/2013, Annex Part A, point 9.2.4.1)

Method of calculation and type of study (*e.g.* modelling, field leaching, lysimeter)	For FOCUS gw modelling, values used – Modelling using FOCUS model(s), with appropriate FOCUSgw scenarios, according to FOCUS guidance. Models used: PEARL 4.4.4, PELMO 5.5.3, MACRO 5.5.4 Crops: Tomato, strawberry **Abamectin B_{1a}** Mol weight (g/mol): 873.1 Crop uptake factor: 0 Water solubility (mg/L): 2.031×10^{-2} at pH 7 and 20°C Vapour pressure: 3.7×10^{-6} Pa at 25°C Geometric mean $DT_{50,lab}$: 25.3 d (n = 9; normalisation to 10kPa or pF2, 20 °C with Q_{10} of 2.58 and Walker equation coefficient 0.7) K_{OC}/K_{OM}: 6588/3821 mL/g (geometric mean, n = 5) $^1/_n$: 0.977 (arithmetic mean, n = 5) **8a-oxo-avermectin B_{1a} (NOA448111)** Mol weight (g/mol): 887.1 Water solubility (mg/L): 51.0 at pH 7 and 20°C Vapour pressure: 3.7×10^{-6} Pa at 25°C Geometric mean $DT_{50,lab}$: 53.0 d (n = 6; normalisation to 10kPa or pF2, 20 °C with Q_{10} of 2.58 and Walker equation coefficient 0.7) K_{OC}/K_{OM}: 3911/2269 mL/g (geometric mean, n = 3) $^1/_n$: 0.829 (arithmetic mean, n = 3) ff (from parent): 0.204 (arithmetic mean, n = 5) **8a-hydroxy-avermectin B_{1a} (NOA448112)** Mol weight (g/mol): 889.1 Water solubility (mg/L): 13.8 at pH 7 and 20°C Vapour pressure: 3.7×10^{-6} Pa at 25°C Geometric mean $DT_{50,lab}$: 32.1 d (n = 9; normalisation to 10kPa or pF2, 20 °C with Q_{10} of 2.58 and Walker equation coefficient 0.7) K_{OC}/K_{OM}: 1770/1027 mL/g (geometric mean, n = 3) $^1/_n$: 0.871 (arithmetic mean, n = 3) ff (from parent): 0.305 (arithmetic mean, n = 8) **4,8-dihydroxy-avermectin B_{1a} (NOA457464, M6)** Mol weight (g/mol): 905.1 Water solubility (mg/L): 2.031×10^{-2} at pH 7 and 20°C Vapour pressure: 3.7×10^{-6} Pa at 25°C Geometric mean $DT_{50,lab}$: 51.9 d (n = 4; normalisation to 10kPa or pF2, 20 °C with Q_{10} of 2.58 and Walker equation coefficient 0.7) K_{OC}/K_{OM}: 1642/952 mL/g (geometric mean, n = 3)

	$^1/_n$: 0.912 (arithmetic mean, n = 3) ff (from NOA448112): 0.682 (arithmetic mean, n = 4) **8a-oxo-4-hydroxy-avermectin B_{1a} (NOA457465)** Mol weight (g/mol): 903.1 Water solubility (mg/L): 2.031 × 10^{-2} at pH 7 and 20°C Vapour pressure: 3.7 × 10^{-6} Pa at 25°C Geometric mean $DT_{50,lab}$: 86.8 d (n = 4; normalisation to 10kPa or pF2, 20 °C with Q_{10} of 2.58 and Walker equation coefficient 0.7) K_{OC}/K_{OM}: 3682/2136 mL/g (geometric mean, n = 3) $^1/_n$: 0.936 (arithmetic mean, n = 3) ff (from NOA448111): 0.959 (arithmetic mean, n = 4) **4"-oxo-avermectin B_{1a} (NOA426289)** Mol weight (g/mol): 871.1 Water solubility (mg/L): 2.031 × 10^{-2} at pH 7 and 20°C Vapour pressure: 3.7 × 10^{-6} Pa at 25°C Geometric mean $DT_{50,lab}$: 20.8 d (n = 3; normalisation to 10kPa or pF2, 20 °C with Q_{10} of 2.58 and Walker equation coefficient 0.7) (Note: A data gap was identified for soil incubation to address the degradation rate of 4"-oxo-avermectin B1a (NOA 426289) in one additional soil. A geomean DT50 of 13.9 days should had been used in the present assessment, since the endpoint used lead to a conservative assessment the simulation was not redone) K_{OC}/K_{OM}: 1427/828 mL/g (lowest value as agreed at experts' meeting) $^1/_n$: 0.876 (value corresponding to lowest K_{OC} as agreed at experts' meeting) ff (from parent): 0.260 (arithmetic mean, n = 3) **8-carboxy-6-hydroxy-avermectin B_{1a} (M4)** Mol weight (g/mol): 904.5 Water solubility (mg/L): 2.031 × 10^{-2} at pH 7 and 20°C Vapour pressure: 3.7 × 10^{-6} Pa at 25°C Geometric mean $DT_{50,lab}$: 27.8* d (n = 3; normalisation to 10kPa or pF2, 20 °C with Q_{10} of 2.58 and Walker equation coefficient 0.7) *(the correct geometric mean DT_{50} for future assessments is 18.6 days) K_{OC}/K_{OM}: 1082/628 mL/g (lowest measured K_{OC} value from all compounds as agreed at experts' meeting) $^1/_n$: 1.0 (default value as agreed at experts' meeting) ff (from NOA448112): 0.941 (arithmetic mean, n = 3)
Application rate	Gross application rate: 18 a.s. g/ha Crop growth stage: BBCH 10-89 (tomato and strawberry)

Canopy interception %: 50 (tomato, early application), 30 (strawberry, early application)
Application rate net of interception: 9 g a.s./ha (tomato), 12.6 g a.s./ha (strawberry)
Early application dates are protective for mid and late application dates (risk envelope)
No. of applications: 3 (tomato, 7 d interval), 2 (strawberry, 7 d interval)
Time of application (absolute or relative application dates): 7, 14, 21 d after emergence (tomato), 7, 14 d after emergence (strawberry)

PEC(gw) - FOCUS modelling results (80th percentile annual average concentration at 1m)

Use: Tomato

	Scenario	Parent (µg/L)	Metabolites (µg/L)		
			NOA448111	NOA448112	NOA457464
PEARL 4.4.4 /Tomato, early appl.	Châteaudun	< 0.001	< 0.001	< 0.001	< 0.001
	Piacenza	< 0.001	< 0.001	< 0.001	< 0.001
	Porto	< 0.001	< 0.001	< 0.001	< 0.001
	Sevilla	< 0.001	< 0.001	< 0.001	< 0.001
	Thiva	< 0.001	< 0.001	< 0.001	< 0.001

	Scenario	Metabolites (µg/L)		
		NOA457465	NOA426289	M4
PEARL 4.4.4 /Tomato, early appl.	Châteaudun	< 0.001	< 0.001	< 0.001
	Piacenza	< 0.001	< 0.001	< 0.001
	Porto	< 0.001	< 0.001	< 0.001
	Sevilla	< 0.001	< 0.001	< 0.001
	Thiva	< 0.001	< 0.001	< 0.001

	Scenario	Parent (µg/L)	Metabolites (µg/L)		
			NOA448111	NOA448112	NOA457464
PELMO 5.5.3 /Tomato, early appl.	Châteaudun	< 0.001	< 0.001	< 0.001	< 0.001
	Piacenza	< 0.001	< 0.001	< 0.001	< 0.001
	Porto	< 0.001	< 0.001	< 0.001	< 0.001
	Sevilla	< 0.001	< 0.001	< 0.001	< 0.001
	Thiva	< 0.001	< 0.001	< 0.001	< 0.001

	Scenario	Metabolites (µg/L)		
		NOA457465	NOA426289	M4
PELMO 5.5.3 /Tomato, early appl.	Châteaudun	< 0.001	< 0.001	< 0.001
	Piacenza	< 0.001	< 0.001	< 0.001
	Porto	< 0.001	< 0.001	< 0.001
	Sevilla	< 0.001	< 0.001	< 0.001
	Thiva	< 0.001	< 0.001	< 0.001

	Scenario	Parent (µg/L)	Metabolites (µg/L)		
			NOA448111	NOA448112	NOA457464
MACRO 5.5.4/ Tomato, early appl.	Châteaudun	< 0.001	< 0.001	< 0.001	< 0.001

	Scenario	Metabolites (µg/L)		
		NOA457465	NOA426289	M4
MACRO 5.5.4/ Tomato, early appl.	Châteaudun	< 0.001	< 0.001	< 0.001

Use: Strawberry

	Scenario	Parent (µg/L)	Metabolites (µg/L)		
			NOA448111	NOA448112	NOA457464
PEARL 4.4.4 /Strawberry, early appl.	Hamburg	< 0.001	< 0.001	< 0.001	< 0.001
	Jokioinen	< 0.001	< 0.001	< 0.001	< 0.001
	Kremsmünster	< 0.001	< 0.001	< 0.001	< 0.001
	Sevilla	< 0.001	< 0.001	< 0.001	< 0.001

	Scenario	Metabolites (µg/L)		
		NOA457465	NOA426289	M4
PEARL 4.4.4 /Strawberry, early appl.	Hamburg	< 0.001	< 0.001	< 0.001
	Jokioinen	< 0.001	< 0.001	< 0.001
	Kremsmünster	< 0.001	< 0.001	< 0.001
	Sevilla	< 0.001	< 0.001	< 0.001

	Scenario	Parent (µg/L)	Metabolites (µg/L)		
			NOA448111	NOA448112	NOA457464
PELMO 5.5.3 /Strawberry, early appl.	Hamburg	< 0.001	< 0.001	< 0.001	< 0.001
	Jokioinen	< 0.001	< 0.001	< 0.001	< 0.001
	Kremsmünster	< 0.001	< 0.001	< 0.001	< 0.001
	Sevilla	< 0.001	< 0.001	< 0.001	< 0.001

	Scenario	Metabolites (µg/L)		
		NOA457465	NOA426289	M4
PELMO 5.5.3 /Strawberry, early appl.	Hamburg	< 0.001	< 0.001	< 0.001
	Jokioinen	< 0.001	< 0.001	< 0.001
	Kremsmünster	< 0.001	< 0.001	< 0.001
	Sevilla	< 0.001	< 0.001	< 0.001

PEC surface water and PEC sediment (Regulation (EU) N° 284/2013, Annex Part A, points 9.2.5 / 9.3.1)

Parent Parameters used in FOCUSsw step 1 and 2	Version control no. of FOCUS calculator: 3.2 Molecular weight (g/mol): 873.1 K_{OC}/K_{OM} (mL/g): 6588/3821 DT_{50} soil (d): 25.3 (geometric mean (n = 9) lab in accordance with FOCUS SFO) DT_{50} water/sediment system (d): 51.7 (geomean from n = 4 sediment water studies) DT_{50} water (d): 1000 (default value) DT_{50} sediment (d): 51.7 (total system value) Crop interception (%): 0 % (no canopy) For applications in walk-in tunnels and soil-bound greenhouses (STEP 1 & 2), only spray drift and drainage were considered (no run-off).
Parameters used in FOCUSsw step 3 (if performed)	Version control no. of FOCUS software: Walk-in tunnels: SWASH 5.3, MACRO 5.5.4, PRZM 4.3.1, TOXSWA 4.4.3 Greenhouse according to Regulation (EC) No 1107/2009: GEM 3.3.2 (PEC_{SW} GEM model results for early applications were multiplied by a factor of 2 agreed at experts' meeting) Water solubility (mg/L): 2.031×10^{-2} at 20 °C Vapour pressure: 3.7×10^{-6} Pa at 25 °C K_{OC}/K_{OM} (mL/g): 6588/3821 1/n: 0.977 Q_{10}: 2.58, Walker equation coefficient: 0.7 Crop uptake factor: 0
Application rate	Crop and growth stage: tomato BBCH 10-89; strawberry BBCH 10-89 Number of applications: 3 (tomato), 2 (strawberry) Interval (d): 7 Application rate(s): 18 g a.s./ha Application window: STEP 1, 2: March-May, June-September STEP 3, 4 (walk-in tunnels): tomato early: 17.04.-31.05; tomato late: 24.06.-07.08.; strawberry early: 17.04.-24.05.; strawberry late: 01.07.-07.08. STEP 3 (permanent greenhouses): tomato: 16.05.-30.05.; strawberry: 23.05.-30.05. (agreed at experts' meeting)

FOCUS STEP 1 Scenario	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
		Actual	TWA	Actual	TWA
tomato	0 h	2.34		122.89	
strawberry	0 h	1.56		81.92	

FOCUS STEP 2 Scenario	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
		Actual	TWA	Actual	TWA
tomato, March-May					
Northern EU	0 h	0.32		20.21	
Southern EU	0 h	0.60		38.37	
tomato, June-September					
Northern EU	0 h	0.32		20.21	
Southern EU	0 h	0.46		29.29	
strawberry, March-May					
Northern EU	0 h	0.24		14.94	
Southern EU	0 h	0.44		28.15	
strawberry, June-September					
Northern EU	0 h	0.24		14.94	
Southern EU	0 h	0.34		21.54	

FOCUS STEP 3 for applications in walk-in tunnels (calculated as open-field application without run-off)

FOCUS STEP 3 Scenario	Water-body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
tomato, early application						
D6	ditch	0 h	0.1125[a)]	0.003767	0.0471	0.02924
tomato, late application						
D6	ditch	0 h	0.1125	0.004221	0.0465	0.03327
strawberry, early application						
D6	ditch	0 h	0.1125	0.003578	0.0390	0.02270
strawberry, late application						
D6	ditch	0 h	0.1125	0.003111	0.0475	0.03065

a) Results present worst-case of single and multiple applications

STEP 3 for applications in <u>permanent greenhouses</u> according to Regulation (EC) No 1107/2009 (GEM 3.3.2)

STEP 3 Scenario	Water-body	Day after overall maximum	PEC_{SW}[6] (µg/L)		PEC_{SED}[7] (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
<u>tomato</u>[a)]						
Greenhouse SW[b)]	-	0 h	0.001342	0.000818	see STEP 2	
<u>strawberry</u>[a)]						
Greenhouse SW	-	0 h	0.000998	0.000608	see STEP 2	

a) Surrogate crop: Vegetables, fruiting: Gherkin
b) Greenhouse surface water scenario; customized scenario basing on "Example project 2 soil-bound-surface water"

FOCUS STEP 4 for applications in <u>walk-in tunnels</u> with no-spray buffer zones for drift mitigation

FOCUS STEP 4 Scenario	Water-body	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
			10 m buffer	20 m buffer	10 m buffer	20 m buffer
<u>tomato, early application</u>						
D6	ditch	0 h	0.0131[a)]	0.0067	0.0637	0.0329
<u>tomato, late application</u>						
D6	ditch	0 h	0.0133	0.0068	0.0595	0.0307
<u>strawberry, early application</u>						
D6	ditch	0 h	0.0146	0.0074	0.0574	0.0293
<u>strawberry, late application</u>						
D6	ditch	0 h	0.0151	0.0077	0.0552	0.0282

a) Results present worst-case of single and multiple applications

[6] According to experts' decision, model results from early application patterns were multiplied by a factor of 2
[7] According to experts' decision, FOCUS STEP 2 calculations for sediment (PEC_{SED}) are to be taken for exposure and risk assessment

Metabolite 8a-oxo-avermectin B_{1a} (NOA448111) Parameters used in FOCUSsw step 1 and 2	Molecular weight (g/mol): 887.1 Soil or water metabolite: soil Koc/Kom (mL/g): 3911/2269 DT_{50} soil (d): 53.0 (geometric mean (n = 6) lab in accordance with FOCUS SFO) DT_{50} water/sediment system (d): 109 (representative worst case from n = 2 sediment water studies) DT_{50} water (d): 1000 (default value) DT_{50} sediment (d): 109 (total system value) Crop interception (%): 0 Maximum occurrence observed (% molar basis with respect to the parent) Total Water and Sediment: 16.0 Soil: 17.0
Metabolite 8a-hydroxy-avermectin B_{1a} (NOA448112) Parameters used in FOCUSsw step 1 and 2	Molecular weight (g/mol): 889.1 Soil or water metabolite: soil Koc/Kom (mL/g): 1770/1027 DT_{50} soil (d): 32.1 (geometric mean (n = 9) lab in accordance with FOCUS SFO) DT_{50} water/sediment system (d): 45 (n = 1 sediment water study) DT_{50} water (d): 1000 (default value) DT_{50} sediment (d): 45.0 (total system value) Crop interception (%): 0 Maximum occurrence observed (% molar basis with respect to the parent) Total Water and Sediment: 9.0 Soil: 22.0
Metabolite 4”-oxo-avermectin B_{1a} (NOA426289) Parameters used in FOCUSsw step 1 and 2	Molecular weight (g/mol): 871.1 Soil or water metabolite: soil Koc/Kom (mL/g): 1427/828 (owest value agreed at experts’ meeting) DT_{50} soil (d): 20.8 (geometric mean (n = 3) lab in accordance with FOCUS SFO) (Note: A data gap was identified for soil incubation to address the degradation rate of 4”-oxo-avermectin B1a (NOA 426289) in one additional soil. A geomean DT50 of 13.9 days should had been used in the present assessment, since these endpoints lead to a conservative assessment the simulation was not redone) DT_{50} water/sediment system (d): 33 (representative worst case from n = 2 sediment water studies) DT_{50} water (d): 1000 (default value) DT_{50} sediment (d): 33 (total system value) Crop interception (%): 0 Maximum occurrence observed (% molar basis with respect to the parent) Total Water and Sediment: 12.0 Soil: 12.0

Metabolite 4,8-dihydroxy-avermectin B_{1a} (NOA457464, M6) Parameters used in FOCUSsw step 1 and 2	Molecular weight (g/mol): 905.1 Soil or water metabolite: soil Koc/Kom (mL/g): 1642/952 DT_{50} soil (d): 51.9 (geometric mean (n = 4) lab in accordance with FOCUS SFO) DT_{50} water/sediment system (d): 1000 (default value) DT_{50} water (d): 1000 (default value) DT_{50} sediment (d): 1000 (default value) Crop interception (%): 0 Maximum occurrence observed (% molar basis with respect to the parent) Total Water and Sediment: 0 Soil: 9.9
Metabolite 8a-oxo-4-hydroxy-avermectin B_{1a} (NOA457465) Parameters used in FOCUSsw step 1 and 2	Molecular weight (g/mol): 903.1 Soil or water metabolite: soil Koc/Kom (mL/g): 3682/2136 DT_{50} soil (d): 86.8 (geometric mean (n = 2) lab in accordance with FOCUS SFO) DT_{50} water/sediment system (d): 1000 (default value) DT_{50} water (d): 1000 (default value) DT_{50} sediment (d): 1000 (default value) Crop interception (%): 0 Maximum occurrence observed (% molar basis with respect to the parent) Total Water and Sediment: 0 Soil: 9.9
Metabolite 8-carboxy-6-hydroxy-avermectin B_{1a} (M4) Parameters used in FOCUSsw step 1 and 2	Molecular weight (g/mol): 904.5 Soil or water metabolite: soil Koc/Kom (mL/g): 1082/628 (lowest measured Koc value from all compounds as agreed at experts' meeting)) DT_{50} soil (d): 18.6 (geometric mean (n = 3) lab in accordance with FOCUS SFO) DT_{50} water/sediment system (d): 1000 (default value) DT_{50} water (d): 1000 (default value) DT_{50} sediment (d): 1000 (default value) Crop interception (%): 0 Maximum occurrence observed (% molar basis with respect to the parent) Total Water and Sediment: 0 Soil: 9.0

Application rate	Crop and growth stage: tomato BBCH 10-89; strawberry BBCH 10-89 Number of applications: 3 (tomato), 2 (strawberry) Interval (d): 7 Application rate(s): 18 g a.s./ha Application window: STEP 1, 2: Same as parent STEP 3, 4: Same as parent
Main routes of entry	drift

FOCUS STEP 1 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
tomato					
NOA448111	0 h	1.05		38.25	
NOA448112	0 h	1.74		29.93	
NOA426289	0 h	1.54		21.19	
NOA457464	0 h	0.58		9.51	
NOA457465	0 h	0.31		11.48	
M4	0 h	0.69		7.43	
strawberry					
NOA448111	0 h	0.70		25.50	
NOA448112	0 h	1.16		19.96	
NOA426289	0 h	1.03		14.13	
NOA457464	0 h	0.39		6.34	
NOA457465	0 h	0.21		7.66	
M4	0 h	0.46		4.96	

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
tomato, March-May, Northern EU					
NOA448111	0 h	0.17		6.48	
NOA448112	0 h	0.28		4.81	
NOA426289	0 h	0.23		3.24	
NOA457464	0 h	0.10		1.65	
NOA457465	0 h	0.06		2.11	
M4	0 h	0.09		1.01	
tomato, March-May, Southern EU					

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
NOA448111	0 h	0.33		12.64	
NOA448112	0 h	0.54		9.49	
NOA426289	0 h	0.45		6.33	
NOA457464	0 h	0.20		3.29	
NOA457465	0 h	0.11		4.21	
M4	0 h	0.19		2.02	
tomato, June-September, Northern EU					
NOA448111	0 h	0.17		6.48	
NOA448112	0 h	0.28		4.81	
NOA426289	0 h	0.23		3.24	
NOA457464	0 h	0.10		1.65	
NOA457465	0 h	0.06		2.11	
M4	0 h	0.09		1.01	
tomato, June-September, Southern EU					
NOA448111	0 h	0.25		9.56	
NOA448112	0 h	0.41		7.15	
NOA426289	0 h	0.34		4.79	
NOA457464	0 h	0.15		2.47	
NOA457465	0 h	0.09		3.16	
M4	0 h	0.14		1.51	
strawberry, March-May, Northern EU					
NOA448111	0 h	0.12		4.64	
NOA448112	0 h	0.20		3.48	
NOA426289	0 h	0.17		2.40	
NOA457464	0 h	0.07		1.15	
NOA457465	0 h	0.04		1.44	
M4	0 h	0.07		0.76	
strawberry, March-May, Southern EU					
NOA448111	0 h	0.23		9.02	
NOA448112	0 h	0.39		6.84	
NOA426289	0 h	0.33		4.66	
NOA457464	0 h	0.14		2.30	
NOA457465	0 h	0.08		2.89	
M4	0 h	0.14		1.51	
strawberry, June-September, Northern EU					

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
NOA448111	0 h	0.12		4.64	
NOA448112	0 h	0.20		3.48	
NOA426289	0 h	0.17		2.40	
NOA457464	0 h	0.07		1.15	
NOA457465	0 h	0.04		1.44	
M4	0 h	0.07		0.76	
strawberry, June-September, Southern EU					
NOA448111	0 h	0.18		6.83	
NOA448112	0 h	0.29		5.16	
NOA426289	0 h	0.25		3.53	
NOA457464	0 h	0.10		1.72	
NOA457465	0 h	0.06		2.16	
M4	0 h	0.10		1.13	

FOCUS STEP 3 for applications in walk-in tunnels (open-field without runoff)

FOCUS STEP 3 Scenario NOA448111	Water-body	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
tomato, early application						
D6	ditch	0 h	0.000090[a)]	0.000007	0.01184	0.01178
tomato, late application						
D6	ditch	0 h	0.000150	0.000030	0.01608	0.01599
strawberry, early application						
D6	ditch	0 h	0.000047	0.000004	0.00812	0.00808
strawberry, late application						
D6	ditch	0 h	0.000075	0.000026	0.01304	0.01297

a) Results present worst-case of single and multiple applications

FOCUS STEP 3 Scenario NOA448112	Water-body	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
tomato, early application						
D6	ditch	0 h	0.000496[a)]	0.000006	0.000733	0.000724
tomato, late application						
D6	ditch	0 h	0.002041	0.000023	0.000987	0.000968

FOCUS STEP 3 Scenario NOA448112	Water-body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
strawberry, early application						
D6	ditch	0 h	0.000262	0.000003	0.000500	0.000494
strawberry, late application						
D6	ditch	0 h	0.001364	0.000015	0.000808	0.000793

a) Results present worst-case of single and multiple applications

FOCUS STEP 3 Scenario NOA426289	Water-body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
tomato, early application						
D6	ditch	0 h	0.000112[a)]	0.000003	0.002021	0.001991
tomato, late application						
D6	ditch	0 h	0.000824	0.000010	0.002701	0.002641
strawberry, early application						
D6	ditch	0 h	0.000057	0.000002	0.001378	0.001360
strawberry, late application						
D6	ditch	0 h	0.000586	0.000009	0.002217	0.002172

a) Results present worst-case of single and multiple applications

FOCUS STEP 3 Scenario NOA457464	Water-body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
tomato, early application						
D6	ditch	0 h	0.004402[a)]	0.000114	0.001878	0.001167
tomato, late application						
D6	ditch	0 h	0.010810	0.000213	0.003440	0.002023
strawberry, early application						
D6	ditch	0 h	0.002530	0.000062	0.001033	0.000649
strawberry, late application						
D6	ditch	0 h	0.007208	0.000133	0.002148	0.001263

a) Results present worst-case of single and multiple applications

FOCUS STEP 3 Scenario NOA457465	Water-body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
tomato, early application						

FOCUS STEP 3 Scenario NOA457465	Water-body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
D6	ditch	0 h	0.001696[a)]	0.000086	0.001484	0.001017
tomato, late application						
D6	ditch	0 h	0.006990	0.000097	0.001668	0.001137
strawberry, early application						
D6	ditch	0 h	0.003423	0.000051	0.000876	0.000603
strawberry, late application						
D6	ditch	0 h	0.004327	0.000058	0.000998	0.000684

a) Results present worst-case of single and multiple applications

FOCUS STEP 3 Scenario M4	Water-body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
tomato, early application						
D6	ditch	0 h	0.002911[a)]	0.000368	0.001826	0.001430
tomato, late application						
D6	ditch	0 h	0.010170	0.001507	0.007416	0.005622
strawberry, early application						
D6	ditch	0 h	0.001702	0.000214	0.001065	0.000837
strawberry, late application						
D6	ditch	0 h	0.007536	0.001125	0.005568	0.004132

a) Results present worst-case of single and multiple applications

STEP 3 evaluation for applications in permanent greenhouses according to Regulation (EC) No 1107/2009 (GEM 3.3.2)

STEP 3 Scenario NOA448111	Water-body	Day after overall maximum	PECSW[8] (µg/L)		PECSED[9] (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
tomato[a)]						
Greenhouse SW[b)]	-	0 h	0.000072	0.000062	see STEP 2	
strawberry[a)]						
Greenhouse SW	-	0 h	0.000042	0.000036	see STEP 2	

a) Surrogate crop: Vegetables, fruiting: Gherkin
b) Greenhouse surface water scenario; customized scenario basing on "Example project 2 soil-bound-surface water"

[8] According to experts' decision, model results from early application patterns were multiplied by a factor of 2
[9] According to experts' decision, FOCUS STEP 2 calculations for sediment (PEC_{SED}) are to be taken for exposure and risk assessment

STEP 3 Scenario NOA448112	Water-body	Day after overall maximum	PEC_{SW}[12] (µg/L)		PEC_{SED}[14] (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
tomato[a)]						
Greenhouse SW[b)]	-	0 h	0.000396	0.000234	see STEP 2	
strawberry[a)]						
Greenhouse SW	-	0 h	0.000228	0.000134	see STEP 2	

a) Surrogate crop: Vegetables, fruiting: Gherkin
b) Greenhouse surface water scenario; customized scenario basing on "Example project 2 soil-bound-surface water"

STEP 3 Scenario NOA426289	Water-body	Day after overall maximum	PEC_{SW}[12] (µg/L)		PEC_{SED}[14] (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
tomato[a)]						
Greenhouse SW[b)]	-	0 h	0.000344	0.000204	see STEP 2	
strawberry[a)]						
Greenhouse SW	-	0 h	0.000200	0.000118	see STEP 2	

a) Surrogate crop: Vegetables, fruiting: Gherkin
b) Greenhouse surface water scenario; customized scenario basing on "Example project 2 soil-bound-surface water"

STEP 3 Scenario NOA457464	Water-body	Day after overall maximum	PEC_{SW}[12] (µg/L)		PEC_{SED}[14] (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
tomato[a)]						
Greenhouse SW[b)]	-	0 h	0.000402	0.000242	see STEP 2	
strawberry[a)]						
Greenhouse SW	-	0 h	0.000240	0.000144	see STEP 2	

a) Surrogate crop: Vegetables, fruiting: Gherkin
b) Greenhouse surface water scenario; customized scenario basing on "Example project 2 soil-bound-surface water"

STEP 3 Scenario NOA457465	Water-body	Day after overall maximum	PEC_{SW}[12] (µg/L)		PEC_{SED}[14] (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
tomato[a)]						
Greenhouse SW[b)]	-	0 h	0.000254	0.000152	see STEP 2	
strawberry[a)]						
Greenhouse SW	-	0 h	0.000154	0.000092	see STEP 2	

a) Surrogate crop: Vegetables, fruiting: Gherkin
b) Greenhouse surface water scenario; customized scenario basing on "Example project 2 soil-bound-surface water"

STEP 3 Scenario M4	Water-body	Day after overall maximum	PECSW[12] (µg/L)		PECSED[14] (µg/kg)	
			Actual	TWA 21	Actual	TWA 21
tomato[a)]						
Greenhouse SW[b)]	-	0 h	0.002170	0.001240	see STEP 2	
strawberry[a)]						
Greenhouse SW	-	0 h	0.001340	0.000748	see STEP 2	

a) Surrogate crop: Vegetables, fruiting: Gherkin
b) Greenhouse surface water scenario; customized scenario basing on "Example project 2 soil-bound-surface water"

FOCUS STEP 4 for applications in walk-in tunnels with no-spray buffer zones for drift mitigation

FOCUS STEP 4 Scenario NOA448111	Water-body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			10 m buffer	20 m buffer	10 m buffer	20 m buffer
tomato, early application						
D6	ditch	0 h	0.000069[a)]	0.000032	0.0260	0.0136
tomato, late application						
D6	ditch	0 h	0.000097	0.000045	0.0289	0.0151
strawberry, early application						
D6	ditch	0 h	0.000049	0.000023	0.0199	0.0103
strawberry, late application						
D6	ditch	0 h	0.000076	0.000035	0.0229	0.0119

a) Results present worst-case of single and multiple applications

FOCUS STEP 4 Scenario NOA448112	Water-body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			10 m buffer	20 m buffer	10 m buffer	20 m buffer
tomato, early application						
D6	ditch	0 h	0.000014[a)]	0.000007	0.00162	0.00085
tomato, late application						
D6	ditch	0 h	0.000019	0.000009	0.00180	0.00094
strawberry, early application						
D6	ditch	0 h	0.000011	0.000005	0.00125	0.00065
strawberry, late application						
D6	ditch	0 h	0.000016	0.000008	0.00144	0.00075

a) Results present worst-case of single and multiple applications

FOCUS STEP 4 Scenario NOA426289	Water-body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			10 m buffer	20 m buffer	10 m buffer	20 m buffer
tomato, early application						
D6	ditch	0 h	0.000054[a)]	0.000027	0.00451	0.00237
tomato, late application						
D6	ditch	0 h	0.000075	0.000037	0.00496	0.00260
strawberry, early application						
D6	ditch	0 h	0.000044	0.000022	0.00347	0.00181
strawberry, late application						
D6	ditch	0 h	0.000065	0.000032	0.00400	0.00208

a) Results present worst-case of single and multiple applications

FOCUS STEP 4 Scenario NOA457464	Water-body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			10 m buffer	20 m buffer	10 m buffer	20 m buffer
tomato, early application						
D6	ditch	0 h	<1E-06[a)]	<1E-06	<1E-06	<1E-06
tomato, late application						
D6	ditch	0 h	<1E-06	<1E-06	<1E-06	<1E-06
strawberry, early application						
D6	ditch	0 h	<1E-06	<1E-06	<1E-06	<1E-06
strawberry, late application						
D6	ditch	0 h	<1E-06	<1E-06	<1E-06	<1E-06

a) Results present worst-case of single and multiple applications

FOCUS STEP 4 Scenario NOA457465	Water-body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			10 m buffer	20 m buffer	10 m buffer	20 m buffer
tomato, early application						
D6	ditch	0 h	<1E-06[a)]	<1E-06	<1E-06	<1E-06
tomato, late application						
D6	ditch	0 h	<1E-06	<1E-06	<1E-06	<1E-06
strawberry, early application						
D6	ditch	0 h	<1E-06	<1E-06	<1E-06	<1E-06
strawberry, late application						
D6	ditch	0 h	<1E-06	<1E-06	<1E-06	<1E-06

a) Results present worst-case of single and multiple applications

FOCUS STEP 4 Scenario M4	Water-body	Day after overall maximum	PECSW (µg/L)		PECSED (µg/kg)	
			10 m buffer	20 m buffer	10 m buffer	20 m buffer
tomato, early application						
D6	ditch	0 h	<1E-06[a)]	<1E-06	<1E-06	<1E-06
tomato, late application						
D6	ditch	0 h	<1E-06	<1E-06	<1E-06	<1E-06
strawberry, early application						
D6	ditch	0 h	<1E-06	<1E-06	<1E-06	<1E-06
strawberry, late application						
D6	ditch	0 h	<1E-06	<1E-06	<1E-06	<1E-06

a) Results present worst-case of single and multiple applications

Estimation of concentrations from other routes of exposure (Regulation (EU) N° 284/2013, Annex Part A, point 9.4)

Method of calculation	No calculation provided

PEC

Maximum concentration	No other routes of exposure expected following the proposed uses

Ecotoxicology

Effects on birds and other terrestrial vertebrates (Regulation (EU) N° 283/2013, Annex Part A, point 8.1 and Regulation (EU) N° 284/2013, Annex Part A, point 10.1)

Species	Test substance	Time scale	End point	Toxicity [mg/kg bw per day]
Birds				
Bobwhite quail	Abamectin	Acute	LD_{50}	>2000
Mallard duck	Abamectin	Acute	LD_{50}	**26**[1]
Bobwhite quail	Abamectin	Long-term	NOEC NOED	6 mg/kg feed **0.7**
Mallard duck	Abamectin	Long-term	NOEC NOED	10 mg/kg feed 1.0
Mammals				
Rat	Abamectin	Acute	LD_{50}	**8.7** (male) 12.8 (female)
Rat	Abamectin	Long-term	NOAEL	**0.12**
Endocrine disrupting properties (Annex Part A, points 8.1.5) Abamectin was not indicated to be an endocrine disruptor following an assessment according to the GD on endocrine disruptors (ECHA and EFSA, 2018)				
Additional higher tier studies (Annex Part A, points 10.1.1.2): No higher tier studies available				
Terrestrial vertebrate wildlife (birds, mammals, reptile and amphibians) (Annex Part A, points 8.1.4, 10.1.3): There are no indications of adverse effects of Abamectin on terrestrial vertebrate wildlife				

[1] corrected for regurgitation, represents a NOED

Toxicity/exposure ratios for terrestrial vertebrates (Regulation (EU) N° 284/2013, Part A, Annex point 10.1)

Tomato at 0.018 kg a.s./ha, 3 applications, permanent (high-tech) greenhouse

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Screening Step (Birds): Not relevant					
Tier 1 (Birds): Not relevant					
Higher tier (birds): Not relevant					
Screening Step (Mammals): Not relevant					
Tier 1 (Mammals): Not relevant					
Higher tier (Mammals): Not relevant					
Risk from bioaccumulation and food chain behaviour					
Indicator or focal species		Time scale	DDD (mg/kg bw per day)	TER	Trigger
Abamectin					
Fish-eating birds		Long-term	0.00000897	78001	5
Fish-eating mammals		Long-term	0.00000801	14972	5
Earthworm-eating birds		Long-term	0.0147	48	5
Earthworm-eating mammals		Long-term	0.0179	6.7	5
8-carboxy-6-hydroxy-avermectin B1a (M4)					
Fish-eating birds		Long-term	0.00001360	5146	5
Fish-eating mammals		Long-term	0.00001215	988	5
Earthworm-eating birds		Long-term	0.0014	50	5
Earthworm-eating mammals		Long-term	0.0017	7.1	5
4´´-oxo-avermectin B1a					
Fish-eating birds		Long-term	0.00000224	31277	5
Fish-eating mammals		Long-term	0.00000200	6004	5
Earthworm-eating birds		Long-term	4.78	**0.015**	5
Earthworm-eating mammals		Long-term	5.82	**0.002**	5
Higher tier: Not available					
Risk from consumption of contaminated water					
Scenarios	**Indicator or focal species**	**Time scale**	**PEC_{dw}xDWR**	**TER**	**Trigger**
Leaf scenario	Birds	Not relevant			
Puddle scenario, Screening step					
Application rate (g a.s./ha)/relevant endpoint <3000 (koc≥500 L/kg), TER calculation not needed					

Bold values are below the respective trigger

Strawberry at 0.018 kg a.s./ha × 2, permanent (high-tech) greenhouse

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Screening Step (Birds): Not relevant					
Tier 1 (Birds): Not relevant					
Higher tier (birds): Not relevant					
Screening Step (Mammals): Not relevant					
Tier 1 (Mammals): Not relevant					
Higher tier (Mammals): Not relevant					
Risk from bioaccumulation and food chain behaviour					
Indicator or focal species		Time scale	DDD (mg/kg bw per day)	TER	Trigger
Abamectin					
Fish-eating birds		Long-term	0.00000667	104942	5
Fish-eating mammals		Long-term	0.00000596	20144	5
Earthworm-eating birds		Long-term	0.0147	48	5
Earthworm-eating mammals		Long-term	0.0179	6.7	5
8-carboxy-6-hydroxy-avermectin B1a (M4)					
Fish-eating birds		Long-term	0.00000821	8530	5
Fish-eating mammals		Long-term	0.00000733	1637	5
Earthworm-eating birds		Long-term	0.0014	50	5
Earthworm-eating mammals		Long-term	0.0017	7.1	5
4´´-oxo-avermectin B1a					
Fish-eating birds		Long-term	0.00000129	54072	5
Fish-eating mammals		Long-term	0.00000116	10379	5
Earthworm-eating birds		Long-term	4.78	**0.015**	5
Earthworm-eating mammals		Long-term	5.82	**0.002**	5
Higher tier: Not available					
Risk from consumption of contaminated water					
Scenarios	**Indicator or focal species**	**Time scale**	**PEC_{dw}xDWR**	**TER**	**Trigger**
Leaf scenario	Birds	Not relevant			
Puddle scenario, Screening step					
Application rate (g a.s./ha)/relevant endpoint <3000 (koc≥500 L/kg), TER calculation not needed					

Bold values are below the respective trigger

Tomato at 0.018 kg a.s./ha, 3 applications Walk-in tunnel (and permanent low-tech greenhouse)

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Screening Step (Birds)					
All	Small insectivorous bird	Acute	4.57	**5.7**	10
All	Small insectivorous bird	Long-term	1.24	**0.6**	5
Tier 1 (Birds)					
Fruiting vegetables Fruit stage 71 - 89	Frugivorous bird "crow"	Acute	1.66	15.7	10
Fruiting vegetables BBCH 10 - 49	Small granivorous bird "finch"	Acute	0.71	36.6	10
Fruiting vegetables BBCH ≥ 50	Small granivorous bird "finch"	Acute	0.21	122.0	10
Fruiting vegetables BBCH 10 - 49	Small omnivorous "lark"	Acute	0.69	37.6	10
Fruiting vegetables BBCH ≥ 50	Small omnivorous "lark"	Acute	0.21	125.4	10
Fruiting vegetables Fruit stage 71 - 89	Frugivorous bird "starling"	Acute	1.42	18.3	10
Fruiting vegetables BBCH 10 - 19	Small insectivorous bird "wagtail"	Acute	0.77	33.7	10
Fruiting vegetables BBCH ≥ 20	Small insectivorous bird "wagtail"	Acute	0.73	35.8	10
Fruiting vegetables Fruit stage 71 - 89	Frugivorous bird "crow"[a]	Long-term	0.23	**3.0**	5
Fruiting vegetables BBCH 10 - 49	Small granivorous bird "finch"	Long-term	0.22	**3.2**	5
Fruiting vegetables BBCH ≥ 50	Small granivorous bird "finch"	Long-term	0.06	11.7	5
Fruiting vegetables BBCH 10 - 49	Small omnivorous "lark"	Long-term	0.21	**3.3**	5
Fruiting vegetables BBCH ≥ 50	Small omnivorous "lark"	Long-term	0.06	11.7	5
Fruiting vegetables Fruit stage 71 - 89	Frugivorous bird "starling"	Long-term	0.39	**1.8**	5

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Fruiting vegetables BBCH 10 - 19	Small insectivorous bird "wagtail"	Long-term	0.22	**3.2**	5
Fruiting vegetables BBCH ≥ 20	Small insectivorous bird "wagtail"	Long-term	0.19	**3.7**	5
Higher tier (birds): Not available, risk mitigation measures recommended					
Screening Step (Mammals)					
All	Small herbivorous mammal	Acute	3.93	**2.2**	10
All	Small herbivorous mammal	Long-term	1.38	**0.09**	5
Tier 1 (Mammals)					
Fruiting vegetables BBCH 71 – 89	Frugivorous mammal "rat"	Acute	1.30	**6.7**	10
Fruiting vegetables BBCH 10 – 19	Small insectivorous "shrew"	Acute	0.22	39.7	10
Fruiting vegetables BBCH ≥ 20	Small insectivorous "shrew"	Acute	0.16	55.9	10
Fruiting vegetables BBCH 10 – 49	Small herbivorous "vole"	Acute	3.93	**2.2**	10
Fruiting vegetables BBCH ≥ 50	Small herbivorous "vole"	Acute	1.18	**7.4**	10
Fruiting vegetables BBCH 10 – 49	Small omnivorous "mouse"	Acute	0.50	17.6	10
Fruiting vegetables BBCH ≥ 50	Small omnivorous "mouse"	Acute	0.15	58.1	10
Fruiting vegetables BBCH 71 – 89	Frugivorous mammal "rat"	Long-term	0.48	**0.2**	5
Fruiting vegetables BBCH 10 – 19	Small insectivorous "shrew"	Long-term	0.08	**1.5**	5
Fruiting vegetables BBCH ≥ 20	Small insectivorous "shrew"	Long-term	0.04	**3.3**	5
Fruiting vegetables BBCH 10 – 49	Small herbivorous "vole"	Long-term	1.38	**0.1**	5
Fruiting vegetables BBCH ≥ 50	Small herbivorous "vole"	Long-term	0.41	**0.3**	5
Fruiting vegetables BBCH 10 – 49	Small omnivorous "mouse"	Long-term	0.15	**0.8**	5

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Fruiting vegetables BBCH ≥ 50	Small omnivorous "mouse"	Long-term	0.04	**2.7**	5
Higher tier (Mammals): not available, risk mitigation measures recommended					

Risk from bioaccumulation and food chain behaviour

Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Abamectin				
Fish-eating birds	Long-term	0.000046	15116	5
Fish-eating mammals	Long-term	0.00004136	2902	5
Earthworm-eating birds	Long-term	0.0147	48	5
Earthworm-eating mammals	Long-term	0.0179	6.7	5
8-carboxy-6-hydroxy-avermectin B1a (M4)				
Fish-eating birds	Long-term	0.00001653	4234	5
Fish-eating mammals	Long-term	0.00001477	813	5
Earthworm-eating birds	Long-term	0.0014	50	5
Earthworm-eating mammals	Long-term	0.0017	7.1	5
4´´-oxo-avermectin B1a				
Fish-eating birds	Long-term	0.00000011	638046	5
Fish-eating mammals	Long-term	0.00000010	122474	5
Earthworm-eating birds	Long-term	4.78	**0.015**	5
Earthworm-eating mammals	Long-term	5.82	**0.002**	5
Higher tier: Not available				

Risk from consumption of contaminated water

Scenarios	**Indicator or focal species**	**Time scale**	**PEC_{dw}xDWR**	**TER**	**Trigger**
Leaf scenario	Birds	Not relevant			
Puddle scenario, Screening step					
Application rate (g a.s./ha)/relevant endpoint <3000 (koc≥500 L/kg), TER calculation not needed					

Bold values are below the respective trigger
[a] based on residue values for tomatoes

Strawberry at 0.018 kg a.s./ha, 2 applications Walk-in tunnel (and permanent low-tech greenhouse)

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Screening Step (Birds)					
All	Small insectivorous bird	Acute	4.02	**6.5**	10
All	Small insectivorous bird	Long-term	0.99	**0.7**	5

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Tier 1 (Birds)					
Strawberries BBCH 10 - 39	Small omnivorous bird "lark"	Acute	0.60	43.0	10
Strawberries BBCH ≥ 40	Small omnivorous bird "lark"	Acute	0.24	107.5	10
Strawberries BBCH 61 - 89	Frugivorous bird "Starling"	Acute	0.68	38.2	10
Strawberries BBCH 10 - 19	Small insectivorous bird "Wagtail"	Acute	0.68	38.5	10
Strawberries BBCH ≥ 20	Small insectivorous bird "Wagtail"	Acute	0.64	40.9	10
Strawberries BBCH 10 - 39	Small omnivorous bird"lark"	Long-term	0.17	**4.1**	5
Strawberries BBCH ≥ 40	Small omnivorous bird"lark"	Long-term	0.07	10.0	5
Strawberries BBCH 61 - 89	Frugivorous bird "Starling"	Long-term	0.20	**3.5**	5
Strawberries BBCH 10 - 19	Small insectivorous bird "Wagtail"	Long-term	0.17	**4.1**	5
Strawberries BBCH ≥ 20	Small insectivorous bird "Wagtail"	Long-term	0.15	**4.7**	5
Higher tier (birds): Not available, risk mitigation measures recommended					
Screening Step (Mammals)					
All	Small herbivorous mammal	Acute	2.98	**2.9**	10
All	Small herbivorous mammal	Long-term	0.74	**0.16**	5
Tier 1 (Mammals)					
Strawberries BBCH 10 -19	Small insectivorous mammal "Shrew"	Acute	0.19	45.4	10
Strawberries BBCH ≥ 20	Small insectivorous mammal "Shrew"	Acute	0.14	63.9	10
Strawberries BBCH ≥ 40	Small herbivorous mammal "Vole"	Acute	1.38	**6.3**	10
Strawberries BBCH 10 -39	Large herbivorous mammal "Lagomorph"	Acute	0.88	**9.8**	10

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Strawberries BBCH ≥ 40	Large herbivorous mammal "Lagomorph"	Acute	0.35	24.7	10
Strawberries BBCH 10 -39	Small omnivorous mammal "Mouse"	Acute	0.43	20.1	10
Strawberries BBCH ≥ 40	Small omnivorous mammal "Mouse"	Acute	0.17	50.0	10
Strawberries BBCH 10 -19	Small insectivorous mammal "Shrew"	Long-term	0.06	**1.9**	5
Strawberries BBCH ≥ 20	Small insectivorous mammal "Shrew"	Long-term	0.03	**4.3**	5
Strawberries BBCH ≥ 40	Small herbivorous mammal "Vole"	Long-term	0.44	**0.3**	5
Strawberries BBCH 10 -39	Large herbivorous mammal "Lagomorph"	Long-term	0.22	**0.5**	5
Strawberries BBCH ≥ 40	Large herbivorous mammal "Lagomorph"	Long-term	0.09	**1.4**	5
Strawberries BBCH 10 -39	Small omnivorous mammal "Mouse"	Long-term	0.12	**1.0**	5
Strawberries BBCH ≥ 40	Small omnivorous mammal "Mouse"	Long-term	0.05	**2.5**	5
Higher tier (Mammals): Not available, risk mitigation measures recommended					
Risk from bioaccumulation and food chain behaviour[*indicate when not relevant* i.e *if Log kow≤3]*					
Indicator or focal species		Time scale	DDD (mg/kg bw per day)	TER	Trigger
Abamectin					
Fish-eating birds		Long-term	0.00003925	17832	5
Fish-eating mammals		Long-term	0.00003506	3423	5
Earthworm-eating birds		Long-term	0.0147	48	5
Earthworm-eating mammals		Long-term	0.0179	6.7	5
8-carboxy-6-hydroxy-avermectin B1a (M4)					
Fish-eating birds		Long-term	0.00001234	5672	5

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Fish-eating mammals		Long-term	0.00001102	1089	5
Earthworm-eating birds		Long-term	0.0014	50	5
Earthworm-eating mammals		Long-term	0.0017	7.1	5
4´´-oxo-avermectin B1a					
Fish-eating birds		Long-term	0.00000010	708940	5
Fish-eating mammals		Long-term	0.00000009	136082	5
Earthworm-eating birds		Long-term	4.78	**0.015**	5
Earthworm-eating mammals		Long-term	5.82	**0.002**	5
Higher tier: Not available					
Risk from consumption of contaminated water					
Scenarios	**Indicator or focal species**	**Time scale**	**PEC_{dw}xDWR**	**TER**	**Trigger**
Leaf scenario	Birds	Not relevant			
Puddle scenario, Screening step					
Application rate (g a.s./ha)/relevant endpoint <3000 (koc≥500 L/kg), TER calculation not needed					

Bold values are below the respective trigger

Toxicity data for all aquatic tested species (Regulation (EU) N° 283/2013, Annex Part A, points 8.2 and Regulation (EU) N° 284/2013 Annex Part A, point 10.2))

Group	Test substance	Time-scale (Test type)	End point	Toxicity[1]
Laboratory tests				
Fish				
Pimephales promelas	Abamectin (purity: 86.2%)	96-hour (flow-through)	LC_{50}	14.7 µg a.s./L (mm)
Oncorhynchus mykiss	Abamectin (purity: 86.2%)	96-hour (flow-through, modified exposure)	LC_{50}	7.0 µg a.s./L (mm)
Oncorhynchus mykiss	[8,9-Z]-avermectin B_{1a}	96-hour (flow-through)	LC_{50}	5.4 µg/L (mm)
Oncorhynchus mykiss	8a-hydroxy-avermectin B_{1a}	96-hour (semi-static)	LC_{50}	504 µg/L (mm)
Oncorhynchus mykiss	Abamectin 1.8% EC	96-hour (semi-static)	LC_{50}	141 µg prep./L 2.5 µg a.s./L (mm)
Danio rerio	Abamectin	96-hour (semi-static)	LC_{50}	49 µg a.s./L (mm)
Geomean approach	Abamectin	-	LC_{50}	12.2 µg a.s./L
Oncorhynchus mykiss	Abamectin (purity: 91 %)	72 d (flow-through)	NOEC	0.52 µg a.s./L[a]
Aquatic invertebrates				
Daphnia magna	^{3}H-Avermectin B_1	48-hour (static)	EC_{50}	0.37 µg a.s./L (mm)
Daphnia magna	^{3}H-Avermectin B_1	48-hour (static; sediment spiked)	EC_{50}	Water: 0.21 µg a.s./L (mm) Centrifuged water: 0.20 µg a.s./L (mm)

				Sediment: 39 µg a.s./kg
Daphnia magna	Abamectin (purity: 88.5%)	48-hour (static)	EC_{50}	0.56 µg a.s./L (mm)
Daphnia longispona	Abamectin (purity. 89.3%)	48-hour (static)	EC_{50}	0.35 µg a.s./L (mm)
Daphnia pulex	Abamectin (purity: 89.3%)	48-hour (static)	EC_{50}	0.096 µg a.s./L (mm)
Simocephalus sp.	Abamectin (purity: 89.3%)	48-hour (static)	EC_{50}	0.30 µg a.s./L (mm)
Brachionus calciflorus	Abamectin (purity: 89.3%)	24-hour (static)	EC_{50}	3778 µg a.s./L (mm)
Thamnocephalus platyururs	Abamectin (purity: 89.3%)	24-hour (static)	EC_{50}	2.1 µg a.s./L (mm)
Chaoborus sp.	Abamectin (purity: 89.3%)	48-hour (static)	EC_{50}	190 µg a.s./L (mm)
Gammarus sp.	Abamectin (purity: 89.3%)	48-hour (static)	EC_{50}	7.7 µg a.s./L (mm)
Lymnaea stagnalis	Abamectin (purity: 89.3%)	48-hour (static)	EC_{50}	50.7 µg a.s./L (mm)
Mysidopopsis bahia	^{3}H-Abamectin B1	96-hour (flow-through)	LC_{50}	0.022 µg a.s./L (mm)
Mysidopopsis bahia	^{3}H-Abamectin B1	96-hour (flow-through)	LC_{50}	0.020 µg a.s./L (mm)
Daphnia magna	8a-hydroxy-avermectin B_{1a} (purity: > 91.7%)	48-hour (static)	EC_{50}	1.6 µg/L (mm)
Daphnia magna	[8,9-Z]-avermectin B_{1a} (purity: 98.8%)	48-hour (static)	EC_{50}	0.082 µg/L (mm)
Daphnia magna	4”-oxo-avermectin B_{1a} (purity: 98%)	48-hour (static)	EC_{50}	0.28 µg/L (nom)
Daphnia magna	4,8a-dihydroxy-avermectin B_{1a} (purity: 99.7%)	48-hour (semi-static)	EC_{50}	854 µg/L (nom)
Daphnia magna	4-Hydroxy-8a-oxo-avermectin B_{1a} (purity: 99.4%)	48-hour (semi-static)	EC_{50}	302.7 µg/L (nom)
Daphnia magna	8a-oxo-avermectin B_{1a} (purity: 97.7%)	48-hour (semi-static)	EC_{50}	3.53 µg/L (mm)
Daphnia magna	Abamectin 1.8% EC	48-hour (semi-static)	EC_{50}	33.9 µg/L 0.603 µg a.s./L (mm)
Eudiaptomus graciloides	Abamectin 1.8% EC	48-hour (static)	EC_{50}	54.17 µg prep./L 1.08 µg a.s./L (nom)
Species sensitivity distribution (SSD)	Abamectin	-	HC_5 (median)	0.018 µg a.s./L
Daphnia magna	Abamectin 1.8% EC	21-d (semi-static)	NOEC	0.37 µg prep./L 0.0067 µg a.s./L (mm)
Sediment-dwelling organisms				
Chironomus riparius	^{14}C-avermectin B_{1a}	28-d (static), sediment spiked	NOEC	3.3 µg a.s./kg dwt (nom)
Chironomus riparius	4”-oxo-avermectin B_{1a} (purity: 97.4 %)	28-d (static), sediment spiked	NOEC	8.1 µg a.s./kg dwt (mm)[b]

Algae				
Pseudokirchneriella subcapitata	[8,9-Z]-avermectin B_{1a} (purity: 87.6%)	72-h (static)	E_bC_{50} E_rC_{50}	> 9 mg/L > 9 mg/L (mm)
Pseudokirchneriella subcapitata	8a-hydroxy-avermectin B_{1a} (purity: 91.7%)	72-h (static)	E_bC_{50} E_rC_{50}	> 6.1 mg/L > 6.1 mg/L (mm)
Desmodesmus subspicatus	4,8a-dihydroxy-avermectin B_{1a} (purity: > 97.7%)	72-h (static)	E_rC_{50} E_yC_{50}	34.1 mg/L 36.7 mg/L (mm)
Desmodesmus subspicatus	8a-oxo-avermectin B_{1a}	72-h (static)	E_rC_{50} E_yC_{50}	> 100 mg/L > 100 mg/L (nom)
Desmodesmus subspicatus	4-Hydroxy-8a-oxo-avermectin B_{1a} (purity: > 94.4%)	72-h (static)	E_rC_{50} E_yC_{50}	43.5 mg/L 16.5 mg/L (mm)
Desmodesmus subspicatus	Abamectin 1.8% EC	72-h (static)	E_bC_{50} E_yC_{50} E_rC_{50}	25.9 mg/L 0.518 mg a.s./L 31.7 mg/L 0.632 mg a.s./L 50.8 mg/L 1.012 mg a.s./L (mm)
Further testing on aquatic organisms Tier 2 assessment addressing the acute risk to fish considering a geomean approach based on three different fish species (*Oncorhynchus mykiss, Pimephales promelas, Danio rerio*). The 96 h LC_{50} vlaues were 2.5 µg a.s./L (*O. mykiss*), 14.7 (*P. promelas*) and 49 µg a.s./L (*D. rerio*) resulting in a geometric mean of 12.17 µg a.s./L. Applying an AF of 100 results in a tier 2A geomean $RAC_{sw,ac}$ of 0.122 µg a.s./L. Tier 2 assessment addressing the acute risk to aquatic invertebrates considering a species sensitivity distribution (SSD) based on 8 different crustacean species (*Americamysis bahia, Daphnia longispina, Daphnia magna, Daphnia pulex, Eudiaptomus graciloides, Gammarus* sp., *Simocephalus* sp., *Thamnocephalus platyurus*). The EC_{50} values were in the range of 0.02 µg a.s./L (*A. bahia*) and 2.10 µg a.s./L (*T. platyurus*). The median HC_5 was determined to be 0.018 µg a.s./L (LL HC_5 = 0.0012 µg a.s./L, UL HC_5 = 0.0075 mg a.s./L). An AF of 6 is agreed resulting in a tier 2B SSD-$RAC_{sw,ac}$ of 0.003 µg a.s./L.				
Potential endocrine disrupting properties (Annex Part A, point 8.2.3) Abamectin was not indicated to be an endocrine disruptor following an assessment according to the GD on endocrine disruptors (ECHA and EFSA, 2018)				

mm Mean measured concentrations
nom Nominal concentrations
im Initial measured concentrations
a Temperature (validity criteria) was slightly outside the recommended range and further raw data for length and weight were not included in the study report. However, due to only a slight deviation of the temperature and the fact that aquatic invertebrates are the most sensitive species the study is considered acceptable for the risk assessment without repetition of a vertebrate study.
b Only supplementary information

Bioconcentration in fish (Annex Part A, point 8.2.2.3)

	Active substance*	Metabolite 4-oxo-avermectin B_{1a}
Log K_{OW}	4.4	6.80 (measured)
Steady-state bioconcentration factor (BCF)	69 (total ^3H in whole fish)	-
Uptake/depuration kinetics BCF	52	-

Annex VI Trigger for the bioconcentration factor	100	-
Clearance time (days) (CT_{50})	Not determined	-
(CT_{90})	Not determined	-
Level and nature of residues (%) in organisms after the 14 day depuration phase	0.32 µg/kg wwt, 95 % (total ^{3}H in whole fish)	-
Higher tier study		
Not required		

* BCF study not full in line with the guideline. Lipid content of the fish were not measurend as well as fish length and weight were not provided in the study.

Toxicity/exposure ratios for the most sensitive aquatic organisms (Regulation (EU) N° 284/2013, Annex Part A, point 10.2)

Abamectin

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for Abamectin – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Scenario	PEC global max (µg L)	Fish acute (Tier 1)	Fish acute (Geomean)	Fish chronic	Aquatic invertebrates (Tier 1)	Aquatic invertebrates (SSD)	Aquatic invertebrates prolonged	Algae	Higher plant	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged	Microcosm / Mesocosm
Species		*Oncorhynchus mykiss*	Fish Geomean	*Oncorhynchus mykiss*	*Americamysis bahia*	Crustacean SSD	*Daphnia magna*	*Desmodesdmus subspicatus*	-		*Chironomus riparius*	-
Toxicity		LC_{50} = 2.5 µg/L	LC_{50} = 12.2	NOEC = 0.52 µg/L	EC_{50} = 0.02 µg/L	HC_5 = 0.018 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 1012 µg/L	-		NOEC = 3.3 µg/kg	-
Trigger**		100	100	10	100	6	10	10	-		10	-
RAC [µg/L]		0.025	0.122	0.052	0.0002	0.003	0.00067	101.2	-		0.33	-
FOCUS Step 1												
	2.34	**93.60**	**19.18**	**45**	**11700**	**780**	**3493**	0.023		122.89	**372.39**	-
FOCUS Step 2												
North Europe	0.32	**12.80**	**2.62**	**6.15**	**1600**	**106.67**	**477.61**	0.0032		20.21	**61.24**	-
South Europe	0.6	**24**	**4.92**	**11.54**	**3000**	**200**	**895.52**	0.0059		38.37	**116.27**	-
FOCUS Step 3* (walk-in-tunnel) D6 / ditch	0.1125	**4.5**	0.92	**2.16**	**562.5**	**37.5**	**167.9**			0.0471	0.14	-
Step 3* (Greenhouse)	0.001342	0.0537	0.011	0.026	**6.71**	0.447	**2.0**					-

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]

**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 4 - PEC/RAC ratios for Abamectin – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Organisms *O. mykiss*

$RAC_{chronic}$: 0.52 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.0131	0.025
Trigger				1

$FOCUS_{sw}$ step 4 - PEC/RAC ratios for Abamectin – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Organisms Crustacean SSD

$SSD\text{-}RAC_{acute}$: 0.003 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.0131	**4.4**
	20 m	-	0.0067	**2.2**
Trigger				1

$FOCUS_{sw}$ step 4 - PEC/RAC ratios for Abamectin – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Organisms *D. magna*

$RAC_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.0131	**19.6**
	20 m		0.0067	**10.0**

Trigger												1

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for Abamectin – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Scenario	**PEC global max (µg L)**	**Fish acute (Tier 1)**	**Fish acute (Geomean)**	**Fish chronic**	**Aquatic invertebrates (Tier 1)**	**Aquatic invertebrates (SSD)**	**Aquatic invertebrates prolonged**	**Algae**	**Higher plant**	**PEC$_{sed}$ (µg/kg)**	**Sed. dweller prolonged**	**Microcosm / Mesocosm**
Species		*Oncorhynchus mykiss*	Fish Geomean	*Oncorhynchus mykiss*	*Americamysis bahia*	Crustacean SSD	*Daphnia magna*	*Desmodesdmus subspicatus*	-		*Chironomus riparius*	-
Toxicity		LC_{50} = 2.5 µg/L	LC_{50} = 12.2	NOEC = 0.52 µg/L	EC_{50} = 0.02 µg/L	HC_5 = 0.018 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 1012 µg/L	-		NOEC = 3.3 µg/kg	-
Trigger**		100	100	10	100	6	10	10	-		10	-
RAC [µg/L]		0.025	0.122	0.052	0.0002	0.003	0.00067	101.2	-		0.33	-
FOCUS Step 1												
	2.34	**93.6**	**19.18**	**45.00**	**11700**	**780**	**3493**	0.023		122.89	**372.39**	-
FOCUS Step 2												
North Europe	0.32	**12.8**	**2.62**	**6.15**	**1600**	**106.67**	**477.61**	0.0032		20.21	**61.24**	-
South Europe	0.46	**18.4**	**3.77**	**8.85**	**2300**	**153.33**	**686.57**	0.0045		29.29	**88.76**	-
FOCUS Step 3* (walk-in-tunnel) D6 / ditch	0.1125	**4.5**	0.92	**2.16**	**562.5**	**37.50**	**167.9**			0.0465	0.14	-
Step 3* (Greenhouse)	0.001342	0.054	0.011	0.0258	**6.71**	0.45	**2.00**					-

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]

**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 4 - PEC/RAC ratios for Abamectin – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Organisms *O. mykiss*

$RAC_{chronic}$: 0.52 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.0133	0.026
Trigger				1

$FOCUS_{sw}$ step 4 - PEC/RAC ratios for Abamectin – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Organisms Crustacean SSD

$SSD\text{-}RAC_{acute}$: 0.003 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.0133	**4.4**
	20 m	-	0.0068	**2.3**
Trigger				1

$FOCUS_{sw}$ step 4 - PEC/RAC ratios for Abamectin – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Organisms *D. magna*

$RAC_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.0133	**19.9**
	20 m		0.0068	**10.1**
Trigger				1

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for Abamectin – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Scenario	PEC global max (µg L)	Fish acute (Tier 1)	Fish acute (Geomean)	Fish chronic	Aquatic invertebrates (Tier 1)	Aquatic invertebrates (SSD)	Aquatic invertebrates prolonged	Algae	Higher plant	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged	Microcosm / Mesocosm
Species		*Oncorhynchus mykiss*	Fish Geomean	*Oncorhynchus mykiss*	*Americamysis bahia*	Crustacean SSD	*Daphnia magna*	*Desmodesdmus subspicatus*	-		*Chironomus riparius*	-
Toxicity		LC_{50} = 2.5 µg/L	LC_{50} = 12.2	NOEC = 0.52 µg/L	EC_{50} = 0.02 µg/L	HC_5 = 0.018 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 1012 µg/L	-		NOEC = 3.3 µg/kg	-
Trigger**		100	100	10	100	6	10	10	-		10	-
RAC [µg/L]		0.025	0.122	0.052	0.0002	0.003	0.00067	101.2	-		0.33	-
FOCUS Step 1												
	1.56	**62.4**	**12.79**	**30**	**7800**	**520**	**2328**	0.015		81.92	**248.24**	-
FOCUS Step 2												
North Europe	0.24	**9.6**	**1.97**	**4.62**	**1200**	**80**	**358**	0.0024		14.94	**45.27**	-
South Europe	0.44	**17.6**	**3.61**	**8.46**	**2200**	**147**	**657**	0.0043		28.15	**85.3**	-
FOCUS Step 3* (walk-in-tunnel) D6 / ditch	0.1125	**4.5**	0.92	**2.16**	**562.5**	**37.5**	**167.9**			0.039	0.12	-
Step 3* (Greenhouse)	0.000998	0.040	0.0082	0.019	**4.99**	0.33	**1.5**					-

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 4 - PEC/RAC ratios for Abamectin – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Organisms *O. mykiss*

RAC$_{chronic}$: 0.52 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio

FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.0146	0.028
Trigger				1

FOCUS$_{sw}$ step 4 - PEC/RAC ratios for Abamectin – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Organisms Crustacean SSD

SSD-RAC$_{acute}$: 0.003 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.0146	**4.9**
	20 m	-	0.0074	**2.5**
Trigger				1

FOCUS$_{sw}$ step 4 - PEC/RAC ratios for Abamectin – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Organisms *D. magna*

RAC$_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.0146	**21.8**
	20 m		0.0074	**11.0**
Trigger				1

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for Abamectin – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Scenario	PEC global max (µg L)	Fish acute (Tier 1)	Fish acute (Geomean)	Fish chronic	Aquatic invertebrates (Tier 1)	Aquatic invertebrates (SSD)	Aquatic invertebrates prolonged	Algae	Higher plant	PEC_{sed} (µg/kg)	Sed. dweller prolonged	Microcosm / Mesocosm
Species		*Oncorhynchus mykiss*	Fish Geomean	*Oncorhynchus mykiss*	*Americamysis bahia*	Crustacean SSD	*Daphnia magna*	*Desmodesdmus subspicatus*	-		*Chironomus riparius*	-
Toxicity		LC_{50} = 2.5 µg/L	LC_{50} = 12.2	NOEC = 0.52 µg/L	EC_{50} = 0.02 µg/L	HC_5 = 0.018 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 1012 µg/L	-		NOEC = 3.3 µg/kg	-
Trigger**		100	100	10	100	6	10	10	-		10	-
RAC [µg/L]		0.025	0.122	0.052	0.0002	0.003	0.00067	101.2	-		0.33	-
FOCUS Step 1												
	1.56	**62.4**	**12.79**	**30**	**7800**	**520**	**2328**	0.015		81.92	**248.24**	-
FOCUS Step 2												
North Europe	0.24	**9.6**	**1.97**	**4.62**	**1200**	**80**	**358.21**	0.0024		14.94	**45.27**	-
South Europe	0.34	**13.6**	**2.79**	**6.54**	**1700**	**113.33**	**507.46**	0.0034		21.54	**65.27**	-
FOCUS Step 3* (walk-in-tunnel) D6 / ditch	0.1125	**4.5**	0.92	**2**	**563**	**38**	**168**			0.0475	0.14	-
Step 3* (Greenhouse)	0.000998	0.0399	0.0082	0.0192	**4.99**	0.333	**1.49**					-

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]

**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

$FOCUS_{sw}$ step 4 - PEC/RAC ratios for Abamectin – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Organisms *O. mykiss*

$RAC_{chronic}$: 0.52 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio

FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.0151	0.029
Trigger				1

FOCUS$_{sw}$ step 4 - PEC/RAC ratios for Abamectin – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Organisms Crustacean SSD

SSD-RAC$_{acute}$: 0.003 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.0151	**5.0**
	20 m	-	0.0077	**2.6**
Trigger				1

FOCUS$_{sw}$ step 4 - PEC/RAC ratios for Abamectin – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Organisms *D. magna*

RAC$_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.0151	**22.5**
	20 m		0.0077	**11.5**
Trigger				1

8a-oxo-avermectin B$_{1a}$

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 8a-oxo-avermectin B$_{1a}$ – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC_{sed} (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 3.53 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 100000 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	0.0353	0.00067	10000		0.33
FOCUS Step 1								
	1.05	**42**	**20.19**	**29.75**	**1567.16**	0.00011	38.25	**115.91**
FOCUS Step 2								
North Europe	0.17	**6.80**	**3.27**	**4.82**	**253.73**	0.000017	6.48	**19.64**
South Europe	0.33	**13.20**	**6.35**	**9.35**	**492.54**	0.000033	12.64	**38.30**
FOCUS Step 3* (walk-in-tunnel)								
D6 / ditch	0.00009	0.0036	0.0017	0.0025	0.134 ~~0~~		0.01184	0.036
Step 3* (Greenhouse)								
	0.000072	0.0029	0.00138	0.00204	0.107			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]

**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

$FOCUS_{sw}$ step 1, 2 & 3 - PEC_{SW}/RAC for 8a-oxo-avermectin B_{1a} – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC_{sed} (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 3.53 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 100000 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	0.0353	0.00067	10000		0.33
FOCUS Step 1								
	1.05	**42**	**20.19**	**29.75**	**1567.16**	0.00011	38.25	**115.91**

FOCUS Step 2								
North Europe	0.17	**6.8**	**3.27**	**4.82**	**253.73**	0.000017	6.48	**19.64**
South Europe	0.25	**10**	**4.81**	**7.08**	**373.13**	0.000025	9.56	**28.97**
FOCUS Step 3* (walk-in-tunnel) D6 / ditch ~~open~~	0.00015	0.0060	0.0029	0.0042	0.224		0.01608	0.049
Step 3* (Greenhouse)	0.000072	0.00288	0.00138	0.00204	0.1075			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 8a-oxo-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Scenario	**PEC global max (µg L)**	**Fish acute**	**Fish chronic**	**Aquatic invertebrates**	**Aquatic invertebrates prolonged**	**Algae**	**PEC$_{sed}$ (µg/kg)**	**Sed. dweller prolonged**
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 3.53 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 100000 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	0.0353	0.00067	10000		0.33
FOCUS Step 1								
	0.7	**28.0**	**13.46**	**19.83**	**1044.78**	0.00007	25.5	**77.27**
FOCUS Step 2								
North Europe	0.12	**4.8**	**2.31**	**3.4**	**179.10**	0.000012	4.64	**14.06**
South Europe	0.23	**9.2**	**4.42**	**6.52**	**343.28**	0.000023	9.02	**27.33**
FOCUS Step 3* (walk-in-tunnel) D6 / ditch	0.000047	0.0019	0.0009	0.0013	0.070		0.008116	0.025
Step 3* (Greenhouse)	0.000042	0.00168	0.00081	0.00119	0.0627			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]

**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 8a-oxo-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 3.53 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 100000 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	0.0353	0.00067	10000		0.33
FOCUS Step 1								
	0.7	**28**	**13.46**	**19.83**	**1044.78**	**28**	25.5	**77.27**
FOCUS Step 2								
North Europe	0.12	**4.8**	**2.31**	**3.4**	**179.10**	0.00001	4.64	**14.06**
South Europe	0.18	**7.2**	**3.46**	**5.1**	**269**	0.00002	6.83	**20.7**
FOCUS Step 3* (walk-in-tunnel) D6 / ditch	0.000075	0.0030	0.0014	0.0021	0.112		0.01304	0.040
Step 3* (Greenhouse)	0.000042	0.00168	0.00081	0.00119	0.0627			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

8a-hydroxy-avermectin B$_{1a}$

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 8a-hydroxy-avermectin B$_{1a}$ – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Raphidocelis subcapitata*		*Chironomus riparius*

Toxicity		LC_{50} = 504 µg/L	NOEC = 0.52 µg/L	EC_{50} = 1.6 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 6100 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		5.04	0.052	0.016	0.00067	610		0.33
FOCUS Step 1								
	1.74	0.35	**33.46**	**108.75**	**2597.01**	0.0029	29.93	**90.7**
FOCUS Step 2								
North Europe	0.28	0.06	**5.38**	**17.50**	**417.91**	0.00046	4.81	**14.58**
South Europe	0.54	0.11	**10.38**	**33.75**	**805.97**	0.00089	9.49	**28.76**
FOCUS Step 3* (walk-in-tunnel) D6 / ditch	0.000496		0.010	0.031	0.74		0.000733	0.0022
Step 3* (Greenhouse)	0.000396		0.0076	0.025	0.59			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

$FOCUS_{sw}$ step 1, 2 & 3 - PEC_{SW}/RAC for 8a-hydroxy-avermectin B_{1a} – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC_{sed} (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Raphidocelis subcapitata*		*Chironomus riparius*
Toxicity		LC_{50} = 504 µg/L	NOEC = 0.52 µg/L	EC_{50} = 1.6 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 6100 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		5.04	0.052	0.016	0.00067	610		0.33
FOCUS Step 1								
	1.74	0.35	**33.46**	**108.75**	**2597.01**	0.0029	29.93	**90.7**
FOCUS Step 2								
North Europe	0.28	0.056	**5.38**	**17.50**	**417.91**	0.00046	4.81	**14.6**
South Europe	0.41	0.081	**7.88**	**25.63**	**611.94**	0.00067	7.15	**21.7**
FOCUS Step 3* (walk-in-tunnel)								

D6 / ditch	0.002041		0.04	0.13	**3.05**	0.000987	0.0030
Step 3* (Greenhouse)	0.000296		0.01	0.02	0.59		

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 4 - PEC$_{SW}$/RAC for 8a-hydroxy-avermectin B$_{1a}$ – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Organisms *D. magna*

RAC$_{chronic}$: 0.00067 µg/L

Mitigation options	**x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)**	**x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)**	**PECsw (µg/L)**	**PEC/RAC ratio**
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.000019	0.028
Trigger				1

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 8a-hydroxy-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Scenario	**PEC global max (µg L)**	**Fish acute**	**Fish chronic**	**Aquatic invertebrates**	**Aquatic invertebrates prolonged**	**Algae**	**PEC$_{sed}$ (µg/kg)**	**Sed. dweller prolonged**
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Raphidocelis subcapitata*		*Chironomus riparius*
Toxicity		LC_{50} = 504 µg/L	NOEC = 0.52 µg/L	EC_{50} = 1.6 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 6100 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		5.04	0.052	0.016	0.00067	610		0.33
FOCUS Step 1								
	1.16	0.23	**22.31**	**72.50**	**1731.34**	0.0019	19.96	**60.5**
FOCUS Step 2								
North Europe	0.2	0.040	**3.85**	**12.50**	**298.51**	0.00033	3.48	**10.5**
South Europe	0.39	0.077	**7.50**	**24.38**	**582.09**	0.00064	6.84	**20.7**

FOCUS Step 3* (walk-in-tunnel) D6 / ditch ~~open~~	0.000262		0.0050	0.016	0.39	0.0005	0.0015
Step 3* (Greenhouse)	0.000228		0.0044	0.0143	0.340		

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 8a-hydroxy-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Scenario	**PEC global max (µg L)**	**Fish acute**	**Fish chronic**	**Aquatic invertebrates**	**Aquatic invertebrates prolonged**	**Algae**	**PEC$_{sed}$ (µg/kg)**	**Sed. dweller prolonged**
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Raphidocelis subcapitata*		*Chironomus riparius*
Toxicity		LC_{50} = 504 µg/L	NOEC = 0.52 µg/L	EC_{50} = 1.6 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 6100 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		5.04	0.052	0.016	0.00067	610		0.33
FOCUS Step 1								
	1.16	0.23	**22.31**	**72.50**	**1731.34**	0.0019	19.96	**60.5**
FOCUS Step 2								
North Europe	0.2	0.040	**3.85**	**12.50**	**298.51**	0.00033	3.48	**10.5**
South Europe	0.29	0.058	**5.58**	**18.13**	**432.84**	0.00048	5.16	**15.6**
FOCUS Step 3* (walk-in-tunnel) D6 / ditch	0.001364		0.026	0.085	**2.04**		0.000808	0.0024
Step 3* (Greenhouse)	0.000228		0.00438	0.0143	0.340			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 4 - PEC$_{SW}$/RAC for 8a-hydroxy-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Organisms *D. magna*

RAC$_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.000016	0.024
Trigger				1

4”-oxo-avermectin B$_{1a}$

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 4”-oxo-avermectin B$_{1a}$ – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 0.28 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 1012 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	0.0028	0.00067	101.2		0.33
FOCUS Step 1								
	1.54	**62**	**29.62**	**550**	**2298.51**	0.015	21.19	**64.21**
FOCUS Step 2								
North Europe	0.23	**9.2**	**4.42**	**82.14**	**343.28**	0.0023	3.24	**9.82**
South Europe	0.45	**18**	**8.65**	**160.71**	**671.64**	0.0044	6.33	**19.18**
FOCUS Step 3* (walk-in-tunnel)								
D6 / ditch	0.000112	0.004	0.0022	0.04	0.17		0.002021	0.0061
Step 3* (Greenhouse)								

	0.000344	0.0138	0.0066	0.123	0.51

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 4"-oxo-avermectin B$_{1a}$ – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 0.28 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 1012 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	0.0028	0.00067	101.2		0.33
FOCUS Step 1								
	1.54	**62**	**29.62**	**550**	**2298.51**	0.015	21.19	**64.21**
FOCUS Step 2								
North Europe	0.23	**9.20**	**4.42**	**82.14**	**343.28**	0.0023	3.24	**9.82**
South Europe	0.34	**13.60**	**6.54**	**121.43**	**507.46**	0.0034	4.79	**14.52**
FOCUS Step 3* (walk-in-tunnel) D6 / ditch	0.000824	0.033	0.016	0.29	**1.23**		0.002701	0.0082
Step 3* (Greenhouse)	0.000344	0.0138	0.0066	0.123	0.513			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 4 - PECSW/RAC for 4"-oxo-avermectin B1a – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Organisms *D. magna*

$RAC_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	0.000075	0.112
Trigger				1

$FOCUS_{sw}$ step 1, 2 & 3 - PEC_{SW}/RAC for 4"-oxo-avermectin B_{1a} – Strawberryat 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC_{sed} (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 0.28 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 1012 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	0.0028	0.00067	101.2		0.33
FOCUS Step 1								
	1.03	**41**	**19.81**	**368**	**1537.31**	0.0102	14.13	**42.82**
FOCUS Step 2								
North Europe	0.17	**6.8**	**3.27**	**60.71**	**253.73**	0.0017	2.4	**7.27**
South Europe	0.33	**13.2**	**6.35**	**117.86**	**492.54**	0.0033	4.66	**14.12**
FOCUS Step 3* (walk-in-tunnel)								
D6 / ditch	0.000057	0.0023	0.0011	0.020	0.085		0.001378	0.0042
Step 3* (Greenhouse)								
	0.0002	0.0080	0.0038	0.071	0.299			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]

**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 4"-oxo-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 0.28 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 1012 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	0.0028	0.00067	101.2		0.33
FOCUS Step 1								
	1.03	**41**	**19.81**	**368**	**1537.31**	0.0102	14.13	**42.82**
FOCUS Step 2								
North Europe	0.17	**6.8**	**3.27**	**60.71**	**253.73**	0.0017	2.4	**7.27**
South Europe	0.25	**10.0**	**4.81**	**89.29**	**373.13**	0.0025	3.53	**10.70**
FOCUS Step 3* (walk-in-tunnel) D6 / ditch	0.000586	0.023	0.011	0.21	0.87		0.002217	0.0067
Step 3* (Greenhouse)	0.0002	0.0080	0.0038	0.071	0.299			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

4,8-dihydroxy-avermectin B$_{1a}$

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 4,8-dihydroxy-avermectin B$_{1a}$ – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*

Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 854 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 34100 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	8.54	0.00067	3410		0.33
FOCUS Step 1								
	0.58	**23.2**	**11.15**	0.068	**865.67**	0.00017	9.51	**28.82**
FOCUS Step 2								
North Europe	0.1	**4**	**1.92**	0.012	**149.25**	0.000029	1.65	**5**
South Europe	0.2	**8**	**3.85**	0.023	**298.51**	0.000059	3.29	**9.97**
FOCUS Step 3* (walk-in-tunnel) D6 / ditch ~~open~~	0.004402	0.18	0.085	0.00052	**6.57**		0.001878	0.0057
Step 3* (Greenhouse)	0.000402	0.0161	0.0077	0.000047	0.60			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

$FOCUS_{sw}$ step 4 - PECSW/RAC for 4,8-dihydroxy-avermectin B1a – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Organisms *D. magna*

$RAC_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.001
Trigger				1

$FOCUS_{sw}$ step 1, 2 & 3 - PEC_{SW}/RAC for 4,8-dihydroxy-avermectin B_{1a} – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC_{sed} (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 854 µg/L	NOEC = ~~0.018~~ 0.0067 µg/L	E_rC_{50} = 34100 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	8.54	0.00067	3410		0.33
FOCUS Step 1								
	0.58	**23.2**	**11.15**	0.068	**865.67**	0.00017	9.51	**28.82**
FOCUS Step 2								
North Europe	0.1	**4**	**1.92**	0.012	**149.25**	0.000029	1.65	**5**
South Europe	0.15	**6**	**2.88**	0.018	**223.88**	0.000044	2.47	**7.48**
FOCUS Step 3* (walk-in-tunnel)								
D6 / ditch	0.01081	0.43	0.21	0.0013	**16.13**		0.00344	0.010
Step 3* (Greenhouse)								
	0.000402	0.0161	0.0077	0.0000471	0.6			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]

**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

$FOCUS_{sw}$ step 4 - PECSW/RAC for 4,8-dihydroxy-avermectin B1a – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Organisms *D. magna*

$RAC_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.001
Trigger				1

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 4,8-dihydroxy-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 854 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 34100 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	8.54	0.00067	3410		0.33
FOCUS Step 1								
	0.39	**15.6**	**7.5**	0.046	**582.09**	0.00011	6.34	**19.21**
FOCUS Step 2								
North Europe	0.07	**2.8**	**1.35**	0.008	**104.48**	0.000021	1.15	**3.48**
South Europe	0.14	**5.6**	**2.69**	0.016	**208.96**	0.000041	2.3	**6.97**
FOCUS Step 3* (walk-in-tunnel) D6 / ditch	0.00253	0.1012	0.049		**3.78**		0.001033	0.0031
Step 3* (Greenhouse)	0.00024	0.0096	0.0046		0.358			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 4 - PEC$_{SW}$/RAC for 4,8-dihydroxy-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Organisms *D. magna*

RAC$_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio

FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.001
Trigger				1

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 4,8-dihydroxy-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 854 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 34100 µg/L		NOEC = 3.3 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	8.54	0.00067	3410		0.33
FOCUS Step 1								
	0.39	**15.6**	**7.5**	0.046	**582.09**	0.00011	6.34	**19.21**
FOCUS Step 2								
North Europe	0.07	**2.8**	**1.35**	0.0082	**104.48**	0.000021	1.15	**3.48**
South Europe	0.1	**4**	**1.92**	0.012	**149.25**	0.000029	1.72	**5.21**
FOCUS Step 3* (walk-in-tunnel)								
D6 / ditch	0.007208	0.29	0.14		**11**		0.002148	0.0065
Step 3* (Greenhouse)								
	0.00024	0.0096	0.00462		0.358			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]

**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 4 - PEC$_{SW}$/RAC for 4,8-dihydroxy-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Organisms *D. magna*

$RAC_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.001
Trigger				1

4-hydroxy-8a-oxo-avermectin B_{1a}

$FOCUS_{sw}$ step 1, 2 & 3 - PEC_{SW}/RAC for 4-hydroxy-8a-oxo-avermectin B_{1a} – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC_{sed} (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 854 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 43500 µg/L		NOEC = 0.33 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	8.54	0.00067	4350		0.033
FOCUS Step 1								
	0.31	**12.4**	**5.96**	0.036	**462.69**	0.000071	11.48	**34.78**
FOCUS Step 2								
North Europe	0.06	**2.4**	**1.15**	0.007	**89.55**	0.000014	2.11	**63.9**
South Europe	0.11	**4.4**	**2.12**	0.013	**164.18**	0.000025	4.21	**140.33**
FOCUS Step 3* (walk-in-tunnel)								
D6 / ditch ~~open~~	0.001696	0.068	0.033		**2.53**		0.001484	0.045
Step 3*~~*~~ (Greenhouse)								
	0.000254	0.0102	0.0049		0.379			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]

**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 4 - PECSW/RAC for 4-hydroxy-8a-oxo-avermectin B1a – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Organisms *D. magna*

RAC$_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.001
Trigger				1

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 4-hydroxy-8a-oxo-avermectin B$_{1a}$ – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 854 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 43500 µg/L		NOEC = 0.33 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	8.54	0.00067	4350		0.033
FOCUS Step 1								
	0.31	**12.4**	**5.96**	0.036	**462.69**	0.000071	11.48	**34.78**
FOCUS Step 2								
North Europe	0.06	**2.4**	**1.15**	0.0070	**89.55**	0.000014	2.11	**63.9**
South Europe	0.09	**3.6**	**1.73**	0.011	**134.33**	0.000021	3.16	**95.75**
FOCUS Step 3* (walk-in-tunnel)								
D6 / ditch	0.00699	0.28	0.13		**10.43**		0.001668	0.050
Step 3* (Greenhouse)								
	0.000254	0.0102	0.0049		0.379			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]

**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

$FOCUS_{sw}$ step 4 - PECSW/RAC for 4-hydroxy-8a-oxo-avermectin B1a – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Organisms *D. magna*

$RAC_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.001
Trigger				1

$FOCUS_{sw}$ step 1, 2 & 3 - PEC_{SW}/RAC for 4-hydroxy-8a-oxo-avermectin B_{1a} – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC_{sed} (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 854 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 43500 µg/L		NOEC = 0.33 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	8.54	0.00067	4350		0.033
FOCUS Step 1								
	0.21	**8.4**	**4**	0.025	**313.**	0.000048	7.66	**232.12**
FOCUS Step 2								
North Europe	0.04	**1.60**	0.77	0.0047	**59.70**	0.0000092	1.44	**43.63**
South Europe	0.08	**3.20**	**1.54**	0.0094	**119.40**	0.000018	2.89	**87.57**
FOCUS Step 3* (walk-in-tunnel)								
D6 / ditch ~~open~~	0.003423	0.14	0.066		**5.1**		0.000876	0.0265

Step 3* (Greenhouse)				
	0.000154	0.0062	0.0030	0230

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 4 - PEC$_{SW}$/RAC for 4-hydroxy-8a-oxo-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Organisms *D. magna*

RAC$_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.001
Trigger				1

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 4-hydroxy-8a-oxo-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Daphnia magna*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 854 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 43500 µg/L		NOEC = 0.33 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	8.54	0.00067	4350		0.033
FOCUS Step 1								
	0.21	**8.4**	**4**	0.025	**313.43**	0.000048	7.66	**232.12**
FOCUS Step 2								
North Europe	0.04	**1.6**	0.77	0.0047	**59.70**	0.0000092	1.44	**43.63**

South Europe	0.06	**2.4**	**1.15**	0.0070	**89.55**	0.000014	2.16	**65.45**
FOCUS Step 3* (walk-in-tunnel)								
D6 / ditch	0.004327	0.17	0.083		**6.5**		0.000998	0.030
Step 3** (Greenhouse)								
	0.000154	0.0062	0.0030		0.230			

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 4 - PEC$_{SW}$/RAC for 4-hydroxy-8a-oxo-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Organisms *D. magna*

RAC$_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.001
Trigger				1

8-carboxy-6-hydroxy-avermectin B$_{1a}$

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 8-carboxy-6-hydroxy-avermectin B$_{1a}$ – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Americamysis bahia*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*

Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 0.02 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 1012 µg/L		NOEC = 0.33 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	0.0002	0.00067	101.2		0.033
FOCUS Step 1								
	0.69	**28**	**13.27**	**3450**	**1029.85**	0.0068	7.43	**225.15**
FOCUS Step 2								
North Europe	0.09	**3.6**	**1.73**	**450**	**134.33**	0.00089	1.01	**30.60**
South Europe	0.19	**8**	**3.65**	**950**	**283.58**	0.0019	2.02	**61.21**
FOCUS Step 3* (walk-in-tunnel)								
D6 / ditch	0.002911	0.116	0.0560	**14.56**	**4.34**	0.002911	0.001826	0.055
Step 3* (Greenhouse)								
	0.00217	0.0868	0.0417	**10.85**	**3.24**	0.00217		

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

$FOCUS_{sw}$ step 4 - PEC_{SW}/RAC for 8-carboxy-6-hydroxy-avermectin B_{1a} – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Organisms *A. bahia*

$RAC_{chronic}$: 0.0002 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.005
Trigger				1

$FOCUS_{sw}$ step 4 - PEC_{SW}/RAC for 8-carboxy-6-hydroxy-avermectin B_{1a} – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, March – May

Organisms *D. magna*

$RAC_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.001
Trigger				1

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 8-carboxy-6-hydroxy-avermectin B$_{1a}$ – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Americamysis bahia*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 0.02 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 1012 µg/L		NOEC = 0.33 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	0.0002	0.00067	101.2		0.033
FOCUS Step 1								
	0.69	**28**	**13.27**	**3450**	**1029.85**	0.0068	7.43	**225.15**
FOCUS Step 2								
North Europe	0.09	**4**	**1.73**	**450**	**134.33**	0.0009	1.01	**30.60**
South Europe	0.14	**6**	**2.69**	**700**	**208.96**	0.0014	1.51	**45.76**
FOCUS Step 3* (walk-in-tunnel)								
D6 / ditch	0.001547	0.062	0.030	**7.74**	**2.31**	0.001547	0.007416	0.224
Step 3* (Greenhouse)								
	0.00217	0.0868	0.04173	**10.85**	**3.24**	0.00217		

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]

**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 4 - PEC$_{SW}$/RAC for 8-carboxy-6-hydroxy-avermectin B$_{1a}$ – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June –

September

Organisms *A. bahia*

$RAC_{chronic}$: 0.0002 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.005
Trigger				1

$FOCUS_{sw}$ step 4 - PEC_{SW}/RAC for 8-carboxy-6-hydroxy-avermectin B_{1a} – Tomato at 0.018 kg a.s./ha [3 applications; interval 7 days]-, June – September

Organisms *D. magna*

$RAC_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.001
Trigger				1

$FOCUS_{sw}$ step 1, 2 & 3 - PEC_{SW}/RAC for 8-carboxy-6-hydroxy-avermectin B_{1a} – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC_{sed} (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Americamysis bahia*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*

Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 0.02 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 1012 µg/L		NOEC = 0.33 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	0.0002	0.00067	101.2		0.033
FOCUS Step 1								
	0.46	**18.4**	**8.85**	**2300**	**686.57**	0.0045	4.96	**150.30**
FOCUS Step 2								
North Europe	0.07	**2.8**	**1.35**	**350**	**104.48**	0.00069	0.76	**23.03**
South Europe	0.14	**5.6**	**2.69**	**700**	**208.96**	0.0014	1.51	**45.76**
FOCUS Step 3* (walk-in-tunnel)								
D6 / ditch	0.001702	0.0681	0.0327	**8.51**	**2.54**	0.001702	0.001065	0.032
Step 3* (Greenhouse)								
	0.00134	0.0536	0.0258	**6.7**	**2.0**	0.00134		

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

$FOCUS_{sw}$ step 4 - PEC_{SW}/RAC for 8-carboxy-6-hydroxy-avermectin B_{1a} – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Organisms *A. bahia*

$RAC_{chronic}$: 0.0002 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.005
Trigger				1

$FOCUS_{sw}$ step 4 - PEC_{SW}/RAC for 8-carboxy-6-hydroxy-avermectin B_{1a} – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, March – May

Organisms *D. magna*

RAC$_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.001
Trigger				1

FOCUS$_{sw}$ step 1, 2 & 3 - PEC$_{SW}$/RAC for 8-carboxy-6-hydroxy-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Scenario	PEC global max (µg L)	Fish acute	Fish chronic	Aquatic invertebrates	Aquatic invertebrates prolonged	Algae	PEC$_{sed}$ (µg/kg)	Sed. dweller prolonged
Species		*Oncorhynchus mykiss*	*Oncorhynchus mykiss*	*Americamysis bahia*	*Daphnia magna*	*Desmodesdmus subspicatus*		*Chironomus riparius*
Toxicity		LC_{50} = 2.5 µg/L	NOEC = 0.52 µg/L	EC_{50} = 0.02 µg/L	NOEC = 0.0067 µg/L	E_rC_{50} = 1012 µg/L		NOEC = 0.33 µg/kg
Trigger**		100	10	100	10	10		10
RAC [µg/L]		0.025	0.052	0.0002	0.00067	101.2		0.033
FOCUS Step 1								
	0.46	**18.4**	**8.85**	**2300**	**686.57**	0.0045	4.96	**150.30**
FOCUS Step 2								
North Europe	0.07	**2.8**	**1.35**	**350**	**104.48**	0.0007	0.76	**23.03**
South Europe	0.1	**4.0**	**1.92**	**500**	**149.25**	0.0010	1.13	**34.24**
FOCUS Step 3* (walk-in-tunnel)								
D6 / ditch	0.007536	0.301	0.145	**37.68**	**11.25**	0.007536	0.005568	0.1687
Step 3* (Greenhouse)								
	0.00134	0.0536	0.02577	**6.70**	**2.0**	0.00134		

*[Only scenarios where the trigger is not met at FOCUSsw step 1-2 should be included in step 3.]
**[If the Trigger value has been adjusted during the risk assessment, it should always be clear on what basis the risk assessment has been performed, i.e. what the AF value is and for which organism and endpoint it refers.]

FOCUS$_{sw}$ step 4 - PEC$_{SW}$/RAC for 8-carboxy-6-hydroxy-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Organisms *A. bahia*

RAC$_{chronic}$: 0.0002 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.005
Trigger				1

FOCUS$_{sw}$ step 4 - PEC$_{SW}$/RAC for 8-carboxy-6-hydroxy-avermectin B$_{1a}$ – Strawberry at 0.018 kg a.s./ha [2 applications; interval 7 days]-, June – September

Organisms *D. magna*

RAC$_{chronic}$: 0.00067 µg/L

Mitigation options	x m non-spray buffer zone (corresponding to ≤ 95 % drift reduction)	x m vegetated buffer strip (corresponding to ≤ 90 % run-off reduction)	PECsw (µg/L)	PEC/RAC ratio
FOCUS Step 4 (walk-in-tunnel)				
D6 / ditch	10 m	-	< 0.000001	< 0.001
Trigger				1

Effects on bees (Regulation (EU) N° 283/2013, Annex Part A, point 8.3.1 and Regulation (EU) N° 284/2013 Annex Part A, point 10.3.1)*

Species	Test substance	Time scale/type of endpoint	End point	toxicity
Apis mellifera	Abamectin	Acute	contact: 24 h LD_{50}	0.001 µg a.s./bee
Apis mellifera	Abamectin	Acute	oral: 24 h 24 h LD_{50}	0.004 µg a.s./bee
Apis mellifera	Abamectin	Acute	oral: 72 h 24 h LD_{50}	0.0069 µg a.s./bee
Apis mellifera	Abamectin	Chronic, adults	10 days, LDD50 10 days, NOEDD	0.011 µg test item/bee/day (equivalent to 0.000208 µg a.i./bee/day) <0.005 µg test item/bee/day(equivalent to <0.0000964 µg a.i./bee/day)
Apis mellifera	Abamectin 1.8% EC	Chronic, larvae	8 days, NOED	8.82×10^{-04} µg prod./larva (equivalent to 1.57×10^{-05} µg a.s./larva)

Potential for accumulative toxicity: No data
Semi-field test: Extended laboratory study with Bombus terrestris exposed to dry residues of Abamectin 1.8% EC applied as foliar spray to apple leaves: 15% and 3.4% mortality at 18 g as/ha after 96 h and 4 d, respectivley. Behavioural effects up to 96 h.
Field tests: -

Risk assessment for – Tomato at 0.018 kg a.s./ha, 3 applications

Species	Test substance	Risk quotient	HQ/ETR	Trigger
Screening step				
Apis mellifera	a.s.	$ETR_{acute\ adult\ oral}$	**19.83**	0.2
Apis mellifera	a.s.	$ETR_{chronic\ adult\ oral}$	**657.7**	0.03
Apis mellifera	Abamectin 1.8% EC	$ETR_{chronic\ larvae}$	**5044.59**	0.2

Species	Test substance	Scenario	BBCH	Risk quotient	HQ/ETR	Trigger
Tier 1						
Apis mellifera	a.s.	treated crop	10 – 49	$ETR_{acute\ adult\ oral}$	**2.40**	0.2
		treated crop	50 – 69		**2.40**	
		treated crop	≥ 70		0.00	
		weeds	10 – 49		**9.65**	
		weeds	50 – 69		**2.90**	
		weeds	≥ 70		**2.90**	
		next crop	10 – 49		**1.83**	
		next crop	50 – 69		**1.83**	
		next crop	≥ 70		**1.83**	
Apis mellifera	a.s.	treated crop	10 - 49	$ETR_{chronic\ adult\ oral}$	**57.32**	0.03
		treated crop	50 - 69		**57.32**	
		treated crop	≥ 70		0.00	
		Weeds	10 - 49		**180.69**	
		Weeds	50 - 69		**54.21**	
		Weeds	≥ 70		**54.21**	
		next crop	10 - 49		**33.65**	
		next crop	50 - 69		**33.65**	
		next crop	≥ 70		**33.65**	
Apis mellifera	Abamectin 1.8% EC	treated crop	10 - 49	$ETR_{chronic\ larvae}$	**146.18**	0.2
		treated crop	50 - 69		**146.18**	
		treated crop	≥ 70		0.00	
		weeds	10 - 49		**2143.95**	
		weeds	50 - 69		**643.18**	
		weeds	≥ 70		**643.18**	
		next crop	10 - 49		**389.81**	
		next crop	50 - 69		**389.81**	
		next crop	≥ 70		**389.81**	

Bold values are below the respective trigger

Risk assessment for – Strawberries at 0.018 kg a.s./ha, 2 applications

Species	Test substance	Risk quotient	HQ/ETR	Trigger
Screening step				
Apis mellifera	a.s.	$ETR_{acute\ adult\ oral}$	**19.83**	0.2
Apis mellifera	a.s.	$ETR_{chronic\ adult\ oral}$	**743.5**	0.03
Apis mellifera	Abamectin 1.8% EC	$ETR_{chronic\ larvae}$	**5044.59**	0.2

Species	Test substance	Scenario	BBCH	Risk quotient	HQ/ETR	Trigger
Tier 1						
Apis mellifera	a.s.	treated crop	≥ 70	$ETR_{acute\ adult\ oral}$	0.00	0.2
		treated crop	10 - 39		**19.83**	
		treated crop	40 - 69		**19.83**	
		weeds	≥ 70		**3.86**	
		weeds	10 - 39		**9.65**	
		weeds	40 - 69		**3.86**	
		next crop	≥ 70		**1.83**	
		next crop	10 - 39		**1.83**	
		next crop	40 - 69		**1.83**	
Apis mellifera	a.s.	treated crop	≥ 70	$ETR_{chronic\ adult\ oral}$	0.00	0.03
		treated crop	10 - 39		**361.39**	
		treated crop	40 - 69		**361.39**	
		Weeds	≥ 70		**72.28**	
		Weeds	10 - 39		**180.69**	
		Weeds	40 - 69		**72.28**	
		next crop	≥ 70		**33.56**	
		next crop	10 - 39		**33.65**	
		next crop	40 - 69		**33.65**	
Apis mellifera	Abamectin 1.8% EC	treated crop	≥ 70	$ETR_{chronic\ larvae}$	0.00	0.2
		treated crop	10 - 39		**4287.90**	
		treated crop	40 - 69		**4287.90**	
		weeds	≥ 70		**857.58**	
		weeds	10 - 39		**2143.95**	
		weeds	40 - 69		**857.58**	
		next crop	≥ 70		**389.81**	
		next crop	10 - 39		**389.81**	
		next crop	40 - 69		**389.81**	

Bold values are below the respective trigger

Risk assessment for honeybees from consumption of drinking water (covering all uses)

Species	Test substance	Risk quotient	ETR	Trigger
Screening level risk assessment from exposure to residues in guttation fluid				
Apis mellifera	a.s. (water solubility = 5.2 mg a.s./L)	$ETR_{acute\ adult\ oral}$	**1.999**	0.2
Apis mellifera	Abamectin 1.8% EC (water solubility = 5.2 mg a.s./L)	$ETR_{chronic\ adult\ oral}$	**35.811**	0.03
Apis mellifera	Abamectin 1.8% EC (water solubility = 5.2 mg a.s./L)	ETR_{larvae}	**6159.44**	0.2
Risk assessment from exposure to residues in surface water				
Apis mellifera	a.s.	$ETR_{acute\ adult\ oral}$	0.00	0.2
Apis mellifera	a.s.	$ETR_{chronic\ adult\ oral}$	0.006	0.03
Apis mellifera	Abamectin 1.8% EC	ETR_{larvae}	**0.8**	0.2

Effects on other arthropod species (Regulation (EU) N° 283/2013, Annex Part A, point 8.3.2 and Regulation (EU) N° 284/2013 Annex Part A, point 10.3.2)

Laboratory tests with standard sensitive species

Species	Test Substance	End point	Toxicity
No standard laboratory studies available			
Additional species			
-			

First tier risk assessment

Test substance	Species	Effect (LR_{50} g/ha)	HQ in-field	HQ off-field[1]	Trigger
-					

Extended laboratory tests, aged residue tests

Species	Substrate, test substance,	Dose	End point	% effect	ER_{50}
Aphidius rhopalosiphi	Apple leaf (3-D), fresh and aged residues, Abamectin 1.8% EC	42 g a.s./ha 0 d aged 7 d aged 14 d aged 0 d aged 7 d aged 14 d aged	Mortality Reproduction 	 100.0 20.0 10.3 n.a. 57.3 36.6	-
Aphidius rhopalosiphi	Barley plants (3-D), fresh and aged residues Abamectin 1.8% EC	7.5 mL prod./ha 15 mL prod./ha 30 mL prod./ha 60 mL prod./ha 120 mL prod./ha 7.5 mL prod./ha 15 mL prod./ha 30 mL prod./ha 60 mL prod./ha 120 mL prod./ha	Mortality Reproduction 	0.0 0.0 33.3 70.0 86.7 2.1 10.9 -9.6 - -	48h LR_{50} = 46.6 mL prod./ha (0.76 g a.s./ha) ER_{50} > 30 mL prod./ha (0.49 g a.s./ha)
Typhlodromus pyri	Apple leaf (3-D), fresh and aged residues, Abamectin 1.8% EC	42 g a.s./ha: 0 d aged 7 d aged 14 d aged 0 d aged 7 d aged 14 d aged	Mortality Reproduction 	 100.0 5.1 2.3 n.a. 9.5 n.a.	-
Typhlodromus pyri	Bean plants, leaf disc (2-D), fresh residues Abamectin 1.8% EC	5.7 mL prod./ha 10.3 mL prod./ha 18.5 mL prod./ha 33.0 mL prod./ha 60.0 mL prod./ha 5.7 mL prod./ha 10.3 mL prod./ha 18.5 mL prod./ha 33.0 mL prod./ha 60.0 mL prod./ha	Mortality 	0.0 5.0 20.0 71.0 80.0 42.3 66.0 18.5 - -	48h LR_{50} = 26.72 mL prod./ha (0.44 g a.s./ha) ER_{50} > 5.7 mL prod./ha (0.09 g a.s./ha)

Species	Substrate, test substance,	Dose	End point	% effect	ER_{50}
Poecilus cupreus	Standard soil (2-D), fresh residue, Abamectin 1.8% EC	720 mL prod./ha 1200 mL prod./ha 2000 mL prod./ha 3333 mL prod./ha 5556 mL prod./ha 720 mL prod./ha 1200 mL prod./ha 2000 mL prod./ha 3333 mL prod./ha 5556 mL prod./ha	Mortality Feeding	0.0 0.0 0.0 0.0 3.3 1.0 0.0 1.1 1.1 0.0	LR_{50} > 5556 mL prod./ha (91.1 g a.s./ha) ER_{50} feeding > 5556 mL prod./ha (100 g a.s./ha) NOAEC > 2000 mL prod./ha (32.78 g a.s./ha) [1]
Orius laevigatus	Bean plants, leaf disc (2-D), fresh residues Abamectin 1.8% EC	21.3 mL prod./ha 47 mL prod./ha 103 mL prod./ha 227 mL prod./ha 500 mL prod./ha 21.3 mL prod./ha 47 mL prod./ha 103 mL prod./ha 227 mL prod./ha 500 mL prod./ha	Mortality Reproduction	0.0 12.0 43.0 95.0 99.0 -1.0 -8.0 50 n.a. n.a.	LR_{50} = 102 mL prod./ha (1.67 g a.s./ha) 47 < ER_{50} < 103 mL prod./ha (0.77 < ER_{50} < 1.69 g a.s./ha)

[1] conservative endpoint based on behavioural effects and deviations to the guideline

Risk assessment for – Tomato at 0.018 kg a.s./ha, 3 applications

Species	LR_{50}/ER_{50} (g/ha)	In-field rate (g/ha)	~~Off-field rate (g/ha)~~
Aphidius rhopalosiphi	0.76 / 0.49	41.4	~~Not relevant~~[1]
Aphidius rhopalosiphi (aged residues)	>42	41.4	
Typhlodromus pyri	0.44 / 0.09	41.4	
Typhlodromus pyri (aged residues)	>42	41.4	
Orius laevigatus	1.67 / 0.77 – 1.69	41.4	
Poecilus cupreus	91.1 / 32.78	48.6	

Off-field risk assessment with buffer zones for – Tomato at 0.018 kg a.s./ha, 3 applications

Crop (use pattern)	**Species**	**Field rate with buffer zone [g a.s./ha]**					**LR_{50} / ER_{50} [g a.s./ha]**
		1m	**3m**	**5m**	**10m**	**20m**	
Tomatoes	*Aphidius*	4.16	-	0.85	0.41	n.c.	0.76 / 0.49

Crop (use pattern)	Species	Field rate with buffer zone [g a.s./ha]					LR_{50} / ER_{50} [g a.s./ha]
		1m	3m	5m	10m	20m	
<50 cm (3 x 18 g a.s./ha)	*rhopalosiphi*						
	Typhlodromus pyri	0.42	-	0.08	0.04	n.c.	0.44 / 0.09
	Orius laevigatus	0.42	-	0.08	0.04	n.c.	1.67 / 0.77 – 1.69
	Poecilus cupreus	0.49	-	0.10	0.05	n.c.	91.1 / 32.78
Tomatoes >50 cm (3 x 18 g a.s./ha)	*Aphidius rhopalosiphi*	-	14.28	n.c.	2.11	0.70	0.76 / 0.49
	Typhlodromus pyri	-	1.43	n.c.	0.21	0.07	0.44 / 0.09
	Orius laevigatus	-	1.43	n.c.	0.21	0.07	1.67 / 0.77 – 1.69
	Poecilus cupreus	-	1.68	n.c.	0.25	0.08	91.1 / 32.78

Off-field risk assessment with drift reducing nozzles for – Tomato at 0.018 kg a.s./ha, 3 applications

Crop (use pattern)	Species	Field rate with drift reducing nozzles [g a.s./ha]				LR_{50} / ER_{50} [g a.s./ha]
		0 %	50 %	75 %	90 %	
Tomatoes <50 cm (3 x 18 g a.s./ha)	*Aphidius rhopalosiphi*	4.16	2.08	1.04	0.42	0.76 / 0.49
	Typhlodromus pyri	0.42	0.21	0.10	0.04	0.44 / 0.09
	Orius laevigatus	0.42	0.21	0.10	0.04	1.67 / 0.77 – 1.69
	Poecilus cupreus	0.49	0.24	0.12	0.05	91.1 / 32.78
Tomatoes >50 cm (3 x 18 g a.s./ha)	*Aphidius rhopalosiphi*	14.28	7.14	3.57	1.43	0.76 / 0.49
	Typhlodromus pyri	1.43	0.71	0.36	0.14	0.44 / 0.09
	Orius laevigatus	1.43	0.71	0.36	0.14	1.67 / 0.77 – 1.69
	Poecilus cupreus	1.68	0.84	0.42	0.17	91.1 / 32.78

Risk assessment for – Strawberry at 0.018 kg a.s./ha, 2 applications

Species	LR_{50}/ER_{50} (g/ha)	In-field rate (g/ha)	~~Off-field rate (g/ha)~~
Aphidius rhopalosiphi	0.76 / 0.49	30.6	~~Not relevant~~[1]
Aphidius rhopalosiphi (aged residues)	>42	30.6	

Species	LR_{50}/ER_{50} (g/ha)	In-field rate (g/ha)	~~Off-field rate (g/ha)~~
Typhlodromus pyri	0.44 / 0.09	30.6	
Typhlodromus pyri (aged residues)	>42	30.6	
Orius laevigatus	1.67 / 0.77 – 1.69	30.6	
Poecilus cupreus	100 / 32.78 b	34.2	

Off-field risk assessment with buffer zones for – Strawberry at 0.018 kg a.s./ha, 2 applications

Crop (use pattern)	**Species**	**Field rate with buffer zone [g a.s./ha]**					**LR_{50} / ER_{50} [g a.s./ha]**
		1m	**3m**	**5m**	**10m**	**20m**	
Strawberry (2 x 18 g a.s./ha)	*Aphidius rhopalosiphi*	3.64	-	0.72	0.37	n.c.	0.76 / 0.49
	Typhlodromus pyri	0.36	-	0.07	0.04	n.c.	0.44 / 0.09
	Orius laevigatus	0.36	-	0.07	0.04	n.c.	1.67 / 0.77 – 1.69
	Poecilus cupreus	0.41	-	0.08	0.04	n.c.	91.1 / 32.78 [b]

Off-field risk assessment with drift reducing nozzles for – Strawberry at 0.018 kg a.s./ha, 2 applications

Crop (use pattern)	**Species**	**Field rate with drift reducing nozzles [g a.s./ha]**				**LR_{50} / ER_{50} [g a.s./ha]**
		0 %	**50 %**	**75 %**	**90 %**	
Strawberry (2 x 18 g a.s./ha)	*Aphidius rhopalosiphi*	3.64	1.82	0.91	0.36	0.76 / 0.49
	Typhlodromus pyri	0.36	0.18	0.09	0.04	0.44 / 0.09
	Orius laevigatus	0.36	0.18	0.09	0.04	1.67 / 0.77 – 1.69
	Poecilus cupreus	0.41	0.20	0.10	0.04	91.1 / 32.78 [b]

Semi-field tests: Not available
Field studies: Not available
Additional specific test: Not available

Effects on non-target soil meso- and macro fauna; effects on soil nitrogen transformation (Regulation (EU) N° 283/2013, Annex Part A, points 8.4, 8.5, and Regulation (EU) N° 284/2013 Annex Part A, points 10.4, 10.5)

Test organism	Test substance	Application method of test a.s./ OM	Time scale	Endpoint	Toxicity
Earthworms					
Eisenia fetida	Abamectin 1.8% EC	Overspray	Chronic (56 d)	$NOEC_{reproduction}$ $NOEC_{reproduction\ corr.}$	<0.072 mg a.s./kg soil dw <0.036 mg a.s./kg soil dw
Eisenia andrei	8a-OH-avermectin B_{1a}	Soil incorporation	Chronic (56 d)	$NOEC_{reproduction}$ $NOEC_{reproduction\ corr.}$	3.66 mg/kg soil dw 1.83 mg /kg soil dw
Other soil macroorganisms (meso-fauna)					
Folsomia candida	Abamectin 1.8% EC	Soil incorporation	Chronic (28 d)	$NOEC_{reproduction}$ $NOEC_{reproduction\ corr.}$	0.103 mg a.s./kg soil dw 0.052 mg a.s./kg soil dw
Folsomia candida	8a-OH-avermectin B_{1a}	Soil incorporation	Chronic (28 d)	$NOEC_{reproduction}$ $NOEC_{reproduction\ corr.}$	0.08 mg a.s./kg soil dw 0.04 mg a.s./kg soil dw
Hypoaspis aculeifer	Abamectin 1.8% EC	Soil incorporation	Chronic (14 d)	$NOEC_{reproduction}$ $NOEC_{reproduction\ corr.}$	3.33 mg a.s./kg soil dw 1.67 mg a.s./kg soil dw
Hypoaspis aculeifer	8a-OH-avermectin B_{1a}	Soil incorporation	Chronic (14 d)	$NOEC_{reproduction}$ $NOEC_{reproduction\ corr.}$	0.146 mg/kg soil dw 0.073 mg/kg soil d.w

corr.: Endpoint has been corrected due to log K_{OW} > 2.0

Higher tier testing (e.g. modelling or field studies): Not available

Parameter	Test substance	Time scale	Effect
Nitrogen transformation	Abamectin 1.8% EC	42 d	<25 %: Nitrate-N-formation: +14.4 (28 – 42 d) at 0.18 mg a.s/kg sdw
	Metabolite 8a-hydroxy avermectin B1a	28 d	<25 %: Nitrate-N-formation: +21.7 % (14 – 28 d) at 0.61 mg/kg sdw
	[8,9-Z]-avermectin B1a	28 d	>25 %: Nitrate-N-formation: +57.8 % (14 – 28 d) at 0.4 mg/kg sdw

Toxicity/exposure ratios for soil organisms

Tomato at 0.18 kg a.s./ha, 3 applications

Test organism	Test substance	Time scale	Soil PEC (mg a.s./kg soil dw)	TER	Trigger
Earthworms					
Eisenia fetida	Abamectin 1.8% EC	Chronic	0.0152	**<2.4**	5
Eisenia andrei	8a-OH-avermectin B_{1a}	Chronic	0.0071	258	5
Other soil macroorganisms (meso-fauna)					
Folsomia candida	Abamectin 1.8% EC	Chronic	0.0152	**3.4**	5
Folsomia candida	8a-OH-avermectin B_{1a}	Chronic	0.0071	5.6	5
Hypoaspis aculeifer	Abamectin 1.8% EC	Chronic	0.0152	109.9	5
Hypoaspis aculeifer	8a-OH-avermectin B_{1a}	Chronic	0.0071	10.3	5

Bold values are below the respective trigger.

Strawberry at 0.18 kg a.s./ha, 2 applications

Test organism	Test substance	Time scale	Soil PEC (mg a.s./kg soil dw)	TER	Trigger
Earthworms					
Eisenia fetida	Abamectin 1.8% EC	Chronic	0.0195	**<1.8**	5
Eisenia andrei	8a-OH-avermectin B_{1a}	Chronic	0.0071	258	5
Other soil macroorganisms (meso-fauna)					
Folsomia candida	Abamectin 1.8% EC	Chronic	0.0195	**2.7**	5
Folsomia candida	8a-OH-avermectin B_{1a}	Chronic	0.0071	5.6	5
Hypoaspis aculeifer	Abamectin 1.8% EC	Chronic	0.0195	85.6	5
Hypoaspis aculeifer	8a-OH-avermectin B_{1a}	Chronic	0.0071	10.3	5

Bold values are below the respective trigger.

Effects on terrestrial non target higher plants (Regulation (EU) N° 283/2013, Annex Part A, point 8.6 and Regulation (EU) N° 284/2013 Annex Part A, point 10.6)

Screening data

Not available.

Laboratory dose response tests

Species	Test substance	Endpoint vegetative vigour	Endpoint emergence	Exposure [mL/ha]	TER	Trigger
Allium cepa, Avena sativa, Beta vulgaris, Glycine max, Brassica napus, Zea mays	Abamectin 1.8 % EC	ER50 > 6000 mL prod./ha	-	27.7	>217	5
Extended laboratory studies: Not available Semi-field and field test: Not available						

[1] ~~application only in greenhouses or closed walk-in tunnels~~

Effects on biological methods for sewage treatment (Regulation (EU) N° 283/2013, Annex Part A, point 8.8)

Test type/organism	End point
Activated sludge	EC_{20}, EC_{50}, EC_{80} > 100 mg a.s./L

Monitoring data (Regulation (EU) N° 283/2013, Annex Part A, point 8.9 and Regulation (EU) N° 284/2013, Annex Part A, point 10.8)

Available monitoring data concerning adverse effect of the a.s.
Not required and not available
Available monitoring data concerning effect of the PPP.
Not required and not available

Definition of the residue for monitoring (Regulation (EU) N° 283/2013, Annex Part A, point 7.4.2) Ecotoxicologically relevant compounds[1]

Compartment	Compound
soil	Avermectin B_{1a}, Avermectin B_{1b}, 8a-oxo-avermectin B_{1a} (NOA448111), 8a-hydroxy-avermectin B_{1a} (NOA448112), 4”-oxo-avermectin B_{1a} (NOA426289), 4,8a-dihydroxy-avermectin B_{1a} (NOA457464), 8a-oxo-4-hydroxy-avermectin B_{1a} (NOA457465)
water	Avermectin B_{1a}, Avermectin B_{1b}, 8a-oxo-avermectin B_{1a} (NOA448111), 8a-hydroxy-avermectin B_{1a} (NOA448112), 4”-oxo-avermectin B_{1a} (NOA426289), 4,8a-dihydroxy-avermectin B_{1a} (NOA457464), 8a-oxo-4-hydroxy-avermectin B_{1a} (NOA457465)
sediment	Avermectin B_{1a}, Avermectin B_{1b}, 8a-oxo-avermectin B_{1a} (NOA448111), 8a-hydroxy-avermectin B_{1a} (NOA448112), 4”-oxo-avermectin B_{1a} (NOA426289), 4,8a-dihydroxy-avermectin B_{1a} (NOA457464), 8a-oxo-4-hydroxy-avermectin B_{1a} (NOA457465)
groundwater	Avermectin B_{1a}, Avermectin B_{1b}, 8a-oxo-avermectin B_{1a} (NOA448111), 8a-hydroxy-avermectin B_{1a} (NOA448112), 4”-oxo-avermectin B_{1a} (NOA426289), 4,8a-dihydroxy-avermectin B_{1a} (NOA457464), 8a-oxo-4-hydroxy-avermectin B_{1a} (NOA457465)

[1] metabolites are considered relevant when, based on the risk assessment, they pose a risk comparable or higher than the parent

Classification and labelling with regard to ecotoxicological data (Regulation (EU) N° 283/2013, Annex Part A, Section 10)

Substance	Abamectin
Harmonised classification according to Regulation (EC) No 1272/2008 and its Adaptations to Technical Process [Table 3.1 of Annex VI of Regulation (EC) No 1272/2008 as amended][10]:	Regulation (EU) No. 618/2012 Aquatic Acute 1: H400 Aquatic Chronic 1: H410 M-Factor: 10 000
According to the Peer review, the criteria for classification may be met for:	Aquatic Acute 1: H400 (EC_{50} = 0.00002 mg/L *Americamysis bahia*); M-Factor = 10 000 Aquatic Chronic 1: H410 (NOEC = 0.0000067 mg/L *Daphnia magna*); M-Factor = 10000

[10] 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. OJ L 353, 31.12.2008, 1-1355.