Draft Assessment Report

Evaluation of Active Substances

Plant Protection Products

Prepared according to **Regulation (EC) 1107/2009**
as it applies in Great Britain (GB PPP)

Cinmethylin (BAS 684 H)

List of Endpoints

Great Britain

November 2020

Version History

When	What
November 2020	Initial DAR

List of end points

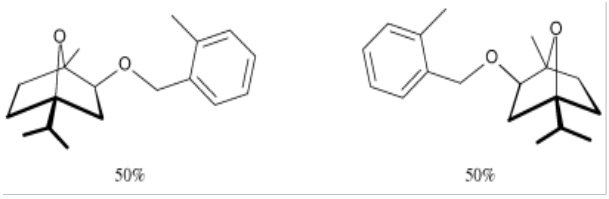
Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 1 Identity, Physical and Chemical Properties, Details of Uses, Further Information, Methods of Analysis

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)	Cinmethylin
Function (*e.g.* fungicide)	Herbicide
Evaluator	HSE

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

Chemical name (IUPAC)	*rac*-(1*R*,2*S*,4*S*)-1-methyl-4-(1-methylethyl)-2-[(2-methylphenyl)methoxy]-7-oxabicyclo[2.2.1]heptane
Chemical name (CA)	*rel*-(1*R*,2*S*,4*S*)-1-methyl-4-(1-methylethyl)-2-[(2-methylphenyl)methoxy]-7-oxabicylo[2.2.1]heptane
CIPAC No	Not yet assigned
CAS No	87818-31-3
EC No (EINECS or ELINCS)	402-410-9
FAO Specification (including year of publication)	No specification exists
Minimum purity of the active substance as manufactured	*910 g/kg (pilot)* 940 g/kg (full scale)
Identity of relevant impurities (of toxicological, ecotoxicological and/or environmental concern) in the active substance as manufactured	**BAS 4539586** (1SR,2RS,4RS)-1-methyl-4-(pro-pan-2-yl)-7-oxa-bicyclo[2.2.1]-heptan-2-ol: **4.0 g/kg** Toluene: 0.5 g/kg
Molecular formula	$C_{18}H_{26}O_2$
Molar mass	274.40 g/mol
Structural formula	

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 1 Identity, Physical and Chemical Properties, Details of Uses, Further Information, Methods of Analysis

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

Melting point (state purity)	Cinmethylin is a liquid at room temperature Solidification point: -56 °C (98.6%) -58 °C (96.2%)
Boiling point (state purity)	330 °C (98.6%) 323 °C (96.2%)
Temperature of decomposition (state purity)	No decomposition observed up to 400 °C (98.6%)
Appearance (state purity)	Clear colourless liquid (99.0%)
Vapour pressure (state temperature, state purity)	8.1 x 10^{-3} Pa at 20 °C (99.0%)
Henry's law constant (state temperature)	3.2 x 10^{-2} Pa m^3 mol^{-1} (99.0%)
Solubility in water (state temperature, state purity and pH)	0.058 g/L at 20°C (pH 7) (98.9%) water solubility is not significantly affected by pH.
Solubility in organic solvents (state temperature, state purity)	in n-heptane > 500 g/L at 25°C (93.0%) in p-xylene > 500 g/L at 25°C (93.0%) in 1,2-dichloroethane > 500 g/L at 25°C (93.0%) in methanol > 500 g/L at 25°C (93.0%) in acetone > 500 g/L at 25°C (93.0%) in ethyl acetate > 500 g/L at 25°C (93.0%)
Surface tension (state concentration and temperature, state purity)	50.3 mN/m at 20 °C (90 % saturated solution) (99.0%)
Partition coefficient (state temperature, pH and purity)	log P_{OW} = 4.5 at 20°C (pH 5.8) (99.0%)
Dissociation constant (state purity)	No dissociation was observed for the test item in the range between pH 3.2 and pH 10.9. (98.9%)

UV/VIS absorption (max.) incl. ε (state purity, pH)

Solvent	*λ (nm);*	ε (L mol^{-1} cm^{-1})
Methanol (pH = 6.8)	209 262	8671.6 269.0
Aqueous (pH = 6.0)	196 208 263	22072.9 8774.2 327.9
Acidic (pH =1.8)	199 208 263	12125.9 8768.3 338.0
Alkaline (pH =12.1)	215 263	6017.6 312.7
No absorption maxima > 290 nm		

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 1 Identity, Physical and Chemical Properties, Details of Uses, Further Information, Methods of Analysis

Flammability (state purity)	Not classified as flammable (93.0%)
Explosive properties (state purity)	Not classified as explosive (93.0%)
Oxidising properties (state purity)	Not oxidising (93.0%)

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 1 Identity, Physical and Chemical Properties, Details of Uses, Further Information, Methods of Analysis

Summary of initial intended uses in Great Britain

Crop and/or situation (a)	Region	Product Name	F G I (b)	Pests or group of pests controlled (c)	Formulation		Application				Application rate per treatment			PHI (days) (l)	Remarks (m)
					Type (d-f)	Rate L/ha	Method kind (f-h)	Growth stage and season (j)	Number min max (k)	Interval between applications (min)	Kg a.i./ha min max (g/hl)	Water l/ha min max	Lk a.i./ha min max (*) (g/ha)		
winter wheat (TRZAW), winter barley (HORVW)	**GB**	BAS 684 03 H	F	blackgrass (ALOMY), ryegrass (LOLSS),	-	0.666	SP	pre-emergence (BBCH 00-08)	a) 1 b) 1	N/A	a) 0.500 b) 0.500	100 -400	-	-	Representative use
winter wheat (TRZAW), winter barley (HORVW)	**GB**	BAS 684 03 H	F	blackgrass (ALOMY), ryegrass (LOLSS),	-	0.666	SP	post-emergence (BBCH 09-29	a) 1 b) 1	N/A	a) 0.500 b) 0.500	100 – 400	-	-	Representative use
winter wheat (TRZAW), winter barley (HORVW)	**GB**	BAS 684 03 H	F	annual meadowgrass (POAAN) and annual dicots	-	0.666	SP	pre-emergence (BBCH 00-08)	a) 1 b) 1	N/A	a) 0.250 b) 0.250	100 – 400	-	-	Representative use
winter wheat (TRZAW), winter barley (HORVW)	**GB**	BAS 684 03 H	F	annual meadowgrass (POAAN) and annual dicots	-	0.666	SP	post-emergence (BBCH 09-29)	a) 1 b) 1	N/A	a) 0.250 b) 0.250	100 - 400	-	-	Representative use

* For uses where the column „Remarks“ in marked in grey further consideration is necessary. Uses should be crossed out when the notifier no longer supports this use(s).

(a) For crops, the EU and Codex classification (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 suckling insects, soil born insects, foliar fungi, weeds

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

(e) GCPF Codes – GIFAP Technical Monograph N° 2, 1989

(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 synthesised, it is more appropriate to give the rate for the variant (e.g. benthiavalicarb-isopropyl).**

(j) Growth stage at 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 application 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

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 1 Identity, Physical and Chemical Properties, Details of Uses, Further Information, Methods of Analysis

Representative Uses covered in the dossier

					Application			Application rate			PHI	Remarks:
Use-No.	**Region/EU Member state(s)**	**Crop and/ or situation (crop destination/ Purpose of crop)**	**F G or I**	**Pests or Group of pests controlled (additionally: developmental stages of the pest or pest group)**	Method / kind	Timimg / Growth stage of crop & season	Max. number (min. interval between applications) a) per use b) per crop / season	kg/L product / ha a) max. rate per appl. b) max. total rate per crop/season	Kg as/ha a) Max rate per appl. b) max. total rate per crop/season	Water L/ha Min - max	(days)	
	Central Zone											
1	BE, DE, NL, UK	winter wheat (TRZAW)	F	blackgrass (ALOMY), ryegrass (LOLSS), windgrass (APESV), annual bluegrass (POAAN) and annual dicots	SP	pre-emergence (BBCH 00-08)	a) 1 b) 1	a) 0,666 b) 0,666	0,500 0,500	100 - 400		representative use

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 1 Identity, Physical and Chemical Properties, Details of Uses, Further Information, Methods of Analysis

2	BE, DE, NL, UK	winter wheat (TRZAW)	F	blackgrass (ALOMY), ryegrass (LOLSS), windgrass (APESV), annual bluegrass (POAAN) and annual dicots	SP	post-emergence (BBCH 09-29)	a) 1 b) 1	a) 0,666 b) 0,666	0,500 0,500	100 - 400		representative use
3	BE, DE,NL,UK	winter wheat (TRZAW)	F	windgrass (APESV), annual bluegrass (POAAN) and annual dicots	SP	pre-emergence (BBCH 00-08)	a) 1 b) 1	a) 0,333 b) 0,333	0,250 0,250	100 - 400		representative use
4	BE, DE,NL,UK	winter wheat (TRZAW)	F	windgrass (APESV), annual bluegrass (POAAN) and annual dicots	SP	post-emergence (BBCH 09-29)	a) 1 b) 1	a) 0,333 b) 0,333	0,250 0,250	100 - 400		representative use
5	BE, DE,NL,UK	winter oilseed rape (BRSNW)	F	windgrass (APESV), annual bluegrass (POAAN) and annual dicots	SP	pre-emergence (BBCH 00-08)	a) 1 b) 1	a) 0,333 b) 0,333	0,250 0,250	100 - 400		representative use

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 1 Identity, Physical and Chemical Properties, Details of Uses, Further Information, Methods of Analysis

6	BE, DE,NL,UK	winter oilseed rape (BRSNW)	F	windgrass (APESV), annual bluegrass (POAAN) and annual dicots	SP	post-emergence (BBCH 09-18)	a) 1 b) 1	a) 0,333 b) 0,333	0,250 0,250	100 - 400		representative use
	Southern Zone											
1	FR	winter wheat (TRZAW)	F	blackgrass (ALOMY), ryegrass (LOLSS), annual bluegrass (POAAN) and annual dicots	SP	BBCH 00-08	a) 1 b) 1	a) 0,666 b) 0,666	0,500 0,500	100 - 400		representative use
2	FR	winter wheat (TRZAW)	F	blackgrass (ALOMY), ryegrass (LOLSS), annual bluegrass (POAAN) and annual dicots	SP	BBCH 09-29	a) 1 b) 1	a) 0,666 b) 0,666	0,500 0,500	100 - 400		representative use
3	FR	winter wheat (TRZAW)	F	windgrass (APESV), annual bluegrass (POAAN) and annual dicots	SP	pre-emergence (BBCH 00-08)	a) 1 b) 1	a) 0,333 b) 0,333	0,250 0,250	100 - 400		representative use

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 1 Identity, Physical and Chemical Properties, Details of Uses, Further Information, Methods of Analysis

4	FR	winter wheat (TRZAW)	F	windgrass (APESV), annual bluegrass (POAAN) and annual dicots	SP	post-emergence (BBCH 09-29)	a) 1 b) 1	a) 0,333 b) 0,333	0,250 0,250	100 - 400		representative use
5	FR	winter oilseed rape (BRSNW)	F	windgrass (APESV), annual bluegrass (POAAN) and annual dicots	SP	pre-emergence (BBCH 00-08)	a) 1 b) 1	a) 0,333 b) 0,333	0,250 0,250	100 - 400		representative use
6	FR	winter oilseed rape (BRSNW)	F	windgrass (APESV), annual bluegrass (POAAN) and annual dicots	SP	post-emergence (BBCH 09-18)	a) 1 b) 1	a) 0,333 b) 0,333	0,250 0,250	100 - 400		representative use

* For uses where the column „Remarks“ in marked in grey further consideration is necessary. Uses should be crossed out when the notifier no longer supports this use(s).
(a) For crops, the EU and Codex classification (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 suckling insects, soil born insects, foliar fungi, weeds
(d) *e.g.* wettable powder (WP), emulsifiable concentrate (EC), granule (GR)
(e) GCPF Codes – GIFAP Technical Monograph N° 2, 1989
(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 synthesised, it is more appropriate to give the rate for the variant (e.g. benthiavalicarb-isopropyl).**
(j) Growth stage at 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 application 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

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 1 Identity, Physical/ Chemical Properties, Details of Uses, Further Information, Methods of Analysis

Further information, Efficacy

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

The representative uses/ GAPs are supported.

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

The representative uses/ GAPs are supported.

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

The representative uses/ GAPs are supported.

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

	Met1	Met2	Met3	Met4	Met5	Met6
Activity against target organism	N/A	N/A	N/A	N/A	N/A	N/A

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 1 Identity, Physical/ Chemical Properties, Details of Uses, Further Information, Methods of Analysis

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)	GC-FID, GC-MS
Impurities in technical a.s. (analytical technique)	GC-FID, GC-MS
Plant protection product (analytical technique)	GC-FID

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		Cinmethylin
Food of animal origin		Cinmethylin
Soil		Cinmethylin
Sediment		Cinmethylin
Water	surface	Cinmethylin
	drinking/ground	Cinmethylin
Air		Cinmethylin
Body fluids and tissues		M684H011 in urine

Monitoring/Enforcement methods

Food/feed of plant origin (analytical technique and LOQ for methods for monitoring purposes)	LC-MS/MS (cinmethylin) LOQ: 0.01 mg/kg for high water, high acid, high oil, high protein and high starch crop groups
Food/feed of animal origin (analytical technique and LOQ for methods for monitoring purposes)	LC-MS/MS (cinmethylin) LOQ: 0.01 mg/kg for egg, milk, meat, fat, liver and kidney
Soil (analytical technique and LOQ)	LC-MS/MS (cinmethylin enantiomers) LOQ: 0.005 mg/kg for soil and sediment
Water (analytical technique and LOQ)	LC-MS/MS (cinmethylin enantiomers, M684H001, M684H004) LOQ: 0.03 µg/L for surface and ground water
Air (analytical technique and LOQ)	LC-MS/MS (cinmethylin) LOQ: 0.05 µg/m^3
Body fluids and tissues (analytical technique and LOQ)	Body fluids: LC-MS/MS (cinmethylin; M684H011) LOQ: 0.01 mg/L For tissues refer to methods for food/feed of animal origin.

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 1 Identity, Physical/ Chemical Properties, Details of Uses, Further Information, Methods of Analysis

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

Substance	Cinmethylin
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]:	Not classified.
Peer review proposal [2] for harmonised classification according to Regulation (EC) No 1272/2008:	Not classified.

[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.

[2] It should be noted that harmonised classification and labelling is formally proposed and decided in accordance with Regulation (EC) No 1272/2008. Proposals for classification made in the context of the evaluation procedure under Regulation (EC) No 1107/2009 are not formal proposals.

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

Rapid and almost complete within 24-hours

An oral absorption value of 100 % is proposed.

For post-hepatic systemic bioavailability, a value of 70 % is proposed and a default inhalation absorption value of 100 % is assumed.

Toxicokinetics

Phenyl label

At 350 mg/kg bw (oral):

	Male	Female
C_{max} [µg Eq/g]	118.0	78.2
T_{max} [h]	4	4
Half-life [h]	22.6	12.9
AUC0→∞ [µg Eq*h/g]	2004	1423

At 15 mg/kg bw (oral):

	Male	Female
C_{max} [µg Eq/g]	6.2	9.4
T_{max} [h]	1	1
Half-life [h]	21.8	7.7
AUC0→∞ [µg Eq*h/g]	52	48

At 1 mg/kg bw (i.v.):

	Male	Female
C_{max} [µg Eq/g]	1.4	0.8
T_{max} [h]	Directly	Directly
Half-life [h]	51.3	26.2
AUC0→∞ [µg Eq*h/g]	5	4

Cyclohexyl label

At 350 mg/kg bw (oral):

	Male	Female
C_{max} [µg Eq/g]	70.5; 77.9	67.2
T_{max} [h]	1; 8	8
Half-life [h]	22.1	16.0
AUC0→∞ [µg Eq*h/g]	1767	1705

At 15 mg/kg bw (oral):

	Male	Female
C_{max} [µg Eq/g]	4.5	9.0
T_{max} [h]	1	1
Half-life [h]	23.3	15.1
AUC0→∞ [µg Eq*h/g]	59	54

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 2 Mammalian Toxicology

Distribution	Predominately to the organs of metabolism and excretion, the liver and kidneys, also the adrenals and adipose tissues.
Potential for bioaccumulation	No evidence for accumulation.
Rate and extent of excretion	Excretion via both the urine (52 – 60 %) and faeces (mainly due to biliary elimination) is rapid, and essentially complete within 48 hours of oral dosing.
Metabolism in animals	Rapidly and extensively metabolised such that there was no significant, post-hepatic exposure to unchanged cinmethylin.
In vitro metabolism	An *in vitro* comparative metabolism study employing primary hepatocytes from humans, rats, dogs and rabbits found no unique metabolites were formed by human primary hepatocytes.
Toxicologically relevant compounds (animals and plants)	Cinmethylin, M684H001, M684H002, M684H005, M684H006, M684H010, M684H012 and M684H026
Toxicologically relevant compounds (environment)	Cinmethylin

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

Rat LD_{50} oral	> 2,000 mg/kg bw	
Rat LD_{50} dermal	> 5,000 mg/kg bw	
Rat LC_{50} inhalation	> 5.3 mg/L air /4h (nose only)	
Skin irritation	Non-irritant	
Eye irritation	Non-irritant	
Skin sensitisation	Sensitising (Buehler test)	**H317**
Phototoxicity	Study not required	

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

Target organ / critical effect	Rat: liver (weight ↑, hypertrophy and clinical chemistry), thyroid (weight increase and histopathology), kidney (weight ↑ and adverse histopathology) and nasal cavity (histopathology). Mouse: ↓ body weight gain, liver (weight ↑ and clinical chemistry) and nasal cavity (histopathology). Dog: ↓ body weight gain, liver (weight ↑, hypertrophy and clinical chemistry),	

	haematological effects, kidney (histopathology), prostate (histopathology and small prostates) and testes (atrophy).	
Relevant oral NOAEL	90-day, rat: 67 mg/kg bw per day. 90-day, mouse: 48 mg/kg bw/day. 1-year, dog: 7.9 mg/kg bw per day.	
Relevant dermal NOAEL	28-day, rat: 1,000 mg/kg bw per day (systemic toxicity) and 100 mg/kg bw/day (local dermal toxicity).	
Relevant inhalation NOAEL	No data - not required.	

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

In vitro studies	Ames Test (Reverse mutation assay) – negative. *In vitro* forward mutation assay in mammalian cells (Mouse lymphoma assay) – negative. *In vitro* micronucleus test in human lymphocytes – negative.	
In vivo studies	*In vivo* micronucleus test in mouse bone marrow – negative. *In vivo* chromosome aberration assay in rat bone marrow – negative.	
Photomutagenicity	No data - not required.	
Potential for genotoxicity	Cinmethylin is unlikely to be genotoxic.	

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

Long-term effects (target organ/critical effect)	Rat: nasal cavity (histopathology). Mouse: ↓ terminal body weight, ↓ body weight gain and ↓ food consumption.	
Relevant long-term NOAEL	2-year, rat: 9 mg/kg bw per day. 18-month, mouse: 37.5 mg/kg bw per day. ($BMDL_{10}$).	
Carcinogenicity (target organ, tumour type)	Rat: equivocal evidence of carcinogenicity (increased incidence of carcinomas) in females but not in males. Mouse: no tumours. Cinmethylin is unlikely to pose a hazard to humans.	
Relevant NOAEL for carcinogenicity	2-year, rat: 59 mg/kg bw per day. 18-month, mouse: 939 mg/kg bw per day.	

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 2 Mammalian Toxicology

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

Reproduction toxicity

Reproduction target / critical effect	Parental toxicity: ↓ food consumption, ↓ body weights and ↓ body weight gains; ↑ liver and thyroid weights; adverse histopathology of thyroid and nasal cavity. Reproductive toxicity: no adverse effect observed in rat 2-generation study. Offspring toxicity: no adverse effect observed.	
Relevant parental NOAEL	80 mg/kg bw per day.	
Relevant reproductive NOAEL	394 mg/kg bw per day.	
Relevant offspring NOAEL	394 mg/kg bw per day.	

Developmental toxicity

Developmental target / critical effect	Rat: Maternal toxicity: clinical observations and ↓ body weight gain. Developmental toxicity: ↑ incidence of abnormalities, indicative of delayed development. Rabbit: Maternal toxicity: ↓ body weight gain, ↑ liver weight, clinical chemistry. Developmental toxicity: ↓ foetal weight.	
Relevant maternal NOAEL	Rat: 30 mg/kg bw per day. Rabbit: 80 mg/kg bw per day.	
Relevant developmental NOAEL	Rat: 300 mg/kg bw per day. Rabbit: 80 mg/kg bw per day.	

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

Acute neurotoxicity	300 mg/kg bw/day.	
Repeated neurotoxicity	No neurotoxicity or neuropathology was observed on repeated exposure.	
Additional studies (e.g. delayed neurotoxicity, developmental neurotoxicity)	No data - not required.	

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 2 Mammalian Toxicology

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

Supplementary studies on the active substance	Mechanistic studies in the liver of rats and mice and ToxCast data presented were not sufficient to propose/establish a MoA for the liver effects. Information shows that some liver CYP activities are marginally increased in rats and mice, possibly as a consequence of PXR activation.
Endocrine disrupting properties	Evaluation is based on the standard regulatory studies and ToxCast/EDSP21 *in vitro* mechanistic data. For the EAS modalities cinmethylin is not an ED and its ED potential has been sufficiently investigated. Thyroid toxicity was seen in the rat. In relation to the T modality a conclusion cannot be reached as further information is required.

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 2 Mammalian Toxicology

Studies performed on metabolites or impurities	<u>Metabolites occurring at significant levels in plant and livestock metabolism studies (M684H001, M684H005, M684H006, M684H009, M684H010, M684H012, M684H021, M684H022, M684H026, M684H039, M684H059)</u> No specific toxicity studies are available. For **M684H001, M684H005, M684H006, M684H010, M684H012 and M684H026**, the toxicity of these metabolites is covered by the toxicity data of the parent and if a risk assessment were to be required, the dietary reference values of cinmethylin could be used. Therefore, these metabolites are considered to be of equivalent toxicity to the parent, toxicologically relevant and potential candidates for inclusion in the residue definitions for risk assessment. Metabolite **M684H009** is considered to be of no toxicological concern and of significantly lower toxicity than cinmethylin. On this basis, it should not be considered further (from a toxicological point view) for the purposes of the residue definitions. However, if a dietary risk assessment were to be required, the BAT value of 57 mg/kg bw/day could be used as a reference value. For **M684H021, M684H022, M684H039 and M684H059**, there are negative genotoxicity (Q)SAR predictions but no information on relative levels in rat and/or mouse plasma compared to the parent or on levels in rat excreta > 10% of the administered dose. Therefore, the toxicity of these metabolites is not covered by the toxicity data of the parent and if a dietary risk assessment were to be required, the Cramer class III TTC value of 1.5 µg/kg bw/day could be used in a first-tier assessment. Overall, these metabolites are of potential higher toxicity than cinmethylin, toxicologically relevant and potential candidates for inclusion in the residue definitions for risk assessment. <u>Relevant impurity 4539586 (cineol alcohol)</u> Ames tests (2): both negative. Chromosome aberration tests (2): both negative. Acute oral toxicity (rat): LD_{50} > 1293 mg/kg bw. Acute Tox. 4 (H302). Acute dermal toxicity (rat): LD_{50} > 2000 mg/kg bw. Acute inhalation toxicity (rat): LC_{50} > 12.8 mg/L. Skin irritation (rabbit): negative. Eye irritation (rabbit): positive. Eye Irrit. 2 (H319). Skin sensitisation (Guinea pig): negative. 28-day oral toxicity (rat): body weight effects and haematology. NOAEL 10 mg/kg bw/d. Harmonised C&L: Acute Tox. 4 (H302). Eye Dam. 1 (H318). Impurity 4539586 is a toxicologically relevant impurity of cinmethylin, but at the specified level it is of no toxicological concern as it does not trigger classification of cinmethylin.

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 2 Mammalian Toxicology

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

Limited; new active substance, no detrimental effects on health in manufacturing personnel

Summary[3] (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)	0.08	dog, 1-year	100
Acute Reference Dose (ARfD)	0.3	rat, developmental	100
Acceptable Operator Exposure Level (AOEL)	0.06	dog, 1-year*	100
Acute Acceptable Operator Exposure Level (AAOEL)	0.21	rat, developmental*	100

*relevant NOAELs adjusted using the post-hepatic systemic availability value of 70 %

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

Representative formulation (*indicate name, type e.g.* EC *and concentration of active substance*)

BAS 684 03 H (EC formulation containing 74.85% of cinmethylin)

- Concentrate: **0.4 %**
- Spray dilution (1.25 g a.s./L of cinmethylin): **11%**

Based on *in vitro* human skin study with the representative product (Fabian & Landsiedel 2017).

- Lowest in-use dilution: (0.625 g a.s./L of cinmethylin): **22%**

Based on pro-rata calculations.

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

Operators

Use: winter wheat and winter barley, tractor mounted equipment, application rate 0.5 kg a.s./ha

Model: EFSA Calculator	% of AOEL
No PPE (with workwear):	31
Model: EFSA Calculator	% of AAOEL
No PPE (with workwear):	51

[3] If available include also reference values for metabolites

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 2 Mammalian Toxicology

	Use: apples, handheld equipment, application rate 2.5 kg a.s./ha German model: Without PPE: 853 PPE (gloves and coverall): 78
Workers	Use: winter wheat and winter barley, tractor mounted equipment, application rate 0.5 kg a.s./ha Model: EFSA Calculator % of AOEL No PPE (with workwear): 26 *Acute worker exposure assessment not possible with EFSA Calculator.*
Bystanders and residents	Use: winter wheat and winter barley, tractor mounted equipment, application rate 0.5 kg a.s./ha Model: EFSA Calculator Adult Resident % AOEL Spray Drift 12 Vapour 6 Surface Deposits 1 Entry into Treated Crops 17 All pathways (mean) 26 Child Resident % AOEL Spray Drift 49 Vapour 27 Surface Deposits 3 Entry into Treated Crops 31 All pathways (mean) 81 Model: EFSA Calculator Adult Bystander % AAOEL Spray Drift 9 Vapour 2 Surface Deposits 1 Entry into Treated Crops 5 Child Bystander % AAOEL Spray Drift 32 Vapour 8 Surface Deposits 3 Entry into Treated Crops 9

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 2 Mammalian Toxicology

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

Substance:	Cinmethylin
Harmonised classification according to Regulation No 1272/2008 and its Adaptations to Technical Process [Table 3.1 of Annex VI of Regulation No 1272/2008 as amended][4] :	No current harmonised classification.
Peer review proposal [5] for harmonised classification according to Regulation No 1272/2008:	**Skin Sens. Cat. 1 (H317** - May cause an allergic skin reaction) **STOT SE Cat. 2 (H371** - May cause damage to the nervous system)

[4] 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.

[5] It should be noted that harmonised classification and labelling is formally proposed and decided in accordance with Regulation (EC) No 1272/2008. Proposals for classification made in the context of the evaluation procedure under Regulation (EC) No 1107/2009 are not formal proposals.

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 3 Residues

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)	**Crop groups**	**Crop(s)**	**Application(s)**	**DAT** (days)
	Fruit crops	-	-	-
	Root crops	Carrot	Foliar spray 1 × 0.50 – 0.51 kg a.s./ha at BBCH 12-13	67 (roots, leaves)
	Leafy crops	-	-	-
	Cereals/grass crops	Wheat	Foliar spray 1 × 0.50 kg a.s./ha at BBCH 29	11-13 (forage) 29 (grain, straw)
	Pulses/Oilseeds	Oilseed rape	Foliar spray 1 × 0.24 – 0.25 kg a.s./ha at BBCH 18	90 (straw, hulls, seeds)
	Miscellaneous	-	-	-
	Two radiolabels (phenyl, cyclohexane) per crop. Comparable metabolic pathways in three crop groups. Additional studies on soybean (soil-grown and hydroponic), peanut (soil-grown and hydroponic) and rice (paddy) which were not conducted to OECD Guideline 501 but considered supporting information.			

Rotational crops (metabolic pattern)	**Crop groups**	**Crop(s)**	**PBI** (days)	**Comments**
	Root/tuber crops	Radish	30, 120, 365	1 × 0.5 kg a.s./ha to bare soil. Two radiolabels (phenyl, cyclohexane).
	Leafy crops	Spinach	30, 120, 365	
	Cereal (small grain)	Wheat	30, 120, 365	
	Other	-	-	
Rotational crop and primary crop metabolism similar?	Yes. No metabolites observed in rotational crops ≥ 0.01 mg eq/kg. Major component identified as natural endogenous compound.			

Processed commodities (standard hydrolysis study)	**Conditions**	BAS 684 H	M684H005	M684H006	
	20 min, 90°C, pH 4	Stable	Not investigated	Not investigated	
	60 min, 100°C, pH 5	Stable			
	20 min, 120°C, pH 6	Stable			
Residue pattern in processed commodities similar to residue pattern in raw commodities?	Yes for BAS 684 H as BAS 684 H is stable under all conditions tested. No data for M684H005 and M684H006.				

Plant residue definition for monitoring (RD-Mo)	BAS 684 H

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 3 Residues

Plant residue definition for risk assessment (RD-RA)	Sum of BAS 684 H, M684H005 and M684H006, expressed as BAS 684 H Particular attention should be paid to uses with higher application rates or in different crops groups to the representative uses to ensure these are sufficiently supported by metabolism data.
Conversion factor (monitoring to risk assessment)	Not applicable, see conversion factors section below

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)

	Animal	Dose (mg/kg bw/d)	Duration (days)	N rate/comment
Animals covered	Laying hen	Phenyl label: 0.90 (12.03 mg/kg DM) Cyclohexane label: 0.94 (11.99 mg/kg DM)	11	900 – 940 N
	Goat/Cow	Phenyl label: 0.30 (12.3 mg/kg DM) Cyclohexane label: 0.39 (12.1 mg/kg DM)	7	300 – 390 N
	Pig	-	-	-
	Fish	Phenyl label: 14.86 mg/kg DM Cyclohexane label: 12.44 mg/kg DM	11	No residues expected in edible fish commodities
	Goat, hen, fish: separate studies with two radiolabels each			

Time needed to reach a plateau concentration in milk and eggs (days)	Milk: 2-7 Eggs: 7-9
Animal residue definition for monitoring (RD-Mo)	BAS 684 H
Animal residue definition for risk assessment (RD-RA)	Not needed
Conversion factor (monitoring to risk assessment)	Not applicable
Metabolism in rat and ruminant similar (Yes/No)	Yes

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 3 Residues

Fat soluble residues (Yes/No)	Parent: Yes Metabolites M684H005 + M684H006: No

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

Confined rotational crop study (Quantitative aspect)	TRRs in edible commodities (spinach, radish roots, wheat grain) were ≤ 0.016 mg/kg at a PBI of 30 d and declined to < 0.01 mg/kg at a PBI of 120 d onwards. TRRs in feed items up to 0.132 mg/kg (wheat hay) and declined over time. Parent BAS 684 H present at or below 0.002 mg/kg or 6.0% TRR. Major component characterised as natural endogenous compound present at a maximum of 38.3% TRR (0.022 mg/kg) in wheat straw at a PBI of 120 d (phenyl label).
Field rotational crop study	Not required given no components of the residue identified at ≥ 0.01 mg/kg in the confined rotational crop study.

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 3 Residues

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

Plant products (Category)	**Commodity**	**T** (°C)	**Stability** (Month/Year)			
			BAS 684 H	M684H005 (covering M684H006)		
High water content	Barley whole plant without roots	≤ -18	24	-		
	Bean whole pods with seeds		24	-		
	Wheat whole plant without roots		-	32		
	Curly kale whole plant		-	24		
High oil content	Oilseed rape seed	≤ -18	24	32		
High protein content	Dried bean seed	≤ -18	24	32		
High starch content	Wheat grain	≤ -18	24	32		
High acid content	Grapes	≤ -18	24	32		
	Wheat straw	≤ -18	24	32		

Data for BAS 684 H demonstrate stability in all different categories under frozen conditions for at least 24 months.

It can be concluded that residues of M684H005 are considered sufficiently stable in kale whole plant without roots for 24 months. A significant decline is observed between 24 and 32 months therefore M684H005 is not considered stable in kale whole plant without roots for 32 months.

As residues of M684H005 have been shown to be stable in all five commodity categories (high water, high oil, high protein, high starch and high acid) it can be assumed that M684H005 residues are stable in all other commodities for the same duration of time under the same storage conditions (24 months at ≤ -18 °C). Extensions of this time period for specific commodities are shown above.

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

Not applicable as no livestock feeding study is required.

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	November 2020	**Cinmethylin (BAS 684H)**

Section 3 Residues

Summary of residues data from the supervised residue trials (Regulation (EU) N° 283/2013, Annex Part A, point 6.3)

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)	HR (mg/kg) (c)	STMR (mg/kg) (d)
Representative uses						
Wheat grain	NEU	Mo: 12 x < 0.01 RA: 12 x < 0.016	Extrapolation to barley	0.01	0.016 (HR_{Mo} 0.01)	0.016 ($STMR_{Mo}$ 0.01)
Wheat straw	NEU	Mo: 12 x < 0.01 RA: 12 x < 0.016	Extrapolation to barley	-	0.016 (HR_{Mo} 0.01)	0.016 ($STMR_{Mo}$ 0.01)
Oilseed rape (proposed future use)	NEU	Mo: 8 x < 0.01 RA: 8 x < 0.016		0.01	0.016 (HR_{Mo} 0.01)	0.016 ($STMR_{Mo}$ 0.01)

Summary of the data on formulation equivalence

Representative use is early in the growing season. No further consideration required.

Summary of data on residues in pollen and bee products (Regulation (EU) No 283/2013, Annex Part A, point 6.10.1)

Additional information submitted but not evaluated as not required at the point of submission.

(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 ($STMR_{Mo}$).

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cimethylin (BAS 684H)**

Section 3 Residues

Inputs for animal burden calculations

Feed commodity	Median dietary burden		Maximum dietary burden	
	(mg/kg)	**Comment**	(mg/kg)	**Comment**
Representative uses				
Wheat grain	0.016	STMR	0.016	STMR
Wheat straw	0.024	STMR	0.024	HR
Barley grain	0.016	STMR	0.016	STMR
Barley straw	0.024	STMR	0.024	HR
Rape meal	0.016	STMR x PF†	-	-
Brewers grain (dried)	0.016	STMR (barley grain) x PF†	-	-
Canola (rape seed meal)	0.016	STMR (rape meal) x PF†	-	-
Distiller's grain (dried)	0.016	STMR (wheat grain) x PF†	-	-
Wheat gluten (meal)	0.016	STMR (wheat grain) x PF†	-	-
Wheat (milled by-products)	0.016	STMR (wheat grain) x PF†	-	-

† PF = 1; waiving the use of default processing factors (PF) as residues in the RAC are < LOQ

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	November 2020	**Cinmethylin (BAS 684H)**

Section 3 Residues

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)

MRL calculations	**Ruminant**				**Pig/Swine**		**Poultry**		**Fish**	
Highest expected intake (mg/kg bw/d) (mg/kg DM for fish)	Beef cattle	0.001	Ram/Ewe	0.001	Breeding	0.001	Broiler	0.001	Carp	-
	Dairy cattle	0.001	Lamb	0.001	Finishing	0.001	Layer	0.001	Trout	-
							Turkey	0.001	Fish intake >0.1 mg/kg DM	
Intake >0.004 mg/kg bw	No		No		No		No		n.a.	
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		0.01		0.01		0.01		0.01		
Fat		0.01		0.01		0.01		0.01		
Meat[(b)]										
Liver		0.01		0.01		0.01		0.01		
Kidney		0.01		0.01		0.01		0.01		
Milk[(a)]		0.01		0.01						
Eggs								0.01		
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.

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 3 Residues

Conversion Factors (CF) for monitoring to risk assessment

Plant products

Mean Conversion Factors (CF) calculated at the different PHIs in the supervised residues trials[(a)]
No conversion factor (monitoring to risk assessment) has been set as residue values in edible plant commodities are all < LOQ.

[(a)]: CF calculated at the supported PHI are underlined.
[(b)]: 0-/0+ for samples collected just before/after the last application

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 3 Residues

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

Crop (RAC)/Edible part or Crop (RAC)/Processed product	Number of studies[a]	Processing Factor (PF)		Conversion Factor (CF_P) for RA[b]
		Individual values	Median PF	
No processing studies conducted as residues were < 0.1 mg/kg in all the RACs analysed in the NEU trials on wheat or oilseed rape, parent BAS 684 H is stable upon processing and no degradation products of toxicological concern are formed upon processing.				

[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)
Consumer risk assessment limited to the representative uses

ADI	0.08 mg/kg bw per day		
TMDI according to EFSA PRIMo	Highest TMDI:	0.8 % ADI	(NL, toddler)
NTMDI, according to UK	Highest NTMDI:	1 % ADI	(UK, infant)
IEDI (% ADI), according to EFSA PRIMo	Highest IEDI:	0.9 % ADI	(NL, toddler)
NEDI (% ADI), according to UK	Highest NEDI:	1 % ADI	(UK, infant)
Factors included in the calculations			
ARfD	0.3 mg/kg bw		
IESTI (% ARfD), according to EFSA PRIMo	Highest IESTI:	0.4 % ARfD	(milk: cattle)
NESTI (% ARfD), according to (to be specified)	Highest NESTI:	0.4 % ARfD	(milk)
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			
0500010	Barley	0.01*	
0500090	Wheat	0.01*	
Animal commodities			
1010000	Commodities from	-	
1011000	(a) swine	0.01*	
1012000	(b) bovine	0.01*	
1013000	(c) sheep	0.01*	
1014000	(d) goat	0.01*	
1015000	(e) equine	0.01*	
1016000	(f) poultry	0.01*	
1017000	(g) other farmed	0.01*	

List of end points

Evaluator	Month and year	Active Substance (Name)
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 3 Residues

	terrestrial animals		
1020000	Milk	0.01*	
1030000	Bird's eggs	0.01*	
1040000	Honey	0.01*	

(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

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

Mineralisation after 100 days	22.6 – 49.1 % after 90-120 d, [^{14}C-benzyl] (n[6] = 4) 21.9 – 42.4 % after 90-120 d, [^{14}C-cyclohexane]-label (n = 2)
Non-extractable residues after 100 days	15.2 – 36.8 % after 90-120 d, [^{14}C-benzyl]-label (n = 4) 11.5 – 22.9 % after 90-120 d, [^{14}C-cyclohexane]-label (n = 2)
Metabolites requiring further consideration - name and/or code, % of applied (range and maximum)	No soil metabolites require further consideration.

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

Mineralisation after 100 days	8.1 – 17.0 % after 118-120 d, [^{14}C-phenyl]-label (n = 4) 16.0 % after 120 d, [^{14}C-cyclohexane]-label (n = 1)
Non-extractable residues after 100 days	16.2 – 41.4 % after 118-120 d, [^{14}C-phenyl]-label (n = 4) 16.4 – 17.1 % after 90 d, [^{14}C-cyclohexane]-label (n = 1)
Metabolites that may require further consideration for risk assessment - name and/or code, % of applied (range and maximum)	No soil metabolites require further consideration.

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

Mineralisation at study end	4.5 % after 15 d, [^{14}C-phenyl/^{13}C-benzyl]-label (n = 1) 2.6 % after 15 d, [^{14}C-cyclohexane]-label (n = 1)
Non-extractable residues at study end	7.7 – 9.4 % after 15 d, [^{14}C-phenyl/^{13}C-benzyl]-label (n = 1) 5.0 – 5.2 % after 15 d, [^{14}C-cyclohexane]-label (n = 1)
Metabolites that may require further consideration for risk assessment - name and/or code, % of applied (range and maximum)	No soil metabolites require further consideration.

[6] n corresponds to the number of soils.

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

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)

Parent	Dark aerobic conditions; non-normalised trigger endpoints					
Soil type	pH[a)]	t. °C / % MWHC	DT_{50} (d)	DT_{90} (d)	St. (χ^2)	Method of calculation
Lufa 2.2	5.6	20 / pF2	93.6	541.4	0.90	DFOP
Lufa 5M	7.4	20 / pF2	19.1	63.5	6.18	SFO
LAD-SCL-PF	8.0	20 / pF2	43.5	144.4	3.02	SFO
MSL-PF	6.3	20 / pF2	18.5	178.1	3.11	DFOP
Maximum			93.6			
pH dependence				No		

[a)] Measured in $CaCl_2$

Parent	Dark aerobic conditions; normalised modelling endpoints				
Soil type	pH[a)]	t. °C / % MWHC	DT_{50} (d) 20 °C pF2/10kPa[b)]	St. (χ^2)	Method of calculation
Lufa 2.2	5.6	20 / pF2	192.8 [c)]	0.90	DFOP
Lufa 5M	7.4	20 / pF2	19.1	6.18	SFO
LAD-SCL-PF	8.0	20 / pF2	43.5	3.02	SFO
MSL-PF	6.3	20 / pF2	74.6 [c)]	3.11	DFOP
Geometric mean (if not pH dependent)			58.8		
pH dependence			No		

[a)] Measured in $CaCl_2$
[b)] Normalised using a Q10 of 2.58 and Walker equation coefficient of 0.7
[c)] Slow phase DT_{50}

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)

No soil metabolites required further consideration.

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

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)

Parent	Aerobic conditions; trigger endpoints						
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)	Method of calculation
Loamy fine sand, bare soil	Höltinghausen, Germany	4.80	0-15	38.7	191.4	10.6	FOMC
Very fine sandy loam, bare soil	Dugliolo di Budrio, Italy	7.66	0-20	27.3	178.5	3.7	FOMC
Sand, bare soil	Røllum, Denmark	4.62	0-30	38.9	207.6	11.2	FOMC
Loam, bare soil	Banbury, UK	6.70	0-25	15.2	55.6	8.0	DFOP
Silt, bare soil	Saint-Amand, Belgium	6.12	0-30	14.8	74.9	4.7	DFOP
Coarse sandy loam, bare soil	Almayate, Spain	7.70	0-25	22.6	87.4	8.8	DFOP
Silt loam, bare soil	New York, US	5.14	0-45	14.9	170.9	9.4	DFOP
Sandy loam, bare soil	North Carolina, US	5.55	0-15	4.2	18.2	3.3	FOMC
Clay loam, bare soil	Texas, US	6.77	0-30	53.9	179.2	15.7	SFO
Sand, bare soil	Washington, US	7.59	0-15	2.5	20.5	8.4	FOMC
Sandy loam, bare soil	California, US	7.69	0-30	12.9	42.7	18.1	SFO
Maximum (for accumulation study trigger)					207.6		
pH dependence				No			

[a)] Measured in $CaCl_2$ for the European field study; measured in a saturated soil paste made from distilled water for the US field study. US field study pH values were converted to be expressed as a $CaCl_2$ pH value using the method reported in EFSA (2017)

[b)] Normalised using a Q10 of 2.58 and Walker equation coefficient of 0.7, values are DegT50matrix

[c)] Calculated as DT50 = DT90 / 3.32 (less than 10% of initial concentration at last sampling).

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

Parent	Aerobic conditions; modelling endpoints							
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
Loamy fine sand, bare soil	Höltinghausen, Germany	4.80	0-15	38.7	191.4	9.7	29.9 [c]	FOMC
Very fine sandy loam, bare soil	Dugliolo di Budrio, Italy	7.66	0-20	27.3	178.5	5.6	47.0 [c]	FOMC
Sand, bare soil	Røllum, Denmark	4.62	0-30	38.9	207.6	9.4	15.3	SFO
Loam, bare soil	Banbury, UK	6.70	0-25	15.2	55.6	8.1	5.4	SFO
Silt, bare soil	Saint-Amand, Belgium	6.12	0-30	14.8	74.9	5.0	8.0 [c]	FOMC
Coarse sandy loam, bare soil	Almayate, Spain	7.70	0-25	22.6	87.4	10.3	13.9	SFO
Silt loam, bare soil	New York, US	5.14	0-45	14.9	170.9	9.6	18.3	SFO
Sandy loam, bare soil	North Carolina, US	5.55	0-15	4.2	18.2	10.4	6.8	SFO
Clay loam, bare soil	Texas, US	6.77	0-30	53.9	179.2	18.4	9.9	SFO
Sand, bare soil	Washington, US	7.59	0-15	2.5	20.5	16.0	3.7	SFO
Sandy loam, bare soil	California, US	7.69	0-30	12.9	42.7	9.9	5.2	SFO
Geometric mean (if not pH dependent)							11.1	
pH dependence				No				

a) Measured in $CaCl_2$ for the European field study; measured in a saturated soil paste made from distilled water for the US field study. US field study pH values were converted to be expressed as a $CaCl_2$ pH value using the method reported in EFSA (2017)

b) Normalised using a Q10 of 2.58 and Walker equation coefficient of 0.7, values are DegT50matrix

c) Calculated as DT50 = DT90 / 3.32 (less than 10% of initial concentration at last sampling).

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)	11.1 (d) *Field endpoints chosen following EFSA guidance.*
Rate of degradation in soil transformation products, normalised geometric mean (if not pH dependent)	No soil metabolites require further consideration.
Kinetic formation fraction (f. f. k_f / k_{dp}) of transformation products, arithmetic mean	

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

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

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	Soil accumulation studies were not triggered by the field-derived dissipation rates.

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)

Parent	Dark anaerobic conditions; trigger and modelling endpoints					
Soil type	pH [a)]	t. °C / % MWHC	DT_{50} (d)	DT_{90} (d)	St. (χ^2)	Method of calculation
Lufa 2.2	5.4	20 / flooded soil	1710	5660	1.1	SFO
Lufa 5M	7.2	20 / flooded soil	651	2160	0.6	SFO
North Dakota	6.3	20 / flooded soil	241	800	1.5	SFO
Wyoming	8.1	20 / flooded soil	1680	5570	4.6	SFO
Maximum (non-normalised) for trigger			1710	5660		
Geometric mean (if not pH dependent) for modelling			819			

[a)] Measured in $CaCl_2$

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)

No soil metabolites required further consideration.

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

Parent	Soil photolysis					
Soil type	pH[a)]	t. °C / % MWHC	DT_{50} / DT_{90} (d) (uncorrected)	DT_{50} / DT_{90} (d) (calculated at 50°N)	St. (χ^2)	Method of calculation
Lufa 5M	6.9; 7.2	22 °C / 60 %	Light: 24.1 / 92.2 Dark: 25.9 / 86.0	28.5 / 109.3 -	2.1 2.8	DFOP SFO

[a)] Two soil batches, hence two pH values; measured in $CaCl_2$.

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

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)

Parent							
Soil Type	OC %	Soil pH[a)]	K_d (mL/g)	K_{doc} (mL/g)	K_F (mL/g)	K_{Foc} (mL/g)	1/n
Loamy sand (Li 10)	0.89	6.1			4.5	510.1	1.00
Sandy loam (Lufa 2.3)	0.66	5.3			1.9	284.3	0.96
Loam (New Jersey)	1.30	6.5			3.5	266.5	0.94
Silty clay loam (La Gironda)	1.92	7.1			5.2	270.2	0.98
Loam (Gunma)	4.34	4.4			13.5	310.8	0.96
Geometric mean (if not pH dependent)*					4.6	317.8	
Arithmetic mean (if not pH dependent)							0.97
pH dependence?			No				

[a)] Measured in $CaCl_2$

* Only relevant after implementation of the published EFSA guidance.

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)

Values estimated via QSAR methods (not used for risk assessment; given for information only)			
Metabolite	Log K_{ow}	K_{oc} (mL/g) MCI Method	K_{oc} (mL/g) Log K_{ow} method
M684H001	3.54	430.2	85.63
M684H003	1.59	18.61	20.07
M684H004	3.05	422.4	104.6

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	Mobility studies were not submitted and were not required.

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	Mobility studies were not submitted and were not required.

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	Field leaching studies were not submitted and were not required.

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

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

Hydrolytic degradation of the active substance and metabolites > 10 %	Cinmethylin was hydrolytically stable (i.e. virtually no degradation) at pH 4, 5, 7 and 9 for 31 days at 25°C. No degradation rates were calculated; additionally, no metabolites were identified.

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

Direct photolytic degradation of active substance and metabolites above 10 %	**<u>Direct photochemical degradation (point 7.2.1.2)</u>** $DisT_{50}$ (irradiated) : 41.8 d [2] (cyclohexane- and phenyl/benzyl labels combined; SFO model fit) $DisT_{50}$ (dark control): > 1000 d (cyclohexane- and phenyl/benzyl labels combined; SFO model fit) Natural light, 40°N: DT_{50} 48.5 days <u>Metabolite:</u> M684H003: peak 6.8 % AR (11 d; mean of 2 replicates) $DisT_{50}$: Not possible to calculate. A default of 1000 d is assumed. Note: dissipation rate could not be calculated as the metabolite did not display a clear decline by the study end. Additionally, the metabolite was identified in both light and dark control samples. A default dissipation rate of 1000 days has been set.
Quantum yield of direct phototransformation in water at Σ > 290 nm	Could not be derived.

[2] The DT_{50} refers to a dissipation rate rather than a degradation rate due to observed high levels of volatilisation in the experiment.

Indirect photolytic degradation of active substance and metabolites above 10 %	**<u>Indirect photochemical degradation (point 7.2.1.3)</u>** $DisT_{50}$: 30.0 d[2] (geomean of cyclohexane- and phenyl/benzyl-label; SFO model fit) Natural light, 40°N; DT_{50} 34.8 days <u>Metabolite:</u> M684H003: 11 % AR (15 d; mean; n = 2) $DisT_{50}$: > 1000 d (cyclohexane-label)
Quantum yield of direct phototransformation in water at Σ > 290 nm	Could not be derived.

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

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

Readily biodegradable (yes/no)	No

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

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)

Parent										
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)		St. (χ^2)	Method of calculation
				At study temp	Normalised to *x* °C[c]		At study temp	Normalised to x °C[c]		
Fresh water (low concentration – 10 µg/L)	7.3	N/A	20	-	-	-	138/457	N/A	1.4	SFO
Fresh water (high concentration – 50 µg/L)				-	-	-	334/1110	N/A	1.8	SFO

[a] Measured in $CaCl_2$
[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. (note temp of x should be stated).

Metabolite M684H001	Max in total system 13.1 % after 63 days (cyclohexane label; mean; n = 2)
Kinetic evaluation was not possible due to the metabolite not showing a decline phase. A default DT_{50} of 1000 d has been applied.	

Mineralisation and non extractable residues (for parent dosed experiments)			
System identifier (indicate fresh, estuarine or marine)	pH water phase	pH sed	Mineralisation
Fresh water (low concentration – 10 µg/L)	7.3	N/A	3.3 – 4.8 % after 63 days (cyclohexane- and phenyl-label; mean; n = 2 per label)
Fresh water (high concentration – 50 µg/L)	7.3	N/A	2.8 – 4.8 % after 63 days (cyclohexane- and phenyl-label; mean; n = 2 per label)

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

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)

Parent	Distribution (Max. in sediment 55.9 % after 56 d; System Berghäuser Altrhein; cyclohexane label); modelling endpoints									
Water / sediment system	pH water phase	pH sed [a]	t. °C	$DegT_{50}$ /$DegT_{90}$ whole sys.	St. (χ^2)	$DisT_{50}$ /$DisT_{90}$ water	St. (χ^2)	$DisT_{50}$ /$DisT_{90}$ sed	St. (χ^2)	Method of calculation
Berghäuser Altrhein, Germany	7.58	6.9	20 ± 2	38.7 / 128.4	11.8	5.1 / 17.0	11.5	81.3 / 270.1	22.9	All SFO
Ranschgraben, Germany	7.30	5.9	20 ± 2	39.7 / 131.8	6.3	8.8[c] / 25.2	4.4	64.8 / 215.1	6.6	SFO; DFOP; SFO
Geometric mean at 20°C[b]				39.2		Max: 8.8		Max: 81.3		

[a] Measured in $CaCl_2$
[b] Normalised using a Q10 of 2.58
[c] DT_{50} is a slow phase DT_{50} calculated as follows: $ln(2)/k_2$

Metabolite M684H001	Distribution (max. in water 11.4 % after 28 d; System Berghäuser Altrhein; cyclohexane label. Max. in sediment 3.8 % after 28 d; System Ranschgraben; cyclohexane label.) kinetic formation fraction (k_f/k_{dp}): not calculated
Kinetic evaluation was not conducted for this metabolite as degradation rates are not required for UK-only applications due to the "total dose" approach of surface water exposure assessments.	

Mineralisation and non extractable residues (from parent dosed experiments)					
Water / sediment system	pH water phase	pH sed. ($CaCl_2$)	Mineralisation	Non-extractable residues in sediment (maximum)	Non-extractable residues in sediment (study end)
Berghäuser Altrhein	7.58	6.9	26.0 - 28.3 % after 100 d (end of study)	Max. 37.3 % after 78 d	Max. 30.8 % after 100 d
Ranschgraben	7.30	5.9	27.8 – 47.0 % after 100 d (end of study)	Max. 26.9 % after 100 d	Max. 26.9 % after 100 d

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

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} of 0.178 d derived by the Atkinson model (version 2.00). OH (12 h) concentration assumed = 1.5×10^6 mol/cm^3
Volatilisation from plant surfaces (BBA guidelines):	89 % after 24 hours Note: this was calculated via the indirect method due to poor recoveries. Indirect method was calculated by taking the measurement of the remaining, non-volatile amount of cinmethylin found on the plant surface and subtracting this from the total applied to the plant surface.
Volatilisation from soil surfaces (BBA guidelines):	73% after 24 hours Note: this was calculated via the indirect method due to poor recoveries. Indirect method was calculated by taking the measurement of the remaining, non-volatile amount of cinmethylin found on the soil surface and subtracting this from the total applied to the soil surface.
Metabolites	None

Cinmethylin deposition on water surfaces in a wind tunnel study. Values at 48 hours were used in the risk assessment for surface water exposure via spray drift.

Parent	Deposition on water surfaces relative to the amount applied to the target; % applied				
Distance (m)	12 hours	24 hours	48 hours	72 hours	96 hours
1	0.59	0.71	0.82	0.71	0.67
3	0.42	0.47	0.56	0.50	0.41
5	0.34	0.38	0.43	0.38	0.35
10	0.22	0.26	0.29	0.26	0.22
15	0.16	0.20	0.22	0.21	0.17
20	0.14	0.14	0.17	0.14	0.14

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:	Cinmethylin
	Surface water:	Cinmethylin, M684H001, M684H003
	Sediment:	Cinmethylin
	Ground water:	Cinmethylin
	Air:	Cinmethylin

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

See section 5, Ecotoxicology

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

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

Soil (indicate location and type of study)	None
Surface water (indicate location and type of study)	None
Ground water (indicate location and type of study)	None
Air (indicate location and type of study)	None

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

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

Parent Method of calculation	DT_{50} (d): 53.9 days Kinetics: SFO Field or Lab: Representative worst-case field degradation rate ($DegT_{50}$)
Application data (Crop 1)	Crop: Winter cereals Depth of soil layer: 5 cm Soil bulk density: 1.5g/cm^3 % plant interception: Pre-emergence therefore no crop interception Number of applications: 1 Interval (d): - Application rate(s): 500 g a.s./ha

$PEC_{(s)}$ (mg/kg)		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.667		Not required	
Short term	24h	0.658	0.662		
	2d	0.650	0.658		
	4d	0.633	0.650		
Long term	7d	0.609	0.638		
	28d	0.465	0.560		
	50d	0.360	0.497		
	100d	0.184	0.375		
Plateau concentration		Not required			

Application data (Crop 2)	Crop: Winter oilseed rape Depth of soil layer: 5 cm Soil bulk density: 1.5g/cm^3 % plant interception: Pre-emergence therefore no crop interception Number of applications: 1 Interval (d): - Application rate(s): 250 g a.s./ha

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

$PEC_{(s)}$ (mg/kg)		Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial		0.333		Not required	
Short term	24h	0.329	0.331		
	2d	0.325	0.329		
	4d	0.317	0.325		
Long term	7d	0.305	0.319		
	28d	0.233	0.280		
	50d	0.180	0.249		
	100d	0.092	0.188		
Plateau concentration		Not required			

Metabolite I	No metabolites required consideration for PEC_{soil}

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

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)	Modelling using FOCUS model(s), with appropriate FOCUSgw scenarios, according to FOCUS guidance. Model(s) used: PEARL 4.4.4, PELMO 5.5.3, MACRO 5.5.4 Crop: Winter cereals; winter oilseed rape Crop uptake factor: 0 % Water solubility (mg/L): 58.0 at pH 7 and 20°C Vapour pressure: 8.1×10^{-3} Pa at 20°C Geometric mean parent DT_{50}: 11.1 d (field) (normalised to pF2, 20 °C with Q10 of 2.58 and Walker equation coefficient 0.7) K_{OC} (geometric mean; parent): 317.8 mL/g (n = 5) 1/n (arithmetic mean; parent): 0.97 (n = 5) Metabolites: None.
Application rate (pre-emergence)	Gross application rate: 500 g/ha. Crop growth stage: Pre-emergence Canopy interception %: 0 Application rate net of interception: 500 g/ha. No. of applications: 1 Time of application (absolute or relative application dates): 10 days pre-emergence

***** Only relevant after implementation of the published EFSA guidance.

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

Model /Crop	Scenario	Parent (µg/L)	Metabolite (µg/L)
	Chateaudun	< 0.001	No metabolites required consideration for groundwater modelling.
	Hamburg	< 0.001	
	Kremsmunster	< 0.001	
	Okehampton	< 0.001	

$PEC_{(gw)}$ From lysimeter / field studies

No lysimeter studies were undertaken or required.

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

PEC surface water and PEC sediment (Regulation (EU) N° 284/2013, Annex Part A, points 9.2.5 / 9.3.1) – <u>UK specific assessment</u>

Calculation method	Spray drift: HSE Excel Calculator (first tier); Drainflow: HSE Excel Calculator (first tier); WEBFRAM (higher tier); MACRO (higher tier)
Parent Parameters used in UK only spraydrift and drainflow considerations	Molecular weight (g/mol): 274.4 K_{OC}/K_{OM} (mL/g): 317.8 (geometric mean; n = 5). 266.5 – 510.1 (n = 5) 1/n: 0.94 – 1.00 (n = 5) $DegT_{50}$ soil (d): 11.1 (field; geomean; n = 11) $DisT_{50}$ water (d): 8.8 (longest dissipation rate; n = 2) Maximum in sediment (% AR): 55.9 Crop interception (%): 0
M684H001 Parameters used in UK only spraydrift and drainflow considerations	*Water-sediment metabolite* Molecular weight (g/mol): 304.4 K_{OC}/K_{OM} (mL/g): not needed; not a soil-relevant metabolite 1/n: not needed $DegT_{50}$ soil (d): not needed $DisT_{50}$ water (d): not needed; total residue approach Maximum in water (% AR): 11.4 Maximum in sediment (% AR): 3.8 Crop interception (%): 0
M684H003 Parameters used in UK only spraydrift and drainflow considerations	*Aqueous photolysis metabolite* Molecular weight (g/mol): 170.3 K_{OC}/K_{OM} (mL/g): not needed; not a soil-relevant metabolite 1/n: not needed $DegT_{50}$ soil (d): not needed $DisT_{50}$ water (d): not needed; total residue approach Maximum in water (% AR): 11.1 Maximum in sediment (% AR): 0.001 (default; not detected) Crop interception (%): 0
Application rate	Crop: field crops (Tier 1); winter wheat and winter barley (Tier 2) Number of applications: 1 Application rates (g a.s./ha): Parent: 500 M684H001: 63.213 M684H003: 34.466 Application dates and BBCH growth stage: 15th October (pre-em; BBCH 00) 1st November (post-em; BBCH 00)

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

	30th March (spring application; BBCH 11-19)
WEBFRAM parameters (Higher tier drainflow only)	Soil classes: Denchworth, Hanslope, Brockhurt, Clifton Climate scenarios: Dry, medium wet
MACRO parameters (Higher tier drainflow only)	Soil classes: Denchworth, Hanslope, Brockhurt, Clifton Climate scenarios: Dry, medium wet

Spray drift - Parent	Buffer zone (m)	Drift rate (%) [a]	PEC_{SW} (µg/L)	PEC_{SED} (µg/kg)
	1	2.77	4.617	11.611
	3	1.51	2.517	6.493
	5	1.00	1.667	4.30

[a] Drift rate includes consideration of deposition following volatilisation at 3 and 5 metres. Values were derived by adding Rautmann standard drift values to the deposition after 48 hours, as measured in the wind tunnel study (CA Section B.8.3.2).

Spray drift - Metabolites	Buffer zone (m)	Drift rate (%) [a]	M684H001		M684H003	
			PEC_{SW} (µg/L)	PEC_{SED} (µg/kg)	PEC_{SW} (µg/L)	PEC_{SED} (µg/kg)
	1	2.77	0.584	0.898	0.318	n/a [b]
	3	1.51	- [c]	- [c]	- [c]	- [c]
	5	1.00	- [c]	- [c]	- [c]	- [c]

[a] Drift rate includes consideration of deposition following volatilisation at 3 and 5 metres. Values were derived by adding Rautmann standard drift values to the deposition after 48 hours, as measured in the wind tunnel study (CA Section B.8.3.2).
[b] Not measured in sediment.
[c] Not calculated because the metabolites passed the risk assessment with a 1 m buffer zone.

Drainflow (Tier 1) - parent	PEC_{SW} (µg/L)	PEC_{SED} (µg/kg)
Pre-emergence Post-emergence	26.923	69.462
Spring application	21.538	55.569

Drainflow (Tier 1) – metabolites [a]	M684H001		M684H003	
	PEC_{SW} (µg/L)	PEC_{SED} (µg/kg)	PEC_{SW} (µg/L)	PEC_{SED} (µg/kg)
Pre-emergence Post-emergence	3.404	5.236	1.856	n/a
Spring application	2.723	4.189	1.485	n/a

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

[a] The metabolites considered here are not soil metabolites, but are water metabolites that are assumed to form after the parent enters a water body via drainflow.

Drainflow (Tier 2: WEBFRAM) - Parent	Application scenario	Proportion of cropped area where exceedances occur [%] [a]	Proportion of cropped area with zero exceedance [%]	Proportion of undrained area [%]	Overall exceedance [%]
Winter wheat	**Pre-emergence**	0.0	63.1	36.8	**0.0**
	Post-emergence	0.0	63.1	36.8	**0.0**
	Spring application	0.0	63.1	36.8	**0.0**
Winter barley	**Pre-emergence**	17.2	37.0	45.6	**0.06**
	Post-emergence	19.2	35.0	45.6	**0.20**
	Spring application	19.2	35.0	45.6	**0.20**

[a] Exceedances refer to an invertebrate regulatory acceptable concentration (RAC) of 20.6 µg/L (*Chironomus spp.*)

Drainflow (Tier 2: MACRO) - Parent	Note: this additional evaluation was undertaken to resolve the risk assessment for *Chironomus* spp. Exceedance values presented for both RACs.			
Climate scenario	**Soil class**			
	Denchworth	**Hanslope**	**Brockhurst**	**Clifton**
***Chironomus* RAC (20.6 µg/L)**				
Pre-emergence (15 October)				
Dry	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Medium	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Wet	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Post-emergence (1 November)				
Dry	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Medium	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Wet	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Spring application (30 March)				
Dry	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Medium	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Wet	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
***Lemna* RAC (8.88 µg/L)**				
Pre-emergence (15 October)				
Dry	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Medium	1/30 (3%) [a]	0/30 (-)	0/30 (-)	0/30 (-)
Wet	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Post-emergence (1 November)				
Dry	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Medium	1/30 (3%) [b]	0/30 (-)	0/30 (-)	0/30 (-)
Wet	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Spring application (30 March)				
Dry	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Medium	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)
Wet	0/30 (-)	0/30 (-)	0/30 (-)	0/30 (-)

[a] Maximum concentration in surface water: 10.709 µg/L

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 4 Environmental fate and behaviour

[b] Maximum concentration in surface water: 9.825 µg/L

Higher tier drainflow for the metabolites M684H001 and M684H003 was not necessary due to the Tier 1 PEC_{sw} via drainflow values not exceeding the RAC.

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

No other routes of exposure required further consideration.

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

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				
Colinus virginianus	**a.s. BAS 684 H**	**Acute**	LD_{50} **LD_{50} extrapolated**	> 2000 **> 3776** [1]
Colinus virginianus	a.s. BAS 684 H	Long-term	LD_{50}/10	> 377.6
Colinus virginianus	**a.s. BAS 684 H**	**Long-term**	**NOEL** NOEC	**99.1 mg a.s./kg b.w./d** 1200 mg a.s./kg diet
Mammals				
Rat (Female)	**a.s. BAS 684 H**	**Acute**	**LD_{50}**	**>2000**
Rat (Male and Female)	SD 95481	Acute	LD_{50}	4550
Mouse (Male and Female)	a.s. BAS 684 H	Acute	LD_{50}	>5000
Rat (Female)	Preparation 'BAS 684 03 H'	Acute	LD_{50}	>2000 formulation/kg b.w. [2]
Mouse (Female)	**a.s. BAS 684 H**	**Long-term**	**NOAEL**	**58 (based on decreased body weight gain)**
Endocrine disrupting properties (Annex Part A, points 8.1.5) *Assessment ongoing.*				
Enantiomer ratios: Both cinmethylin and the relevant metabolite M684-H005 consist of two enantiomers. The enantiomer ratios have been considered in volume 1 (section 2.12.7) where an acceptable risk was demonstrated for proposed uses. It should be noted these conclusions apply to the proposed GAP single application to oilseed rape/cereals hence any changes in future submissions may need further consideration.				
Additional higher tier studies (Annex Part A, points 10.1.1.2): *BCF Earthworm study submitted as part of request for additional information was evaluated and considered valid. The resulting endpoint was a bioconcentration factor (BCF) value of 1.12.*				
Terrestrial vertebrate wildlife (birds, mammals, reptile and amphibians) (Annex Part A, points 8.1.4, 10.1.3): -				

Bold indicates endpoints used in risk assessment

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

[1] Extrapolation according to EFSA (2009) Chapter 2.1.2. has been applied to the acute endpoint LD_{50} >2000 mg a.s./kg bw ([redacted] 2016a) since 10 animals were tested and there were no mortalities at the limit dose (extrapolation factor = 1.888)
[2] Active substance content: 741.0 g/L

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

Bare soil at 250 g a.s./ha x 1 application

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Screening Step (Birds)					
All	Small granivorous bird	Acute	6.325	>597	10
All	Small granivorous bird	Long-term	1.51	65.61	5
Screening Step (Mammals)					
All	Small herbivorous mammal	Acute	3.6	>555.6	10
All	Small herbivorous mammal	Long-term	0.87	66.32	5

Risk from bioaccumulation and food chain behaviour
The log K_{ow} of the active substance BAS 684 H is 4.5 at 20°C and pH=7. Hence, the risk of secondary poisoning was assessed to fish- and earthworm eating mammals.

Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Earthworm-eating birds	Long-term	23.40	**4.24**	5
Earthworm-eating mammals	Long-term	28.53	**2.03**	5
Fish-eating birds	Long-term	3.03	32.74	5
Fish-eating mammals	Long-term	2.70	21.46	5

Higher tier :

At first tier an unacceptable risk was identified for the earthworm eating bird and mammal assessment (indicated in **bold**).

The applicant has submitted an earthworm BCF study in response to a request for additional information to address the failing earthworm eating bird and mammal risk assessment. This was evaluated by the UK and incorporated into the refined risk assessment.

Refined risk assessment

Earthworm-eating birds – DDD=0.390 mg/kg b.w./day and TER= 254.10

Earthworm-eating mammals – DDD= 0.475 mg/kg b.w./day and TER= 122.11

TERs exceed the trigger of 5 demonstrating acceptable risk to birds and mammals from secondary poisoning via earthworms.

Risk from consumption of contaminated water

Scenarios	**Indicator or focal species**	**Time scale**	**PEC_{dw}xDWR**	**TER**	**Trigger**
Puddle scenario, Screening step					
1) Application rate (g a.s./ha)/relevant endpoint <50 (koc<500 L/kg), TER calculation not needed.					

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Bare soil at 500 g a.s./ha x 1 application

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Screening Step (Birds)					
All	Small granivorous bird	Acute	12.65	>298.5	10
All	Small granivorous bird	Long-term	3.02	32.8	5
Screening Step (Mammals)					
All	Small granivorous mammal	Acute	7.20	>277.8	10
All	Small granivorous mammal	Long-term	1.75	33.14	5

Risk from bioaccumulation and food chain behaviour

The log K_{ow} of the active substance BAS 684 H is 4.5 at 20°C and pH=7. Hence, the risk of secondary poisoning was assessed to fish- and earthworm eating mammals.

Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Earthworm-eating birds	Long-term	46.1	**2.12**	5
Earthworm-eating mammals	Long-term	57.09	**1.02**	5
Fish-eating birds	Long-term	3.03	32.74	5
Fish-eating mammals	Long-term	2.70	21.46	5

Higher tier :

At first tier an unacceptable risk was identified for the earthworm eating bird and mammal assessment (indicated in **bold**).

The applicant has submitted an earthworm BCF study in response to a request for additional information to address the failing earthworm eating bird and mammal risk assessment. This was evaluated by the UK and incorporated into the refined risk assessment.

Refined risk assessment

Earthworm-eating birds – DDD=0.778 mg/kg b.w./day and TER= 127.38

Earthworm-eating mammals – DDD= 0.948 mg/kg b.w./day and TER= 61.18

TERs exceed the trigger of 5 demonstrating acceptable risk to birds and mammals from secondary poisoning via earthworms.

Risk from consumption of contaminated water

Scenarios	**Indicator or focal species**	**Time scale**	**PEC_{dw}xDWR**	**TER**	**Trigger**
Puddle scenario, Screening step					
1)Application rate (g a.s./ha)/relevant endpoint <50 (koc<500 L/kg), TER calculation not needed.					

Cereals at 250 g a.s./ha x 1 application

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Screening Step (Birds)					
All	Small omnivorous bird	Acute	39.7	>95.1	10
All	Small omnivorous bird	Long-term	8.59	11.54	5

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Screening Step (Mammals)					
All	Small herbivorous mammal	Acute	29.6	>67.6	10
All	Small herbivorous mammal	Long-term	6.40	9.1	5

Risk from bioaccumulation and food chain behaviour

The log K_{ow} of the active substance BAS 684 H is 4.5 at 20°C and pH=7. Hence, the risk of secondary poisoning was assessed to fish- and earthworm eating mammals.

Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Earthworm-eating birds	Long-term	23.40	**4.24**	5
Earthworm-eating mammals	Long-term	28.53	**2.03**	5
Fish-eating birds	Long-term	3.03	32.74	5
Fish-eating mammals	Long-term	2.70	21.46	5

Higher tier :

At first tier an unacceptable risk was identified for the earthworm eating bird and mammal assessment (indicated in **bold**).

The applicant has submitted an earthworm BCF study in response to a request for additional information to address the failing earthworm eating bird and mammal risk assessment. This was evaluated by the UK and incorporated into the refined risk assessment.

Refined risk assessment

Earthworm-eating birds – DDD=0.390 mg/kg b.w./day and TER= 254.10

Earthworm-eating mammals – DDD= 0.475 mg/kg b.w./day and TER= 122.11

TERs exceed the trigger of 5 demonstrating acceptable risk to birds and mammals from secondary poisoning via earthworms.

Risk from consumption of contaminated water

Scenarios	**Indicator or focal species**	**Time scale**	**PEC_{dw}xDWR**	**TER**	**Trigger**
Puddle scenario, Screening step					
1)Application rate (g a.s./ha)/relevant endpoint <50 (koc<500 L/kg), TER calculation not needed.					

Bold indicates failing risk assessment.

Cereals at 500 g a.s./ha x 1 application

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Screening Step (Birds)					
All	Small omnivorous bird	Acute	79.40	>47.6	10
All	Small omnivorous bird	Long-term	17.17	5.8	5
Screening Step (Mammals)					
All	Small herbivorous mammal	Acute	59.20	>33.8	10
All	Small herbivorous mammal	Long-term	12.8	**4.5**	5

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Tier 1 (Mammals)					
BBCH 10-19	Small insectivorous mammal "shrew"	Long-term	1.1	52	5
BBCH ≥ 20	Small insectivorous mammal "shrew"		0.5	115	
Early (shoots)	Large herbivorous mammal "lagomorph"		5.9	9.8	
BBCH 10-29	Small omnivorous mammal "mouse"		2.1	25	

Risk from bioaccumulation and food chain behaviour

The log K_{ow} of the active substance BAS 684 H is 4.5 at 20°C and pH=7. Hence, the risk of secondary poisoning was assessed to fish- and earthworm eating mammals.

Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Earthworm-eating birds	Long-term	46.1	**2.12**	5
Earthworm-eating mammals	Long-term	57.09	**1.02**	5
Fish-eating birds	Long-term	3.03	32.74	5
Fish-eating mammals	Long-term	2.70	21.46	5

Higher tier :

At first tier an unacceptable risk was identified for the earthworm eating bird and mammal assessment (indicated in **bold**).

The applicant has submitted an earthworm BCF study in response to a request for additional information to address the failing earthworm eating bird and mammal risk assessment. This was evaluated by the UK and incorporated into the refined risk assessment.

Refined risk assessment

Earthworm-eating birds – DDD=0.778 mg/kg b.w./day and TER= 127.38

Earthworm-eating mammals – DDD= 0.948 mg/kg b.w./day and TER= 61.18

TERs exceed the trigger of 5 demonstrating acceptable risk to birds and mammals from secondary poisoning via earthworms.

Risk from consumption of contaminated water

Scenarios	Indicator or focal species	Time scale	PEC_{dw}xDWR	TER	Trigger
Puddle scenario, Screening step					
1)Application rate (g a.s./ha)/relevant endpoint <50 (koc<500 L/kg), TER calculation not needed.					

Bold indicates failing risk assessment.

Oil seed rape at 250 g a.s./ha x 1 application

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Screening Step (Birds)					
All	Small omnivorous bird	Acute	39.70	>95.1	10
All	Small omnivorous bird	Long-term	8.59	11.5	5

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Screening Step (Mammals)					
All	Small herbivorous mammal	Acute	29.60	>67.6	10
All	Small herbivorous mammal	Long-term	6.40	9.06	5

Risk from bioaccumulation and food chain behaviour

The log K_{ow} of the active substance BAS 684 H is 4.5 at 20°C and pH=7. Hence, the risk of secondary poisoning was assessed to fish- and earthworm eating mammals.

Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
Earthworm-eating birds	Long-term	23.40	**4.24**	5
Earthworm-eating mammals	Long-term	28.53	**2.03**	5
Fish-eating birds	Long-term	3.03	32.74	5
Fish-eating mammals	Long-term	2.70	21.46	5

Higher tier :

At first tier an unacceptable risk was identified for the earthworm eating bird and mammal assessment (indicated in **bold**).

The applicant has submitted an earthworm BCF study in response to a request for additional information to address the failing earthworm eating bird and mammal risk assessment. This was evaluated by the UK and incorporated into the refined risk assessment.

Refined risk assessment

Earthworm-eating birds – DDD=0.390 mg/kg b.w./day and TER= 254.10

Earthworm-eating mammals – DDD= 0.475 mg/kg b.w./day and TER= 122.11

TERs exceed the trigger of 5 demonstrating acceptable risk to birds and mammals from secondary poisoning via earthworms.

Risk from consumption of contaminated water

Scenarios	**Indicator or focal species**	**Time scale**	**PEC_{dw}xDWR**	**TER**	**Trigger**
Puddle scenario, Screening step					
1)Application rate (g a.s./ha)/relevant endpoint <50 (koc<500 L/kg), TER calculation not needed.					

Risk to birds and mammals from plant metabolites

Bare soil at 500 g a.s./ha x 1 application (covers lower application rate of 250 g a.s./ha)

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
M684H005 & M684H006 combined					
Screening Step (Birds)					
All	Small granivorous bird	Acute	1.232	>3064	10
All	Small granivorous bird	Long-term	1.232	80.4	5
Screening Step (Mammals)					
All	Small granivorous mammal	Acute	0.748	>2673	10
All	Small granivorous mammal	Long-term	0.784	77.5	5

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Cereals at 500 g a.s./ha x 1 application (covers lower application rate of 250 g a.s./ha)

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
M684H005 & M684H006 combined					
Screening Step (Birds)					
All	Small omnivorous bird	Acute	9.944	>379.7	10
All	Small omnivorous bird	Long-term	9.944	10	5
Screening Step (Mammals)					
All	Small herbivorous mammal	Acute	5.852	>341	10
All	Small herbivorous mammal	Long-term	5.852	9.91	5

Oilseed Rape at 250 g a.s./ha x 1 application

Growth stage	Indicator or focal species	Time scale	DDD (mg/kg bw per day)	TER	Trigger
M684H005 & M684H006 combined					
Screening Step (Birds)					
All	Small omnivorous bird	Acute	3.39	>1113.9	10
All	Small omnivorous bird	Long-term	3.39	29.2	5
Screening Step (Mammals)					
All	Small herbivorous mammal	Acute	1.995	>1003	10
All	Small herbivorous mammal	Long-term	1.995	29.1	5

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
Laboratory tests				
Fish				
Oncorhynchus mykiss (also known as Salmo gairdneri)	a.s.	Acute 96 hr (static)	Mortality, LC_{50}	8.49 (m.m)[a] mg a.s./L
Cyprinus carpio	a.s.	Acute 96 hr (static)	Mortality, LC_{50}	**5.75** (g.m) mg a.s./L
Pimephales promelas	a.s.	Acute 96 hr (static)	Mortality, LC_{50}	5.84 (m.m)[a] mg a.s./L
Cyprinus carpio	Preparation 'BAS 684 03H'	Acute 96 hr (static)	Mortality, LC_{50}	**5.86** (g.m) mg product/L **4.32** (g.m) mg a.s./L
Pimephales promelas	a.s.	Chronic (static, or semi-static or flow-through)	NOEC EC_{10} (body length)	**0.59** (m.m) mg a.s./L 0.92 (m.m) mg a.s./L

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Group	Test substance	Time-scale (Test type)	End point	Toxicity
Oncorhynchus mykiss (also known as Salmo gairdneri)	M684H003	96 hr (static)	Mortality, LC_{50}	**> 1000** (nom.) mg a.s./L Supporting information only[##]
Aquatic invertebrates				
Daphnia magna	a.s.	48 h (static)	Mortality, EC_{50}	**7.26** (nom.) mg a.s./L
Gammarus pulex	a.s.	96 h (static)	Mortality, LC_{50}	6.6 (nom.) mg a.s./L Supporting information only[b]
Lymnaea stagnalis	a.s.	96 h (static)	Mortality, LC_{50}	7.0 (nom.) mg a.s./L Supporting information only[b]
Tubifex tubifex	a.s.	96 h (static)	Mortality, LC_{50}	5.4 (nom.) mg a.s./L Supporting information only[b]
Chironomus lugubris	a.s.	96 h (static)	Mortality, LC_{50}	> 2.06 (g.m) mg a.s./L Supporting information only[b]
Daphnia magna	Preparation 'BAS 684 03H'	48 h (static, or semi-static or flow-through)	Mortality, EC_{50}	**14.5** (g.m) mg product/L **10.68** (g.m) mg a.s./L
Daphnia magna	a.s.	21 d (static, or semi-static or flow-through)	NOEC EC_{10}	**0.29** (g.m) mg a.s./L[#] > 0.29 (g.m) mg a.s./L[#]
Daphnia magna	M684H001	48 h (static)	Mortality, EC_{50}	**> 100** (nom.) mg a.s./L
Daphnia magna	M684H003	48 h (static)	Mortality, EC_{50}	**840** (nom.) mg a.s./L Supporting information only[##]
Daphnia magna	M684H003	48 h (static)	Mortality, EC_{50}	> 100 (nom.) mg a.s./L
Sediment-dwelling organisms				
The study Pearson & Stephenson (1987a) determined an LC_{50} for *Chironomus lugubris* based on water only exposure. However, this study was only considered suitable as supporting information by the UK evaluator and the LC_{50} value was above the highest test concentration i.e. > 2.06 mg a.s./L (g.m.). In accordance with EFSA aquatic guidance document 2013 consideration of toxicity to *Chironomus* sp is required if the substance accumulates in sediment (water/sediment study demonstrates > 10 % of applied radioactivity at or after day 14 present in the sediment) and the chronic *Daphnia* test shows an EC_{10}/NOEC of < 0.1 mg a.s./L. Whilst the cinmethylin levels were above 10 % after day 14, peaking at 55.9 % at 56 days the chronic *Daphnia* endpoints were above the trigger of 0.1 mg a.s./L. Therefore, further consideration is not required.				

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Group	Test substance	Time-scale (Test type)	End point	Toxicity
Algae				
Pseudokirchneriella subcapitata	a.s.	72 h (static)	Growth rate: E_rC_{50} E_rC_{10} Yield: E_yC_{50} E_yC_{10}	**23.04** (g.m) mg a.s./L > 1.765 (g.m)[c] mg a.s./L 5.96 (g.m) mg a.s./L 0.93 (g.m) mg a.s./L
Anabaena flos-aquae	a.s.	96 h (static)	Growth rate: E_rC_{50} E_rC_{10} Yield: E_yC_{50} E_yC_{10}	51.34 (g.m) mg a.s./L 24.55 (g.m) mg a.s./L 31.10 (g.m) mg a.s./L 16.86 (g.m) mg a.s./L
Pseudokirchneriella subcapitata	Preparation 'BAS 684 03H'	72 h (static)	Growth rate: E_rC_{50} E_rC_{10} Yield: E_yC_{50} E_yC_{10}	**26.3** (g.m) mg product/L **19.37** (g.m) mg a.s./L 15.4 (g.m) mg product /L 11.34 (g.m) mg a.s./L 10.7 (g.m) mg product/L 7.88 (g.m) mg a.s./L Not reported.
Higher plant				
Lemna gibba	a.s.	7 d (static, water only)	Fronds number, E_rC_{50} E_rC_{10} Frond dry weight,E_rC_{50} E_rC_{10}	**0.0888** g.m mg a.s./L 0.0285 g.m mg a.s./L > 0.2580 g.m mg a.s./L 0.0300 g.m mg a.s./L
Glyceria maxima	a.s.	14 d (static, water only)	Total length, ErC_{50} E_rC_{10} Wet weight, E_rC_{50} E_rC_{10} Dry weight, E_rC_{50} E_rC_{10}	0.137 g.m mg a.s./L 0.023 g.m mg a.s./L 0.159 g.m mg a.s./L 0.044 g.m mg a.s./L 0.621 g.m mg a.s./L 0.035 g.m mg a.s./L

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Group	Test substance	Time-scale (Test type)	End point	Toxicity
Lemna gibba	Preparation 'BAS 684 03H'	7 d (static, water only)	Fronds number, E_rC_{50} E_rC_{10} Frond dry weight, E_rC_{50} E_rC_{10}	**0.167** (g.m) mg product/L **0.123** (g.m) mg a.s./L 0.053 (g.m) mg product/L 0.039 (g.m) mg a.s./L >8.97 (g.m) mg product/L >6.607 (g.m) mg a.s./L 0.063 (g.m) mg product/L 0.046 (g.m) mg a.s./L
Glyceria maxima	Preparation 'BAS 684 03H'	14 d (static, water /sediment)	Total length, E_rC_{50} E_rC_{10} Wet weight, E_rC_{50} E_rC_{10} Dry weight, E_rC_{50} E_rC_{10}	0.947 (g.m) mg product/L 0.698 (g.m) mg a.s./L 0.040 (g.m) mg product/L 0.029 (g.m) mg a.s./L **0.617** (g.m) mg product/L **0.454** (g.m) mg a.s./L 0.030 (g.m) mg product/L 0.022 (g.m) mg a.s./L 2.218 (g.m) mg product/L 1.634 (g.m) mg a.s./L 0.035 (g.m) mg product/L 0.026 (g.m) mg a.s./L
Lemna gibba	M684H001	7 d (static, water only)	Fronds number, E_rC_{50} E_rC_{10} Frond dry weight, E_rC_{50} E_rC_{10}	**> 78.3** g.m mg a.s./L 16.2 g.m mg a.s./L **> 78.3** g.m mg a.s./L 22.4 g.m mg a.s./L
Lemna gibba	M684H003	7 d (static, water only)	Fronds number, E_rC_{50} E_rC_{10} Frond dry weight, E_rC_{50} E_rC_{10}	**>100** g.m mg a.s./L Limit study **> 100** g.m mg a.s./L Limit study

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Group	Test substance	Time-scale (Test type)	End point	Toxicity
Lemna gibba	M684H004	7 d (static, water only)	Fronds number, E_rC_{50} E_rC_{10} Frond dry weight, E_rC_{50} E_rC_{10}	3.28 g.m mg a.s./L 0.881 g.m mg a.s./L >23.47 g.m mg a.s./L 1.08 g.m mg a.s./L
Potential endocrine disrupting properties (Annex Part A, point 8.2.3)				
Evaluation on-going.				

($_{nom}$) nominal concentration; ($_{mm}$) mean measured concentration; prep.: preparation; a.s.: active substance

[#] *Based on time weighted average concentration. Due to lack of analytical measurements during study for three test concentrations only the lowest and highest concentrations could be calculated. Therefore, this endpoint is considered conservative.*

[##] *Not considered suitable for quantitative use as insufficient information provided to confirm analytical method was validated.*

Bold values are most sensitive endpoints for each group.

[a] *Endpoint should have been based on geometric mean measured. However, the geometric mean test concentrations calculated by the UK evaluator are comparable to mean measured concentrations hence the study author values have been accepted, see relevant study summaries for further details.*

[b] *Study considered suitable as supporting information only by the UK evaluator due to uncertainties; not possible to confirm validity criteria were met and lack of control without solvent (see study summary for further details).*

[c] *Uncertainty regarding statistically derived value hence conservative approach has been taken and a greater than value reported.*

Bioconcentration in fish (Annex Part A, point 8.2.2.3)

	Active substance
$logP_{O/W}$	4.5
Steady-state bioconcentration factor (BCF_{SSL}) (total wet weight/normalised to 5% lipid content)	677 L/kg at 0.5 µg eq/L* 694 L/kg at 5 µg eq/L*
Uptake/depuration kinetics BCF (total wet weight/normalised to 5% lipid content)	707 L/kg at 0.5 µg eq/L* 688 L/kg at 5 µg eq/L*
Annex VI Trigger for the bioconcentration factor	1000
Clearance time (days) (CT_{50})	1.12 days at 0.5 µg eq/L 1.08 days at 5 µg eq/L
(CT_{95})	4.8 days at 0.5 µg eq/L 4.6 days at 5 µg eq/L
Further consideration of BCF values using metabolism study ([redacted] 2018a)	

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

The BCF_{KLg} values from [redacted] 2017b were 707 and 688 L kg^{-1} at 0.5 and 5 µg eq/L respectively when corrected for lipid content. A supporting metabolism study ([redacted] 2018a) was also submitted hence it is possible to ascertain the BCF for the parent (cinmethylin) and identify metabolites present. In this study at end of exposure period cinmethylin (BAS 684 H) accounted for 24.1 % TRR/0.085 mg a.s./kg (Total Radioactive Residue) at 0.5 µg a.s./L and 8.6 % TRR/0.045 mg a.s./kg at 5 µg a.s./L. The metabolite M684H012 accounted for 24.1 % TRR, 14.7 % TRR, M684H022 (isomer 1) for 7.7 % TRR, 4.2 % TRR, M684H022 (isomer 2) for 8.0 % TRR, 10.6 % TRR, M684H026 for 8.2 % TRR, 5.2 % TRR at 0.5 and 5 µg a.s./L. In order to account for the metabolites present using this study the UK evaluator has re-calculated the BCF endpoints based on cinmethylin to 170 and 59 for 0.5 and 5 µg a.s./L, corresponding to a geometric mean of 100.4. As stated in EFSA aquatic guidance 2013 biomagnification must be considered for compounds where the BCF is > 1000 and the elimination of radioactivity during the 14-day depuration phase in the bioconcentration study is < 95 % and the substance is stable in water or sediment ($DegT_{90}$ > 100 days). The environmental fate section details the worst case DT_{90} in water to be 25.2 days and > 100 days in sediment meeting the 'stability' criteria for sediment. The BCF value (geomean) was 100 and based on the metabolism study ([redacted] 2018a) the worst case DT_{50} value considering total radioactivity was 1.12 days hence both are within the triggers detailed and further consideration is not required.

* based on total ^{14}C

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

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

UK SPECIFIC - TERs for cinmethylin – single application to winter cereals at 500 g a.s./ha (worst case GAP for proposed use).

Group		**Fish acute**	**Fish chronic**	**Invertebrate acute**		**Invertebrate chronic**	**Algae**	**Higher-Plant**
Test species		***C. carpio***	***P. promelas***	***D. magna***	***C. lugubris***	***D. magna***	***P. subcapitata***	***L. gibba***
Endpoint		LC_{50}	NOEC	EC_{50}	LC_{50}	NOEC	E_rC_{50}	E_rC_{50}
(µg a.s./L)		5750	590	7260	>2060	290	23040	88.8
AF		100	10	100	100	10	10	10
RAC (µg a.s./L)		57.5	59	72.6	20.6	29	2304	8.88
Entry pathway / Buffer zone [m] / season	**PEC $_{gl\text{-}sw\ max}$ (µg a.s./L)**	**PEC/RAC (= ETR)**						
Spray drift Standard distance (1 m)	4.617	0.080	0.078	0.0636	0.2241	0.159	0.002	0.520
Drainage	26.923	0.468	0.456	0.371	**1.307**	0.928	0.012	**3.032**

AF: Assessment factor; PEC: Predicted environmental concentration; RAC: Regulatory acceptable concentration; PEC/RAC ratios above the relevant trigger of 1 are shown in **bold**; Shaded RAC indicates study was considered as supporting information due to issues confirming validity criteria. This risk assessment has been included as illustrative due to the species potentially being more sensitive than the valid standard study testing *Daphnia magna*.

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Higher tier assessment (cinmethylin drain flow) required for aquatic plants and invertebrates:

An acceptable risk to aquatic plants and invertebrates was concluded based on higher tier drain flow modelling for all uses. See RAR for full details.

UK SPECIFIC - TERs for cinmethylin metabolites – single application to winter cereals at 500 g a.s./ha (worst case GAP for proposed use).

Group	Exposure	Fish (Acute)	Inverteb. acute		Aquatic plants	
Test species		*O. mykiss*	*D. magna*		*L. gibba*	
Metabolite:		M684H003	M684H001	M684H003	M684H001	M684H003
Endpoint (µg metabolite/L)		LC_{50} >1000000	EC_{50} >100000	EC_{50} 840000	E_rC_{50} >78300	E_rC_{50} >100000
AF		100	100	100	10	10
RAC (µg metabolite/L)		10000	1000	8400	7830	10000
Spray drift entry / Buffer zone [m]	$PEC_{sw\text{-}ini}$ (µg metabolite/L)	PEC/RAC (= ETR)				
M684H001 standard distance (1 m)	0.584	--	0.000584	--	0.0000746	--
M684H003 standard distance (1 m)	0.318	0.0000318	--	0.0000378	--	0.0000318
M684H001 Drainage	3.404	--	0.003404	--	0.0004347	--
M684H003 Drainage	1.856	0.0001856	--	0.000221	--	0.0001856

AF: Assessment factor; PEC: Predicted environmental concentration; RAC: Regulatory acceptable concentrations, -- = not applicable as different metabolite PEC
Shaded RAC indicates study was considered as supporting information due to issues confirming analytical method was sufficiently validated.

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

<u>UK SPECIFIC</u> - TERs for cinmethylin representative formulation ('BAS 684 03 H')– single application to winter cereals at 500 g a.s./ha (worst case GAP for proposed use).

Group	Exposure	Fish (Acute)	Inverteb. acute	Algae	Aquatic plants
Test species		*O. mykiss*	*D. magna*	*P. subcapitata*	*L. gibba*
Endpoint		LC_{50}	EC_{50}	E_rC_{50}	E_rC_{50}
(µg product/L)		5860	14500	26300	167
AF		100	100	10	10
RAC (µg product/L)		58.6	145	2630	16.7
Spray drift entry / Buffer zone [m]	$PEC_{sw\text{-}ini}$ (µg product/L)	PEC/RAC (= ETR)			
standard distance (1 m)	6.149	0.105	0.042	0.002	0.368

AF: Assessment factor; PEC: Predicted environmental concentration; RAC: Regulatory acceptable concentrations

Overall conclusion for aquatic organisms:

Based on the above an acceptable risk to aquatic organisms for the proposed uses can be concluded.

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

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)*

* This section does reflect the new EFSA Guidance Document on bees which has not yet been noted by the Standing Committee on Plants, Animals, Food and Feed.

Species	Test substance	Time scale/type of endpoint	End point	toxicity
Apis mellifera	a.s., BAS 684 H	Acute	Oral toxicity (LD_{50})	>200.0 µg a.s./bee
Bombus terrestris	a.s., BAS 684 H	Acute	Oral toxicity (LD_{50})	> 195.4 µg a.s./bee
Apis mellifera	Preparation 'BAS 684 02 H'	Acute	Oral toxicity (LD_{50})	> 294.7 µg BAS 684 02 H/bee
Bombus terrestris	Preparation 'BAS 684 02 H'	Acute	Oral toxicity (LD_{50})	> 258.5 µg BAS 684 02 H/bee
Apis mellifera	a.s., BAS 684 H	Acute	Contact toxicity (LD_{50})	>200.0 µg a.s./bee
Bombus terrestris	a.s., BAS 684 H	Acute	Contact toxicity (LD_{50})	>200.0 µg a.s./bee
Apis mellifera	Preparation 'BAS 684 02 H'	Acute	Contact toxicity (LD_{50})	> 272.0 µg BAS 684 02 H/bee
Bombus terrestris	Preparation 'BAS 684 02 H'	Acute	Contact toxicity (LD_{50})	> 272.0 µg BAS 684 02 H/bee
Apis mellifera	Preparation 'BAS 684 02 H'	Chronic adult (10d repeated exposure)	EC_{10} EC_{20} LDD_{50} LC_{50} NOEDD NOEC	86.5µg a.s./bee/day 110.1µg a.s./bee/day 143.2 µg a.s./bee/day 3.982 g a.s./kg food 48.6 µg a.s./bee/day 1.284 g a.s./kg food
Apis mellifera	a.s., BAS 684 H	Bee brood development	EC_{10} EC_{20} ED_{50} EC_{50} NOED NOEC	45.1 µg a.s./larva 100.7 µg a.s./larva > 100.1 µg a.s./larva > 650 mg a.s./kg food ≥ 100.1 µg a.s./larva ≥ 650 mg a.s./kg food
Apis mellifera	Preparation 'BAS 684 03 H'	Bee brood development	EC_{10} EC_{20} ED_{50} EC_{50} NOED NOEC	116.3 µg BAS 684 03 H/larva 124.7 µg BAS 684 03 H /larva > 133.4 µg BAS 684 03 H /larva > 844 mg BAS 684 03 H /kg food 66.7 µg BAS 684 03 H /larva 422 mg BAS 684 03 H/kg food

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Potential for accumulative toxicity: -
Semi-field test (Cage and tunnel test) -
Field tests -

Risk assessment for – 'BAS 684 03 H' at 500 g a.s./ha (worst case cereals GAP use)

Species	Test substance	Risk quotient	HQ	Trigger
Apis mellifera	a.s., BAS 684 H 500g a.s./ha	HQoral	<2.5	50
Apis mellifera	a.s., BAS 684 H 500g a.s./ha	HQcontact	<2.5	50
Apis mellifera	Preparation 'BAS 684 H 02 H' 679.32 g/ha *	HQoral	<2.3	50
Apis mellifera	Preparation 'BAS 684 H 02 H' 679.32 g/ha *	HQcontact	<2.5	50
-	a.s., preparation	ETRacute adult oral	-	-
-	a.s., preparation	ETRchronic adult oral	-	-
-	a.s., preparation	ETRlarvae	-	-
-	a.s., preparation	ETRhpg	-	-

* Taking into account the density of BAS 684 02 H of 1.020 g/cm^3

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
Typhlodromus pyri	Preparation 'BAS 684 03 H'	Mortality, LR_{50}	0.764 L/ha

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Species	Test Substance	End point	Toxicity
Aphidius rhopalosiphi	Preparation 'BAS 684 03 H'	Mortality, LR_{50}	0.136 L/ha
Additional species			
-			
-			

First tier risk assessment for – 'BAS 684 03 H' at 500 g a.s./ha (worst cereals case GAP use)

Test substance	Species	Effect (LR_{50} L/ha)	HQ in-field	HQ off-field[1]	Trigger
Preparation 'BAS 684 03 H'	*Typhlodromus pyri*	0.764 L/ha	0.872	0.024	2
Preparation 'BAS 684 03 H'	*Aphidius rhopalosiphi*	0.136 L/ha	**4.897**	0.135	2

[1] Using a drift rate of 2.77%
Bold indicates faling HQ value

Extended laboratory tests, aged residue tests

Species	Life stage	Test substance, substrate	Time scale	Dose (L/ha)[1,2]	End point	Corrected mortality[3]	Sublethal effects (%)	ER_{50}
Aphidius rhopalosiphi	Adults	Preparation 'BAS 684 03 H' on natural substrate (3D exposure)	Exposure: 2, 24 and 48 hrs. Reproduction phase: 24hrs Mummy development: 11 days	0.04375 0.0875 0.175 0.350 0.700	Mortality, reproduction	-3.6 0 -3.6 0 7.1	-16.0 -3.9 -2.6 -6.1 -5.2	>0.7 L/ha >0.7 L/ha
Aleochara bilineata	Adults	Preparation 'BAS 684 03 H' on natural substrate (2D exposure)	Exposure: 28d Parasitisation period: 7d Post parasitisation period: 5 weeks	0.7 1.4	Mortality, reproduction	n.d. n.d.	6.4 7.2	> 1.4 L/ha > 1.4 L/ha

[1] Initial residues
[2] Expressed in terms of the formulation
[3] Positive values indicate an increase in mortality; negative values indicate a decrease in mortality, relative to the control

Risk assessment for – [representative use] at [application rate] g a.s./ha [x number of applications] based on extended lab test or aged residue tests

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Species	ER_{50} (L/ha)	In-field rate	Off-field rate[1]
Aphidius rhopalosiphi	>0.7 L/ha	0.666	-
Aleochara bilineata	> 1.4 L/ha	0.666	-

[1]indicate distance assumed to calculate the drift rate and if 3D or 2D.

Semi-field tests
-
Field studies
-
Additional specific test
-

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	End point	Toxicity
Earthworms					
Eisenia andrei	a.s.	Mixed into soil/ 10 % peat	Chronic	Reproduction	EC_{10cor} **41.80** mg a.s./kg d.w.soil[#]
Eisenia andrei	Preparation 'BAS 684 03H'	Mixed into soil/ 10 % peat	Chronic	Reproduction	$NOEC_{10cor}$ 59.2 mg product/kg d.w.soil (**43.63** mg a.s./kg d.w.soil) [#]
Other soil macroorganisms					
Folsomia candida	Preparation 'BAS 684 03H'	Mixed into soil/ 5 % peat	Chronic	Reproduction	EC_{10cor} 91 mg product/kg d.w.soil (**67** mg a.s./kg d.w.soil)[#]
Hypoaspis aculeifer	Preparation 'BAS 684 03H'	Mixed into soil/ 5 % peat	Chronic	Reproduction	EC_{10cor} 138.8 mg product/kg d.w.soil (**102** mg a.s./kg d.w.soil)[#]

cor = corrected endpoint as log pow is > 2. [#] Uncertainty surrounding these studies, due to the volatile nature of cinmethylin further consideration is required. See RAR documents (Volume 3 CA and CP dossiers) for full details. Bold values used in risk assessment.

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

Consideration of volatilisation in risk assessment:

As detailed in the chemistry dossier (volume 3, CA section 2) the vapour pressure of cinmethylin is 8.1 x 10^{-3} Pa at 20 °C suggesting there is potential for volatilisation. The study Hassink 2017b (section B.8.3.2, volume 3, CA dossier) demonstrated relatively high volatilisation from soil for cinmethylin. The toxicity studies conducted did not follow the recommended steps in the relevant OECD guidelines for volatile test items. Therefore, currently it is not possible to conclude for soil organisms, noting this includes soil micro-organisms.

Nitrogen transformation	a.s.	-4.3 % effect at day 28 at 1.43 mg a.s./kg d.w.soil -1.3 % effect at day 28 at **7.17** mg a.s./kg d.w.soil
	Preparation 'BAS 684 03H'	+9.11 % effect at day 28 at 6.67 mg product/kg d.w.soil (**4.92** mg a.s/kg d.w.soil)

- = inhibition, + = stimulation, bold values used in risk assessment

Toxicity/exposure ratios for soil organisms

Single application to winter cereals at 500 g a.s./ha (worst case GAP for proposed uses)

Test organism	Test substance	Time scale	Soil PEC[1]	TER	Trigger
Earthworms					
Eisenia fetida	a.s.	Chronic	0.667	63	5
Eisenia fetida	Preparation 'BAS 684 03H'	Chronic	0.667	65	5
Other soil macroorganisms					
Folsomia candida	Preparation 'BAS 684 03H'	Chronic	0.667	100	5
Hypoaspis aculeifer	Preparation 'BAS 684 03H'	Chronic	0.667	153	5

[1] mg a.s./kg soil based on maximum initial PEC_{soil}

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)

Laboratory dose response tests (**spray drift**)

Species	Test substance	ER_{50} (g a.s./ha) vegetative vigour	ER_{50} (g a.s./ha) emergence	Exposure[1] (g a.s./ha)	TER (vegetative vigour/emergence)	Trigger
Most sensitive species (Ryegrass)	Preparation 'BAS 684 03H'	523.3	31.3	13.85	**2.26** / 38	5
Consideration of risk from spray drift: As refinement option, a probabilistic risk assessment approach based on SSD data was proposed using a median HC_5 value. However, the use of a median HC_5 was rejected due to wide confidence limits, inclusion of unbound values and differences in sensitivities between groups (monocotyledons were more sensitive than dicotyledons based on the available data). To allow for these uncertainties the lower 90 % confidence limit HC_5 (for						

monocotyledons) was used in the refined risk assessment. It should be noted this results in an endpoint lower than that considered in the first tier risk assessment i.e. HC_5 of 1.25 g a.s./ha and therefore does not address the risk.

As the risk from spraydrift for the proposed use was not resolved the following label mitigation was proposed:

'Extreme care must be taken to avoid spray drift onto non-crop plants outside of the target area.'

Consideration of risk from volatilisation:
As detailed in the environmental fate dossier (volume 3, CA) volatilisation of cinmethylin requires further consideration based on vapour pressure exceeding triggers of Vp = 10^{-5} Pa (plant) or 10^{-4} Pa (soil) at 20℃ as outlined in 283/2013 data requirements. Therefore, the applicant submitted a wind tunnel study further investigating volatilisation that has been evaluated in the fate dossier (Wallace (2017a), section B.8.3.2, volume 3, CA dossier).

It is noted that biological assessments were not made during the study, ideally ryegrass (most sensitive species based on available laboratory data) should have been exposed and any phytotoxicity recorded. Therefore, the laboratory studies were considered and an NOER of 21.9 ml product/ha equivalent to 16.1 g a.s./ha based on phytotoxicity derived.

There is no agreed risk assessment scheme for the evaluation of the risk to non-target plants from volatilisation. Given the lack of an agreed scheme and difficulties incorporating the exposure based on air concentration, the UK evaluator has focused on the aqueous deposition values determined in the wind tunnel study (Wallace (2017a)) to consider the risk from volatilisation. Based on the deposition values the maximum was 0.82 % at a 1-meter distance and 0.43 % at 5 meters. This has been considered in a quantitative assessment for the proposed uses (full details in RAR). The overall conclusion for non-target plants when considering the risk from volatilization was an acceptable risk for proposed use on winter oilseed rape. However, the proposed use on winter cereals (wheat and barley) requires a **buffer zone of 5 metres**, noting there is no agreed risk assessment scheme.

[1] based on Ganzelmeier drift data for worst case GAP (winter cereals). Bold value indicates potential risk that requires further consideration.

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	3 h EC_{50} > 1000 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.

None submitted.

Available monitoring data concerning effect of the PPP.

None submitted.

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

Compartment	
soil	Cinmethylin
water	Cinmethylin

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	**Cinmethylin (BAS 684H)**

Section 5 Ecotoxicology

sediment	Cinmethylin
groundwater	Cinmethylin

[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	Cinmethylin
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][7]:	Draft assessment not complete.
Peer review proposal[8] for harmonised classification according to Regulation (EC) No 1272/2008:	Acute category 1, H400 'Very toxic to aquatic life' (M factor: 10) Chronic category 1, H410 'Very toxic to aquatic life with long lasting effects' (M factor: 1)

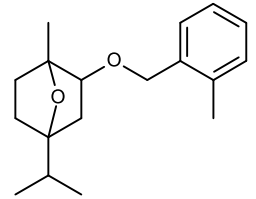
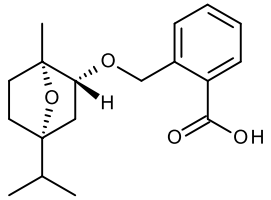
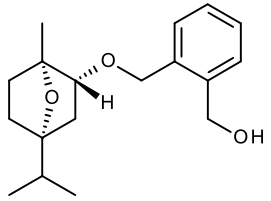
[7] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006. OJ L 353, 31.12.2008, 1-1355.

[8] It should be noted that harmonised classification and labelling is formally proposed and decided in accordance with Regulation (EC) No 1272/2008. Proposals for classification made in the context of the evaluation procedure under Regulation (EC) No 1107/2009 are not formal proposals.

List of end points

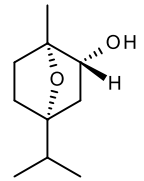
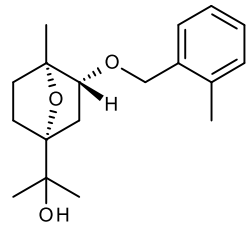
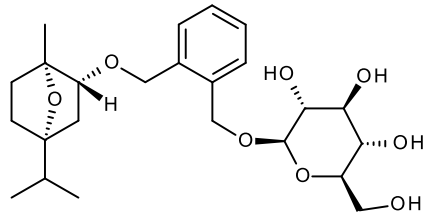
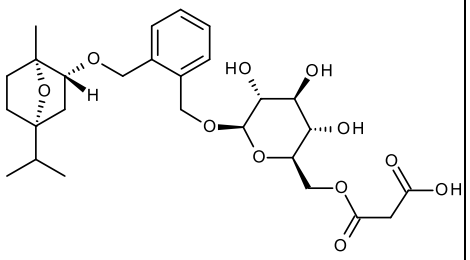
Evaluator	Month and year	Active substance
HSE	**November 2020**	

Used compounds code(s)

Code/Trivial name*	IUPAC name/SMILES notation	Structural formula
BAS 684 H (900202) (SD95481) (WL95481) (IN-YA168) (IN-42326) (N.B. 5103-156) **Cinmethylin**	(1RS,2SR,4SR)-1,4-epoxy-p-menth-2-yl 2-methylbenzyl ether Smiles Codes: C[C@@]12CC[C@](C[C@H]2OCc2ccccc2C)(O1)C(C)C	
M684H001 (6055521) (SD202193)	2-({[(1SR,2RS,4RS)-1-methyl-4-(propan-2-yl)-7-oxabicyclo[2.2.1]hept-2-yl]oxy}methyl)benzoic acid Smiles Codes: C[C@@]12CC[C@](C[C@H]2OCc2ccccc2C(=O)O)(O1)C(C)C	
M684H002 (6055479) (SD207856)	[2-({[(1SR,2RS,4RS)-1-methyl-4-(propan-2-yl)-7-oxabicyclo[2.2.1]hept-2-yl]oxy}methyl)phenyl]methanol Smiles Codes: C[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO)(O1)C(C)C	

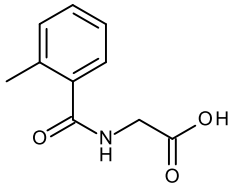
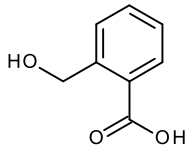
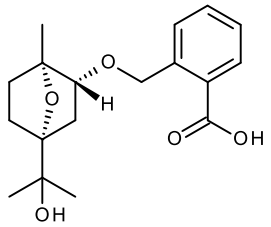
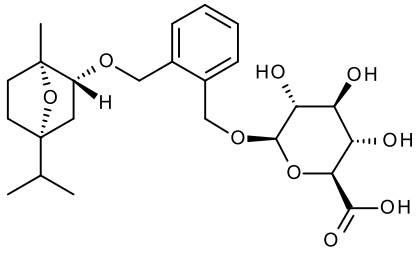
List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	

M684H003 (4539586) (SD93853) Cineole alcohol	(1SR,2RS,4RS)-1-methyl-4-(propan-2-yl)-7-oxabicyclo[2.2.1]heptan-2-ol Smiles Codes: C[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO)(O1)C(C)C	
M684H004 (6055480)	2-{(1RS,3RS,4SR)-4-methyl-3-[(2-methylbenzyl)oxy]-7-oxabicyclo[2.2.1]hept-1-yl}propan-2-ol Smiles Codes: C[C@@]12CC[C@](C[C@H]2OCc2ccccc2C)(O1)C(C)(C)O	
M684H005 (6067256)	[2-({[(1SR,2RS,4RS)-1-methyl-4-(propan-2-yl)-7-oxabicyclo[2.2.1]heptan-2-yl]oxy}methyl)phenyl]methyl beta-D-glucopyranoside Smiles Codes: C[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO[C@@H]2O[C@H](CO)[C@@H](O)[C@H](O)[C@H]2O)(O1)C(C)C	
M684H006 (6067258)	[2-({[(1SR,2RS,4RS)-1-methyl-4-(propan-2-yl)-7-oxabicyclo[2.2.1]heptan-2-yl]oxy}methyl)phenyl]methyl 6-O-(carboxyacetyl)-beta-D-glucopyranoside Smiles Codes: C[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO[C@@H]2O[C@H](COC(=O)CC(=O)O)[C@@H](O)[C@H](O)[C@H]2O)(O1)C(C)C	

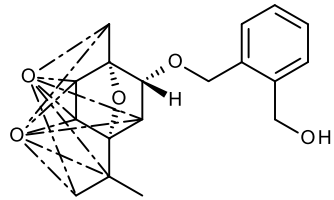
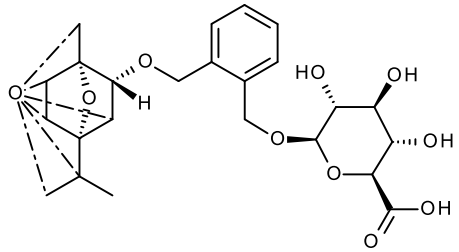
List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	

M684H009 (73032) (SD213341) 2-methyl-hippuric acid	N-(2-methylbenzoyl)glycine Smiles Codes: Cc1ccccc1C(=O)NCC(=O)O	
M684H010 (111609) (SD207859)	2-(hydroxymethyl)benzoic acid Smiles Codes: OCc1ccccc1C(=O)O	
M684H011 (6055478) (SD207574)	2-({[(1SR,2RS,4RS)-4-(2-hydroxypropan-2-yl)-1-methyl-7-oxabicyclo[2.2.1]hept-2-yl]oxy}methyl)benzoic acid Smiles Codes: C[C@@]12CC[C@](C[C@H]2OCc2ccccc2C(=O)O)(O1)C(C)(C)O	
M684H012 (6074715)	[2-({[(1SR,2RS,4RS)-1-methyl-4-(propan-2-yl)-7-oxabicyclo[2.2.1]heptan-2-yl]oxy}methyl)phenyl]methyl beta-D-glucopyranosiduronic acid Smiles Codes: C[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO[C@@H]2O[C@H](C(=O)O)[C@@H](O)[C@H](O)[C@H]2O)(O1)C(C	

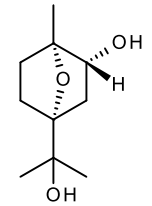
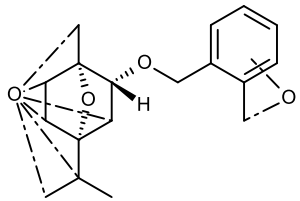
List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	

M684H021	- Smiles Codes: C[C@]12O[C@](CC1O)(C(O)[C@H]2OCc1ccccc1CO)C(C)C OC1C(O)[C@@]2(C[C@@H](OCc3ccccc3CO)[C@@]1(C)O2)C(C)C OC[C@]12O[C@](CC1O)(C[C@H]2OCc1ccccc1CO)C(C)C C[C@]12O[C@](CC1O)(C[C@H]2OCc1ccccc1CO)C(C)(C)O C[C@]12O[C@](CC1O)(C[C@H]2OCc1ccccc1CO)C(C)CO C[C@@]12CC(O)[C@@](O1)(C(O)[C@H]2OCc1ccccc1CO)C(C)C OC[C@@]12CC[C@@](O1)(C(O)[C@H]2OCc1ccccc1CO)C(C)C C[C@@]12CC[C@@](O1)(C(O)[C@H]2OCc1ccccc1CO)C(C)(C)O C[C@@]12CC[C@@](O1)(C(O)[C@H]2OCc1ccccc1CO)C(C)CO OC[C@@]12CC(O)[C@](C[C@H]2OCc2ccccc2CO)(O1)C(C)C C[C@@]12CC(O)[C@](C[C@H]2OCc2ccccc2CO)(O1)C(C)(C)O C[C@@]12CC(O)[C@](C[C@H]2OCc2ccccc2CO)(O1)C(C)CO OC[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO)(O1)C(C)(C)O OC[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO)(O1)C(C)CO C[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO)(O1)C(C)(O)CO C[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO)(O1)C(CO)CO	
M684H022	- Smiles Codes: C[C@@]12CC[C@@](O1)(C(O)[C@H]2OCc1ccccc1CO[C@@H]1O[C@H](C(=O)O)[C@@H](O)[C@H](O)[C@H]1O)C(C)C OC[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO[C@@H]2O[C@H](C(=O)O)[C@@H](O)[C@H](O)[C@H]2O)(O1)C(C)C C[C@]12O[C@](CC1O)(C[C@H]2OCc1ccccc1CO[C@@H]1O[C@H](C(=O)O)[C@@H](O)[C@H](O)[C@H]1O)C(C)C C[C@@]12CC(O)[C@](C[C@H]2OCc2ccccc2CO[C@@H]2O[C@H](C(=O)O)[C@@H](O)[C@H](O)[C@H]2O)(O1)C(C)C C[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO[C@@H]2O[C@H](C(=O)O)[C@@H](O)[C@H](O)[C@H]2O)(O1)C(C)(C)O C[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO[C@@H]2O[C@H](C(=O)O)[C@@H](O)[C@H](O)[C@H]2O)(O1)C(C)CO	

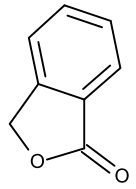
List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	

M684H026 (6059081)	(1SR,2RS,4RS)-4-(2-hydroxypropan-2-yl)-1-methyl-7-oxabicyclo[2.2.1]heptan-2-ol Smiles Codes: O[C@@H]1C[C@]2(CC[C@]1(C)O2)C(C)(C)O	
M684H039	- Smiles Codes: C[C@]12O[C@](CC1O)(C[C@H]2OCc1ccccc1CO)C(C)C C[C@]12O[C@](CC1O)(C[C@H]2OCc1cccc(O)c1C)C(C)C C[C@]12O[C@](CC1O)(C[C@H]2OCc1ccc(O)cc1C)C(C)C C[C@]12O[C@](CC1O)(C[C@H]2OCc1cc(O)ccc1C)C(C)C C[C@]12O[C@](CC1O)(C[C@H]2OCc1c(C)cccc1O)C(C)C C[C@@]12CC[C@@](O1)(C(O)[C@H]2OCc1ccccc1CO)C(C)C C[C@@]12CC[C@@](O1)(C(O)[C@H]2OCc1cccc(O)c1C)C(C)C C[C@@]12CC[C@@](O1)(C(O)[C@H]2OCc1ccc(O)cc1C)C(C)C C[C@@]12CC[C@@](O1)(C(O)[C@H]2OCc1cc(O)ccc1C)C(C)C C[C@@]12CC[C@@](O1)(C(O)[C@H]2OCc1c(C)cccc1O)C(C)C C[C@@]12CC(O)[C@](C[C@H]2OCc2ccccc2CO)(O1)C(C)C C[C@@]12CC(O)[C@](C[C@H]2OCc2cccc(O)c2C)(O1)C(C)C C[C@@]12CC(O)[C@](C[C@H]2OCc2ccc(O)cc2C)(O1)C(C)C C[C@@]12CC(O)[C@](C[C@H]2OCc2cc(O)ccc2C)(O1)C(C)C C[C@@]12CC(O)[C@](C[C@H]2OCc2c(C)cccc2O)(O1)C(C)C C[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO)(O1)C(C)(C)O C[C@@]12CC[C@](C[C@H]2OCc2cccc(O)c2C)(O1)C(C)(C)O C[C@@]12CC[C@](C[C@H]2OCc2ccc(O)cc2C)(O1)C(C)(C)O C[C@@]12CC[C@](C[C@H]2OCc2cc(O)ccc2C)(O1)C(C)(C)O C[C@@]12CC[C@](C[C@H]2OCc2c(C)cccc2O)(O1)C(C)(C)O C[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO)(O1)C(C)CO C[C@@]12CC[C@](C[C@H]2OCc2cccc(O)c2C)(O1)C(C)CO C[C@@]12CC[C@](C[C@H]2OCc2ccc(O)cc2C)(O1)C(C)CO C[C@@]12CC[C@](C[C@H]2OCc2cc(O)ccc2C)(O1)C(C)CO C[C@@]12CC[C@](C[C@H]2OCc2c(C)cccc2O)(O1)C(C)CO OC[C@@]12CC[C@](C[C@H]2OCc2ccccc2CO)(O1)C(C)C OC[C@@]12CC[C@](C[C@H]2OCc2cccc(O)c2C)(O1)C(C)C OC[C@@]12CC[C@](C[C@H]2OCc2ccc(O)cc2C)(O1)C(C)C OC[C@@]12CC[C@](C[C@H]2OCc2cc(O)ccc2C)(O1)C(C)C OC[C@@]12CC[C@](C[C@H]2OCc2c(C)cccc2O)(O1)C(C)C	

List of end points

Evaluator	Month and year	Active substance
HSE	**November 2020**	

M684H059 (18851) (SD637 Phthalide; FL-No 10.056	2-benzofuran-1(3H)-one Smiles Codes: O=C1OCc2ccccc12	

* The compound code / trivial name in bold is the name used in the list of endpoints.