



Draft Assessment Report

Evaluation of Active Substances

Plant Protection Products

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

Elemental iron

Volume 3 – B.3 (AS)

Great Britain

January 2024

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B.3. DATA ON APPLICATION

B.3.1. USE OF THE ACTIVE SUBSTANCE

Elemental iron is a low risk molluscicide for the reduction of feeding damage in a range of agricultural and horticultural crops. The originally proposed uses in D1 are given as ‘All edible and non edible crops’ and ‘amenity vegetation’. This broad term is no longer acceptable and crops must be supported by data or extrapolation. This is to promote targeted, responsible use of molluscicide products by ensuring the GAP table reflects the relevant uses. Under Regulation 1107 Annex II point 3.2 it is stated that “an active substance alone or associated with a safener or synergist shall only be approved where it has been established for one or more representative uses that the plant protection product, consequent on application consistent with good plant protection practice and having regard to realistic conditions of use is sufficiently effective”. Adama have demonstrated efficacy and crop safety of the representatives uses on cereals, oilseed rape, cabbage, kohlrabi, lettuce, Chinese cabbage, fruit crops, ornamentals, root vegetables, tubers and field crop plants. This is sufficient to meet the requirements set with Regulation 1107. However, the individual claims and uses will all be assessed in detail at product authorisation stage.

This is in line with the principles established in SANCO/10054/2013 - rev. 3 ‘Guidance Document on Data Requirements on Efficacy for the Dossier to be Submitted for the Approval of New Active Substances Contained in Plant Protection Products’ where the ‘principal objective of the efficacy evaluation of an active substance is to confirm that the doses are realistic for the GAP submitted for risk evaluation and approval and representative for all subsequent authorisations.’

The proposed uses are as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Use- No. (e)	Region	Crop and/ or situation (crop destination / purpose of crop)	F, G, or I	Pests Group or of pests controlled (additionally: developmental stages of the pest or pest group)	Application				Application rate			PHI (days)	Remarks: e.g. g safener/sy nergist per ha (f)
					Meth od / Kind	Timing / Growth stage of crop & season	Max. number a) per use b) per crop/ season	Min. interval between applicat ions (days)	kg product / ha a) max. rate per appl. b) max. total rate per crop/seaso n	kg as/ha a) max. rate per appl. b) max. total rate per crop/seas on	Water L/ha min / max		

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Use- No. (e)	Region	Crop and/ or situation (crop destination / purpose of crop)	F, G, or I	Pests or Group pests controlled (additionally: developmental stages of the pest or pest group)	Application				Application rate			PHI (days)	Remarks: e.g. g safener/sy nergist per ha (f)
					Meth od / Kind	Timing / Growth stage of crop & season	Max. number a) per use b) per crop/ season	Min. interval between applicat ions (days)	kg product / ha a) max. rate per appl. b) max. total rate per crop/seaso n	kg as/ha a) max. rate per appl. b) max. total rate per crop/seas on	Water L/ha min / max		
1	GB	Cereals (YCERE)	F	Slugs (DERORE, ARIOSS)	RB	pre-emergenc e (BBCH 00-08)	a) 1 b) 6	5 Days	a) 8 b) 48	a) 0.08 b) 0.48	N/A		Representa tive use.
2	GB	Oilseed rape (BRSNN)	F	Slugs (DERORE, ARIOSS)	RB	Pre and post emergenc e (BBCH 00-14)	a) 1 b) 6	5 Days	a) 8 b) 48	a) 0.08 b) 0.48	N/A		Representa tive use.
3	GB	Cabbage (BRSOL)	F	Slugs (DERORE, ARIOSS)	RB	Post emergenc e (BBCH 12-14)	a) 1 b) 6	5 Days	a) 8 b) 48	a) 0.08 b) 0.48	N/A		Representa tive use.
4	GB	Kohlrabi (BRSOG)	F	Slugs (DERORE, ARIOSS)	RB	Post emergenc e (BBCH 14)	a) 1 b) 6	5 Days	a) 8 b) 48	a) 0.08 b) 0.48	N/A		Representa tive use.
5	GB	Lettuce (LACSA)	F	Slugs (DERORE, ARIOSS)	RB	Post emergenc e (BBCH 13-16)	a) 1 b) 6	5 Days	a) 8 b) 48	a) 0.08 b) 0.48	N/A		Representa tive use.
6	GB	Chinese cabbage (BRSPK)	F	Slugs (DERORE, ARIOSS)	RB	Post emergenc e (BBCH 12-14)	a) 1 b) 6	5 Days	a) 8 b) 48	a) 0.08 b) 0.48	N/A		Representa tive use.
7	GB	Strawberry (FRAAN)	F	Slugs and snails (HELXAS, CEPANE, DERORE, ARIOSS)	RB	Post emergenc e (BBCH 87-99)	a) 1 b) 6	5 Days	a) 8 b) 48	a) 0.08 b) 0.48	N/A		Representa tive use.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Use- No. (e)	Region	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)	Application				Application rate			PHI (days)	Remarks: e.g. g safener/sy nergist per ha (f)
					Meth od / Kind	Timing / Growth stage of crop & season	Max. number a) per use b) per crop/ season	Min. interval between applicat ions (days)	kg product / ha a) max. rate per appl. b) max. total rate per crop/seaso n	kg as/ha a) max. rate per appl. b) max. total rate per crop/seas on	Water L/ha min / max		
8	GB	Fruit crops (3FRUC)	F	Slugs (DERORE, ARIOSS)	RB	Post emergenc e (BBCH 87-99)	a) 1 b) 6	5 Days	a) 8 b) 48	a) 0.08 b) 0.48	N/A		Representa tive use.
9	GB	Ornamental s (3ORTC)	F	Slugs (DERORE, ARIOSS)	RB	Post emergenc e (BBCH 12-51)	a) 1 b) 6	5 Days	a) 8 b) 48	a) 0.08 b) 0.48	N/A		Representa tive use.
10	GB	Potato (SOLTU)	F	Slugs (MILXBU)	RB	Post emergenc e (BBCH 31-89)	a) 1 b) 6	5 Days	a) 8 b) 48	a) 0.08 b) 0.48	N/A		Representa tive use.
11	GB	Root vegetables (NNNVW)	F	Slugs (MILXBU)	RB	Post emergenc e (BBCH 31-89)	a) 1 b) 6	5 Days	a) 8 b) 48	a) 0.08 b) 0.48	N/A		Representa tive use.
12	GB	Tubers (NNNZK)	F	Slugs (MILXBU)	RB	Post emergenc e (BBCH 31-89)	a) 1 b) 6	5 Days	a) 8 b) 48	a) 0.08 b) 0.48	N/A		Representa tive use.
13	GB	Field crop plants (NNNAC)	F	Slugs (MILXBU, DERORE, ARIOSS)	RB	Post emergenc e (BBCH 87-99)	a) 1 b) 6	5 Days	a) 8 b) 48	a) 0.08 b) 0.48	N/A		Representa tive use.

B.3.2. FUNCTION

Elemental iron is used as a molluscicide for the control of slugs and snails at a dose of 0.08kg a.s/ha with a maximum rate per crop of 0.48kg a.s/ha per year.

B.3.3. EFFECTS ON HARMFUL ORGANISMS

Elemental iron bait is ingested by the slug or snail. Contact with the low pH gastric digestive fluid inside the mollusc makes the elemental iron soluble. The iron binds to the [REDACTED] in the stomach and an iron salt complex is formed. The iron [REDACTED] causes slugs and snails to stop feeding by interrupting oxygen transport and causing oxidative stress/anoxia, resulting in death. Due to the mode of action of elemental iron no slimy secretions are observed on the soil surface and affected slugs will often go underground to die.

B.3.4. FIELD OF USE ENVISAGED

ADAMA propose that Elemental iron is intended to be used in agriculture and horticulture on all edible crops (vegetables, fruit crops and arable crops) and non edible crops subjected to snail and slug pressure in the field and greenhouses. The following table summarises the intended uses below.

Crop and/ or situation	Region	Product name	F G or I	Pests or Group of pests controlled	Formulation		Application				Application rate per treatment			PHI (days) (l)	Remarks: (m)
					Type	Conc. of as	Method Kind	Growth stage & season	number min max	interval between applications (days)	kg as/hl min max	water L/ha min max	kg as/ha min max		
(a)			(b)	(c)	(d-f)	(i)	(f-h)								

All edible and non edible crops (outdoor & protected)	GB	Iron 1% RB	F/G/I	Molluscs	RB	10 g/kg	Spreading	When infestation appears (peak mainly in spring & autumn)	1-6	Minimum 5	Not applicable because the product is intended to be applied as a ready to use granular bait	Not applicable because the product is intended to be applied as a ready to use granular bait	0.08	Not required	Maximum Seasonal application rate 0.48 kg as/ha
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Crop and/ or situation (a)	Region	Product name	F G or I (b)	Pests or Group of pests controlled (c)	Formulation		Application				Application rate per treatment			PHI (days) (l)	Remarks: (m)
					Type	Conc. of as	Method Kind	Growth stage & season (j)	number min max (k)	interval between applications (days)	kg as/hl min max	water L/ha min max	kg as/ha min max		
Amenity Vegetation	GB	Iron 1% RB	F/G/I	Molluscs	RB	10 g/kg	Spreading	When infestation appears (peak mainly in spring & autumn)	1-6	Minimum 5	Not applicable because the product is intended to be applied as a ready to use granular bait	Not applicable because the product is intended to be applied as a ready to use granular bait	0.08	Not required	Maximum Seasonal application rate 0.48 kg as/ha

- (a) For crops, the EU and Codex classifications (both) should be taken into account; where relevant, the use situation should be described (e.g. fumigation of a structure)
- (b) Outdoor or field use (F), greenhouse application (G) or indoor application (I)
- (c) e.g. biting and 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 No 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. fluoroxypr). **In certain cases, where only one variant is synthesised, it is more appropriate to give the rate for the variant (e.g. benthiavalicarb-isopropyl).**
- (j) Growth stage 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

B.3.5. HARMFUL ORGANISMS CONTROLLED AND CROPS OR PRODUCTS PROTECTED OR TREATED

Elemental iron formulated as a 10g/kg RB formulation has been tested widely on slugs and snails in a range of crops. The specific claims will be considered in subsequent product authorisations.

Details of harmful organisms against which protection is afforded are presented below:

Crop	Crop code	Disease/Organism	Disease/Organism code
Oilseed rape	BRSNN	Slugs	DERORE, ARIOSS
Cereals	YCERE	Slugs	DERORE, ARIOSS
Cabbage	BRSOL	Slugs	DERORE, ARIOSS
Kohlrabi	BRSOG	Slugs	DERORE, ARIOSS
Lettuce	LACSA	Slugs	DERORE, ARIOSS
Chinese cabbage	BRSPK	Slugs	DERORE, ARIOSS
Fruit crops	3FRUC	Slugs	DERORE, ARIOSS
Strawberry	FRAAN	Slugs and snails	HELXAS, CEPANE, DERORE, ARIOSS
Ornamentals	3ORTC	Slugs	DERORE, ARIOSS
Potato	SOLTU	Slugs	MILXBU
Root vegetables	NNNVW	Slugs	MILXBU
Tubers	NNNZK	Slugs	MILXBU
Field crop plants	NNNAC	Slugs	MILXBU, DERORE, ARIOSS

B.3.6. MODE OF ACTION

Elemental iron is an inorganic compound that kills slugs and snails by stopping feeding due to interrupting the oxygen transport which causes oxidative stress/ anoxia within the slugs & snails. This results in the death of the molluscs.

It is not systemic in plants and does not belong to a specific mode of action group and its resistance classification is not expressed.

B.3.7. INFORMATION ON THE OCCURRENCE OR POSSIBLE OF THE DEVELOPMENT OF RESISTANCE AND APPROPRIATE MANAGEMENT STRATEGIES

The development of resistance is considered unlikely because of the physiological mode of action of elemental iron. The iron salt formed on contact with the low pH gastric digestive fluid of the mollusc interferes with haemocyanin, the respiratory pigment of the snail's haemolymph, interfering with the uptake of oxygen. It is unlikely that a change leading to the possible development of resistance can occur in this biological pathway, which has taken millions of years to evolve and remain stable for gas exchange.

Slugs surviving baits containing elemental iron show no aversion against baits thereafter. As elemental iron is not persistent the selection pressure on the target organisms occurs only temporarily.

Elemental iron is a new active substance to GB. No resistance to other active substances (ferric phosphate and metaldehyde) has been reported in molluscs, despite years of extensive use. The mode of action of elemental iron is similar to ferric phosphate and no resistance is currently known.

B.3.8. REFERENCES RELIED ON

Data Point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Data protection claimed Y/N	Justification if data protection is claimed	Owner	Previous evaluation
M-CP Section 6	Adama	2019	Elemental iron M-CP Section 6	N	Y	Y	Adama	N
M-CA Section 3	Adama	2018	Elemental iron M-CA, Section 3	N	Y	Y	Adama	N
Document D	Adama	2018	Elemental iron Document D	N	Y	Y	Adama	N
Document C	Adama	2018	Elemental iron Document C	N	Y	Y	Adama	N