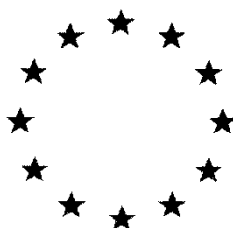


European Commission



**Draft Assessment Report prepared according to the Commission
Regulation (EU) N° 1107/2009**

ISOFLUCYPRAM

Volume 3 – B.3 (AS)

**Rapporteur Member State : United Kingdom
Co-Rapporteur Member State : France**

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B.3. DATA ON APPLICATION

This Renewal Assessment Report has been drafted by the Rapporteur Member State based on the information submitted by the applicant in Documents M-CA, Section 3. Limited efficacy information is required for new actives and this has been provided by the applicant under the appropriate headings in part MCA3 in line with the guidance for renewals – ‘Guidance Document on the renewal of approval of active substances to be assessed in compliance with Regulation (EU) No 844/2012 (SANCO/2012/11251)’.

B.3.1. USE OF THE ACTIVE SUBSTANCE

Isoflucypram is a new active substance for agricultural use as a foliar fungicide spray application on cereals.

The proposed uses are as follows;

Details of intended uses and Conditions of use according to Good Agricultural Practice (GAP)

Crop and/or situation	Member State or Country	F G or I	Pests or Group of pests controlled	Formulation		Application				Application rate per treatment			PHI (days)	Remarks
				Type/ Conc. of a.s.	Rate L/ha	Method / Kind	Timing/ Growth stage of crop & season	Number min max	Interval between applic. min (days)	kg a.s./hL	Water L/ha	kg a.s./ha		
(a)		(b)	(c)	(d-f)		(g-h)	(i)	(k)		min max	min max	min max	(l)	(m)
wheat	EU	F	<i>Mycosphaerella graminicola</i> , <i>Puccinia recondita</i> , <i>Puccinia striiformis</i> , <i>Pyrenophora tritici-repentis</i>	EC50	1.5	Foliar spray	BBCH 30-69	1	-	-	100-400	0.075	*	* A Pre-Harvest-Interval for use in wheat (including durum wheat and spelt), rye and triticale is not applicable; the timing is defined by the growth stage at application.
rye	EU	F	<i>Puccinia recondita</i> , <i>Rhynchosporium secalis</i>	EC50	1.5	Foliar spray	BBCH 30-69	1	-	-	100-400	0.075	*	
triticale	EU	F	<i>Mycosphaerella graminicola</i> , <i>Puccinia recondita</i> , <i>Puccinia striiformis</i> , <i>Pyrenophora tritici-repentis</i>	EC50	1.5	Foliar spray	BBCH 30-69	1	-	-	100-400	0.075	*	
barley	EU	F	<i>Rhynchosporium secalis</i> , <i>Pyrenophora teres</i> , <i>Puccinia hordei</i> , <i>Ramularia collo-cygni</i>	EC50	1.5	Foliar spray	BBCH 30-61	1	-	-	100-400	0.075	*	* A Pre-Harvest-Interval for use in barley and oats is not applicable; the timing is defined by the growth stage at application.
oats	EU	F	<i>Puccinia coronata</i> , <i>Pyrenophora avenae</i>	EC50	1.5	Foliar spray	BBCH 30-61	1	-	-	100-400	0.075	*	

Remarks: (a) For crops, Codex (or other, e.g. EU) classifications should be used; where relevant, the use situation should be described (e.g. fumigation of a structure)
(b) Outdoor or field use (F), glasshouse application (G) or indoor application (I)
(c) e.g. biting and sucking insects, soil born insects, foliar fungi, weeds
(d) Kind, e.g. overall, broadcast, aerial spraying, row, individual plant, between the plants
(e) type of equipment used must be indicated
(f) g/kg or g/L
(g) Growth stage at last treatment (BBCH Monograph, Growth Stages of Plants, 1997, Blackwell, ISBN 3-

B.3.2. FUNCTION

Fungicide

B.3.3. EFFECTS ON HARMFUL ORGANISMS

Isoflucypram belongs to the class of SDHI fungicides and is a novel broad spectrum fungicide of the chemical class of N-cyclopropyl-N-benzyl-pyrazole-carboxamides. It relies on foliar uptake and has systemic activity being first absorbed by the cuticle and then translocated in plant tissues via the xylem stream.

It is intended to provide control of a range of diseases of cereal crops (wheat, triticale, rye, barley and oats) caused by fungi from the classes of *Ascomycetes*, *Basidiomycetes* and *Deuteromycetes*. In wheat, ISY EC 50 was applied for the control of *Mycosphaerella graminicola* and *Puccinia recondita/Puccinia tritricina* and in barley for the control of *Pyrenophora teres* and *Rhynchosporium secalis*. These are major representative target diseases and are considered to support the proposed GAP.

Isoflucypram belongs to FRAC resistance group 7 and its mode of action is through the inhibition of the fungal enzyme succinate dehydrogenase resulting in inhibition of spore germination and/or a reduction in germ tube elongation at the leaf surface.

B.3.4. FIELD OF USE ENVISAGED

Isoflucypram is to be used as a broad spectrum foliar fungicide in cereals. The intended uses comprise winter- and spring-wheat (including Durum wheat and spelt), winter- and spring-barley, rye, triticale, and oats.

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

The list of harmful organisms controlled is presented below having been taken from the applicant's intended uses (Document: [D D 1 01 M-612534 0004506221](#))

Details of intended uses and Conditions of use according to Good Agricultural Practice (GAP)

Crop and/or situation (a)	Member State or Country (b)	F G or I (c)	Pests or Group of pests controlled (d-f)	Formulation		Application				Application rate per treatment			PHI (days) (l)	Remarks (m)
				Type/ Conc. of a.s. (d-f)	Rate L/ha (g-h)	Method / Kind (g-h)	Timing/ Growth stage of crop & season (j)	Number min max (k)	Interval between applic. min (days) (l)	kg a.s./hL min max	Water L/ha min max	kg a.s./ha min max		
wheat	EU	F	<i>Mycosphaerella graminicola</i> , <i>Puccinia recondita</i> , <i>Puccinia striiformis</i> , <i>Pyrenophora tritici-repentis</i>	EC50	1.5	Foliar spray	BBCH 30-69	1	-	-	100-400	0.075	*	* A Pre-Harvest-Interval for use in wheat (including durum wheat and spelt), rye and triticale is not applicable; the timing is defined by the growth stage at application.
rye	EU	F	<i>Puccinia recondita</i> , <i>Rhynchosporium secalis</i>	EC50	1.5	Foliar spray	BBCH 30-69	1	-	-	100-400	0.075	*	
triticale	EU	F	<i>Mycosphaerella graminicola</i> , <i>Puccinia recondita</i> , <i>Puccinia striiformis</i> , <i>Pyrenophora tritici-repentis</i>	EC50	1.5	Foliar spray	BBCH 30-69	1	-	-	100-400	0.075	*	
barley	EU	F	<i>Rhynchosporium secalis</i> , <i>Pyrenophora teres</i> , <i>Puccinia hordei</i> , <i>Ramularia collo-cygni</i>	EC50	1.5	Foliar spray	BBCH 30-61	1	-	-	100-400	0.075	*	* A Pre-Harvest-Interval for use in barley and oats is not applicable; the timing is defined by the growth stage at application.
oats	EU	F	<i>Puccinia coronata</i> , <i>Pyrenophora avenae</i>	EC50	1.5	Foliar spray	BBCH 30-61	1	-	-	100-400	0.075	*	

Remarks: (a) For crops, Codex (or other, e.g. EU) classifications should be used; where relevant, the use situation should be described (e.g. fumigation of a structure)
 (b) Outdoor or field use (F), glasshouse application (G) or indoor application (I)
 (c) e.g. biting and sucking insects, soil born insects, foliar fungi, weeds
 (d) Kind, e.g. overall, broadcast, aerial spraying, row, individual plant, between the plants
 (e) type of equipment used must be indicated
 (f) g/kg or g/L
 (g) Growth stage at last treatment (BBCH Monograph, Growth Stages of Plants, 1997, Blackwell, ISBN 3-

B.3.6. MODE OF ACTION

The applicant has provided the following information on the mode of action.

The biochemical mode of action of isoflucypram has been shown to rely on the inhibition of the fungal enzyme succinate dehydrogenase, which is part of the mitochondrial respiration chain. The inhibition of this enzyme is affecting both, the generation of energy as well as the formation of precursors needed for the synthesis of essential cellular compounds such as amino acids within the target fungus.

At the biological level, this corresponds to an inhibition of spore germination and/or a reduction in germ tube elongation at the surface of the plant. Moreover, the appressorium formation is affected and the fungus is unable to penetrate through the host tissue. In case isoflucypram is applied after the fungus has already penetrated the plant tissue, isoflucypram is able to inhibit further fungal growth due to its intrinsic curativity.

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

The applicant has provided the following case for resistance;

“As an SDH isoflucypram is assigned to FRAC Group 7. Therefore, to fulfil the requirements of an effective anti-resistance management strategy, isoflucypram will be offered in mixtures with non cross-resistant fungicides from different chemical classes with alternate biochemical modes of action delivering highly active solutions. These tailor-made and broad spectrum combinations of isoflucypram show – beside the long-lasting efficacy – highly beneficial properties in terms of plant physiology enabling treated crops to exhibit good disease control to maximize their full yield potential.”

However the zRMS has re-summarised this information in line with the steps outlined in EPPO standard PP1/213 (4).

Mode of action

Isoflucypram belongs to the chemical class of Succinate DeHydrogenase Inhibitor (SDHI) fungicides. It's mode of action has been shown to rely on the inhibition of the fungal enzyme succinate dehydrogenase resulting in the inhibition of spore germination and/or a reduction in germ tube elongation at the leaf surface.

Mechanisms of resistance

Although isoflucypram is a new active it shares the resistance risk typical for all SDHI fungicides. Resistance is known in various fungal species in field populations and lab mutants. Target site mutations in *sdh* gene, e.g. H/Y (or H/L) at 257, 267, 272 or P225L, dependent on fungal species. FRAC classifies SDHI fungicides as “medium to high risk”. The number and frequency of isolates with reduced sensitivity to SDHI fungicides is increasing hence the resistance type characteristic for SDHI is best described as "continuous selection" or "shifting". Resistance management is therefore required.

Evidence of resistance

As isoflucypram is a new active there are no specific reported cases of resistance. However, isoflucypram is a SDHI fungicide so will likely share the resistance risk typical for all other SDHI fungicides. No further evidence has been provided but this will be considered further as part of the product authorisation. The applicant is a member of the FRAC SDHI Working group and is known to actively monitor key diseases to assess sensitivity shifts.

The current FRAC SDHI Working group recommendations provide the following guidance for the use of foliar application on cereals

Resistance management for SDHI fungicides in general

- ☐ Apply SDHI fungicides always in mixtures
- ☐ The mixture partner should provide satisfactory disease control when used alone on the target disease and must have a different mode of action.
- ☐ Apply a maximum of 2 SDHI fungicide containing sprays per cereal crop.
- ☐ Apply the SDHI fungicide preventively or as early as possible in the disease cycle. Do not rely only on the curative potential of SDHI fungicides.
- ☐ Strongly reduced rate programs including multiple applications must not be used. Refer to manufacturers' recommendations for rates.

Resistance risk conclusion

The zRMS considers that isoflucypram represents an acceptable resistance risk when the appropriate resistance risk modifiers for SDHI fungicides are in use. However, the risk of resistance will require further consideration by the applicant at the National level during the product evaluation process.

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
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a