CONCLUSION ON PESTICIDE PEER REVIEW

Conclusion on the peer review of the pesticide risk assessment of the active substance etridiazole[1]

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SUMMARY

Etridiazole is one of the 84 substances of the third stage part B of the review programme covered by Commission Regulation (EC) No 1490/2002,[3] as amended by Commission Regulation (EC) No 1095/2007.[4] In accordance with the Regulation, at the request of the Commission of the European Communities (hereafter referred to as 'the Commission'), the EFSA organised a peer review of the initial evaluation, i.e. the Draft Assessment Report (DAR), provided by the Netherlands, being the designated rapporteur Member State (RMS). The peer review process was subsequently terminated following the applicant's decision, in accordance with Article 11e, to withdraw support for the inclusion of etridiazole in Annex I to Council Directive 91/414/EEC.

Following the Commission Decision of 5 December 2008 (2008/934/EC)[5] concerning the non-inclusion of etridiazole in Annex I to Council Directive 91/414/EEC and the withdrawal of authorisations for plant protection products containing that substance, the applicant Chemtura Europe Ltd made a resubmission application for the inclusion of etridiazole in Annex I in accordance with the provisions laid down in Chapter III of Commission Regulation (EC) No. 33/2008.[6] The resubmission dossier included further data in response to the issues identified in the DAR.

In accordance with Article 18 of Commission Regulation (EC) No. 33/2008, the Netherlands, being the designated RMS, submitted an evaluation of the additional data in the format of an Additional Report. The Additional Report was received by the EFSA on 2 December 2009.

In accordance with Article 19 of Commission Regulation (EC) No. 33/2008, the EFSA distributed the Additional Report to Member States and the applicant for comments on 4 December 2009. The EFSA collated and forwarded all comments received to the Commission on 15 January 2010.

In accordance with Article 20, following consideration of the Additional Report, the comments received, and where necessary the DAR, the Commission requested the EFSA to conduct a focused peer review in the area of mammalian toxicology and deliver its conclusions on etridiazole.

The conclusions laid down in this report were reached on the basis of the evaluation of the representative uses of etridiazole as a fungicide on glasshouse grown fruiting vegetables and cut

[1] On request from the European Commission, Question No EFSA-Q-2010-00147, issued on 24 September 2010.
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[3] OJ L224, 21.8.2002, p.25
[4] OJ L 246, 21.9.2007, p.19
[5] OJ L 333, 11.12.2008, p.11
[6] OJ L 15, 18.1.2008, p.5

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flowers in non-soil production systems, as proposed by the applicant. Full details of the representative uses can be found in Appendix A to this report.

Data gaps have been identified in the section on identity, physical and chemical properties and analytical methods.

Data gaps were identified in the toxicology section to address the relevance of the impurities present in the technical specification, and the toxicological profile of the plant metabolites 5-hydroxy-ethoxyetridiazole acid and 3-hydroxymethyl etridiazole.

The plant residue definition was provisionally proposed as the sum of etridiazole and metabolites 5-hydroxy-ethoxyetridiazole acid and 3-hydroxymethyl etridiazole (and its conjugates), pending the conclusion on the toxicological profile of these two metabolites. A data gap was set to provide a full residue data set where samples are analysed according to the proposed residue definition and as a consequence the consumer risk assessment could not be performed for the representative uses on fruiting vegetables.

The data available on fate and behaviour in the environment were considered insufficient to carry out a complete environmental exposure assessment at the EU level for the representative uses. The necessary estimations for short-range and long-range transport for the metabolite etridiazole acid were not available. No estimations for the leaching potential were available for etridiazole and its potentially volatile metabolites, which can potentially reach the environment outside of the glasshouses via deposition after volatilisation.

A data gap was identified for assessment of the compliance of ecotoxicological test material with the technical specification of the five-batch analysis. A data gap remains for the applicant to address the risk to soil-dwelling organisms from the volatilization-deposition of etridiazole and all routes of formation of dichloro-etridiazole and etridiazole acid. Buffer zones of 5 m to water bodies are required for the intended use in ornamentals.

KEY WORDS

Etridiazole, peer review, risk assessment, pesticide, fungicide

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BACKGROUND

Legislative framework

Commission Regulation (EC) No 1490/2002,[7] as amended by Commission Regulation (EC) No 1095/2007[8] lays down the detailed rules for the implementation of the third stage of the work programme referred to in Article 8(2) of Council Directive 91/414/EEC. This regulates for the European Food Safety Authority (EFSA) the procedure for organising, upon request of the Commission of the European Communities (hereafter referred to as 'the Commission'), a peer review of the initial evaluation, i.e. the Draft Assessment Report (DAR), provided by the designated rapporteur Member State.

Commission Regulation (EC) No 33/2008[9] lays down the detailed rules for the application of Council Directive 91/414/EEC for a regular and accelerated procedure for the assessment of active substances which were part of the programme of work referred to in Article 8(2) of Council Directive 91/414/EEC but which were not included in Annex I. This regulates for the EFSA the procedure for organising the consultation of Member States and the applicant for comments on the Additional Report provided by the designated RMS, and upon request of the Commission the organisation of a peer review and/or delivery of its conclusions on the active substance.

Peer review conducted in accordance with Commission Regulation (EC) No 1490/2002

Etridiazole is one of the 84 substances of the third stage part B of the review programme covered by Commission Regulation (EC) No 1490/2002, as amended by Commission Regulation (EC) No 1095/2007. In accordance with the Regulation, at the request of the Commission, the EFSA organised a peer review of the DAR provided by the designated rapporteur Member State, the Netherlands, which was received by the EFSA on 23 April 2007 (Netherlands, 2007).

The peer review was initiated on 7 August 2007 by dispatching the DAR to Member States and the applicant Chemtura Netherlands B.V. for consultation and comments. In addition, the EFSA conducted a public consultation on the DAR. The comments received were collated by the EFSA and forwarded to the RMS for compilation and evaluation in the format of a Reporting Table.

The peer review process was subsequently terminated following the applicant's decision, in accordance with Article 11e, to withdraw support for the inclusion of etridiazole in Annex I to Council Directive 91/414/EEC.

Peer review conducted in accordance with Commission Regulation (EC) No 33/2008

Following the Commission Decision of 5 December 2008 (2008/934/EC)[10] concerning the non-inclusion of etridiazole in Annex I to Council Directive 91/414/EEC and the withdrawal of authorisations for plant protection products containing that substance, the applicant Chemtura Europe Ltd made a resubmission application for the inclusion of etridiazole in Annex I in accordance with the provisions laid down in Chapter III of Commission Regulation (EC) No. 33/2008. The resubmission dossier included further data in response to the issues identified in the DAR in the areas of methods of analysis and residues.

In accordance with Article 18, the Netherlands, being the designated RMS, submitted an evaluation of the additional data in the format of an Additional Report (Netherlands, 2009). The Additional Report was received by the EFSA on 2 December 2009.

[7] OJ L224, 21.8.2002, p.25
[8] OJ L246, 21.9.2007, p.19
[9] OJ L 15, 18.1.2008, p.5
[10] OJ L 333, 11.12.2008, p.11

In accordance with Article 19, the EFSA distributed the Additional Report to Member States and the applicant for comments on 4 December 2009. In addition, the EFSA conducted a public consultation on the Additional Report. The EFSA collated and forwarded all comments received to the Commission on 15 January 2010. At the same time, the collated comments were forwarded to the RMS for compilation in the format of a Reporting Table. The applicant was invited to respond to the comments in column 3 of the Reporting Table. The comments and the applicant's response were evaluated by the RMS in column 3.

In accordance with Article 20, following consideration of the Additional Report, the comments received, and where necessary the DAR, the Commission decided to further consult the EFSA. By written request, received by the EFSA on 24 February 2010, the Commission requested the EFSA to arrange a consultation with Member State experts as appropriate and deliver its conclusions on etridiazole within 6 months of the date of receipt of the request, subject to an extension of a maximum of 90 days where further information were required to be submitted by the applicant in accordance with Article 20(2).

The scope of the peer review and the necessity for additional information, not concerning new studies, to be submitted by the applicant in accordance with Article 20(2), was considered in a telephone conference between the EFSA, the RMS, and the Commission on 22 February 2010; the applicant was also invited to give its view on the need for additional information. On the basis of the comments received, the applicant's response to the comments, and the RMS' subsequent evaluation thereof, it was concluded that the EFSA should organise a consultation with Member State experts in the area of mammalian toxicology and that further information should be requested from the applicant in the areas of physical-chemical properties, residues and mammalian toxicology.

The outcome of the telephone conference, together with EFSA's further consideration of the comments is reflected in the conclusions set out in column 4 of the Reporting Tables. All points that were identified as unresolved at the end of the comment evaluation phase and which required further consideration, including those issues to be considered in consultation with Member State experts, and the additional information to be submitted by the applicant, were compiled by the EFSA in the format of an Evaluation Table.

The conclusions arising from the consideration by the EFSA, and as appropriate by the RMS, of the points identified in the Evaluation Table, together with the outcome of the expert discussions where these took place, were reported in the final column of the Evaluation Table.

A final consultation on the conclusions arising from the peer review of the risk assessment took place with Member States via a written procedure in August 2010.

This conclusion report summarises the outcome of the peer review of the risk assessment on the active substance and the representative formulation evaluated on the basis of the representative uses as a fungicide on glasshouse grown fruiting vegetables and cut flowers in non-soil production systems, as proposed by the applicant. A list of the relevant end points for the active substance as well as the formulation is provided in Appendix A. In addition, a key supporting document to this conclusion is the Peer Review Report, which is a compilation of the documentation developed to evaluate and address all issues raised in the peer review, from the initial commenting phase to the conclusion. The Peer Review Report (EFSA, 2010) comprises the following documents:

- the comments received,
- the Reporting Tables (revision 1-1; 4 March 2010),
- the Evaluation Table (10 September 2010),
- the report of the scientific consultation with Member State experts (where relevant).

Given the importance of the DAR and the Additional Report including its addendum (compiled version of July 2010 containing all individually submitted addenda; Netherlands, 2010) and the Peer Review Report, both documents are considered respectively as background documents A and B to this conclusion.

THE ACTIVE SUBSTANCE AND THE FORMULATED PRODUCT

Etridiazole is the ISO common name for ethyl 3-trichloromethyl-1,2,4-thiadiazol-5-yl ether (IUPAC).

The representative formulated product for the evaluation was 'Aaterra ME', a micro-emulsion formulation (ME) containing 700 g/l etridiazole, registered under different trade names in Europe.

The representative uses evaluated comprise applications through drip-irrigation on glasshouse grown fruiting vegetables (tomato, pepper, cucumber) and cut flowers in non-soil production systems to control soil and root fungi. Full details of the GAP can be found in the list of end points in Appendix A.

CONCLUSIONS OF THE EVALUATION

1. Identity, physical/chemical/technical properties and methods of analysis

The minimum purity of etridiazole technical material is 970 g/kg. No FAO specification exists.

The proposed revised technical specification was based on quality control data on the batches from industrial production and is not supported by the five-batch data based on pilot plant production. A data gap was identified for new five-batch data based on industrial production, as a consequence the specification could not be finalized and should be regarded as provisional. The assessment of the data package revealed no issues that need to be included as critical areas of concern with respect to the identity, physical, chemical and technical properties of etridiazole or the respective formulation. A data gap was identified for the determination of the boiling point at atmospheric pressure. The main data regarding the identity of etridiazole and its physical and chemical properties are given in Appendix A.

Analytical methods are available for the determination of etridiazole and the impurities in the technical material and for the determination of the active substance in the representative formulation. An adequate analytical method is available for determination of etridiazole in food of plant origin, however pending on the final residue definition in plants, a data gap might be identified for an analytical method for the compounds in the residue definition. Adequate analytical methods are available for the monitoring of compounds in the residue definition in the environmental matrices. Methods for food of animal origin are not relevant as no MRL is proposed. Etridiazole is classified as toxic by inhalation,[11] and as a consequence a data gap was identified for an analytical method for body fluids and tissues.

2. Mammalian toxicity

Etridiazole was discussed at the PRAPeR experts' meeting on mammalian toxicology PRAPeR 79. The technical specification as proposed in the addendum to volume 4 dated May 2010 is supported by the batches used in the toxicological studies, however the relevance of the impurities was not addressed; a data gap is identified on the relevance of the impurities present in the technical specification.

Etridiazole has low to moderate acute toxicity depending on the route of administration. No skin or eye irritation was observed, but it may cause sensitisation by skin contact. The target organ of etridiazole is the liver upon short-term and long-term exposure, leading to the relevant short-term NOAEL of 3.1 mg/kg bw/day, derived from the 1-year dog study, while a LOAEL of 5 mg/kg bw/day is identified from the long-term study in rats. Upon long-term exposure, carcinogenic effects are found in the liver (rat and mouse), testes, thyroid and kidneys (rat); the kidney tumours were found to be rat specific and not relevant to humans. Etridiazole has promotion activity, but no potential for genotoxicity. Fertility and overall reproductive performance were not impaired, developmental

[11] According to Annex VI of Regulation (EC) No 1272/2008, Table 3.2 [ex-Annex I of Directive 67/548/EEC] and according to Annex VI of Regulation (EC) No 1272/2008, Table 3.1.

malformations were observed at doses causing high maternal toxicity (death) in rabbits. No potential for neurotoxicity was observed in the standard toxicity studies.

Dichloro-etridiazole, a metabolite possibly appearing in groundwater, can reasonably be assumed to present the same toxicological profile as the parent etridiazole; the reference values of the parent are applicable to this metabolite and if it is confirmed that the metabolite appears in groundwater at levels above the trigger value of 0.1 µg/L, it would be relevant based on the carcinogenic properties of the parent. Toxicological studies were presented on etridiazole acid (5-ethoxy-1,2,4-thiadiazole-3-carboxylic acid) giving indications that the metabolite is less toxic than the parent and has no genotoxic potential. Based on the carcinogenic profile of the parent, according to the guidance document on the assessment of the relevance of metabolites in groundwater (European Commission, 2003) this metabolite would also be relevant if it is shown that its levels exceed the trigger value in groundwater. Insufficient toxicological information (Derek analysis) was provided on the major plant metabolites 5-hydroxy-ethoxyetridiazole acid and 3-hydroxymethyl etridiazole, and a data gap was identified.

The acceptable daily intake (ADI) of etridiazole is 0.015 mg/kg bw/day, applying a safety factor of 300 to the LOAEL from the 2-year rat study. The acceptable operator exposure level (AOEL) is 0.03 mg/kg bw/day, derived from the 1-year dog study and applying a safety factor of 100. The acute reference dose (ARfD) is 0.15 mg/kg bw based on the rabbit developmental toxicity study showing a NOAEL of 15 mg/kg bw/day, 100 safety factor applied.

The estimated operator exposure is below the AOEL when gloves are worn during mixing and loading operations for worst-case representative use on ornamentals only according to both the German and the UK POEM models, the other crops are below AOEL without PPE according to the German model. Workers re-entering glasshouses treated with etridiazole may be exposed by inhalation to both the parent and the metabolite dichloro-etridiazole due to their volatilisation properties; worker exposure was below the AOEL for both substances when no personal protective equipment (PPE) is worn. Bystander exposure is not relevant as they should not be allowed to enter greenhouses during applications of plant protection products.

3. Residues

Metabolism in plants was investigated in cucumber by applications of a solution containing ^{14}C-labelled etridiazole directly to the hydroponic growth substrate. Different dose rates were tested but detailed information was provided for the low dose only (1N) and selected extracts from the higher dose groups were only used to allow identification. Following two applications the TRR in fruits collected 3 to 46 days after application was in the range of 0.297 to 0.911 mg/kg. The entire radioactivity was extracted by water and thus was very polar in nature. Parent etridiazole was only detected in the samples collected shortly after treatment, within 6 days after application, accounting for 2 – 23 % TRR. For later intervals (>11 days), the residues were mainly composed of the metabolites 5-hydroxy-ethoxyetridiazole acid (14 – 33 % TRR) and 3-hydroxymethyl etridiazole, free (3 – 12 % TRR) or glucose conjugated (5 – 17 % TRR), the remaining radioactivity (28 – 59 % TRR) being characterised as a large number of polar components associated with natural plant constituents. A second metabolism study conducted on cotton was submitted but considered as informative only.

The information submitted on the toxicity of etridiazole acid has shown this metabolite to be of lower acute and semi-chronic toxicity than the parent (see section 2) and its inclusion in the plant residue definition is therefore not necessary. In contrast, no sufficient data were provided to conclude on the toxicity of the metabolites 5-hydroxy-ethoxyetridiazole acid and 3-hydroxy methyl etridiazole (free and conjugated), although these two compounds were seen to represent a large part of the residues at some harvest points (up to *c.a.* 30% TRR and 0.18 mg/kg). Therefore, and as long as the toxicity of these two major metabolites is not addressed, EFSA is of the opinion that the residue in plant has provisionally to be defined as the sum of etridiazole, 5-hydroxy-ethoxyetridiazole acid and 3-hydroxy methyl etridiazole (and its conjugates).

Supervised residues trials conducted on tomato, sweet pepper and cucumber grown indoors on artificial substrate were provided, but samples were analysed for the parent and the etridiazole acid metabolite only. Therefore, no data are available to derive MRLs according to the proposed residue definition and a data gap was identified for a full residue data set where samples are analysed according to the residue definition.

No chronic or acute risk assessment could be performed since the toxicological profile of the two major plant metabolites was not addressed, and residue trials are not available in which samples are analysed according to the proposed residue definition. The absence of consumer risk assessment was identified as a critical area of concern.

4. Environmental fate and behaviour

Etridiazole and its soil and aquatic metabolites, etridiazole acid and dichloro-etridiazole have a high potential for volatilization. Therefore all three compounds can potentially reach the environment outside the glasshouse via deposition after volatilisation. The estimated atmospheric half-life of etridiazole or dichloro-etridiazole is less than 2 days. Therefore long-range transport through the atmosphere for these compounds is not expected. Estimations of atmospheric half-life for etridiazole acid were not available, therefore a data gap was identified for assessments of the potential long-range transport through the atmosphere for this metabolite. The available estimations for short-range transport (deposition to soil and water) are detailed at the end of this section.

In soil laboratory incubations of etridiazole under aerobic conditions in the dark, two major (> 10 % applied radioactivity (AR)) soil metabolites, dichloro-etridiazole and etridiazole acid were formed. Mineralisation to carbon dioxide was a sink accounting for 4.7 – 8.2 % AR after 90 – 100 days. The formations of unextractable residues were a significant sink, accounting for 6 – 40 % AR after 90 – 100 days. Regarding the persistence, no reliable calculations for soil DT_{50} were available for etridiazole and for the metabolite dichloro-etridiazole. The metabolite etridiazole acid exhibited low to moderate persistence.

Etridiazole exhibits medium mobility in soil (only three soil experiments were accepted). The metabolite dichloro-etridiazole exhibited high mobility, while etridiazole acid exhibited very high mobility in soil. There was no indication that adsorption of etridiazole or its soil metabolites was pH dependent.

In a field leaching study in the Netherlands where etridiazole was applied to soil (spray application at a rate of 7 kg/ha) in two greenhouses, etridiazole and its soil metabolites, dichloro-etridiazole and etridiazole acid were found in relatively high concentrations in the groundwater, in waters of ditches used for irrigation or in drainage waters (with the exception of dichloro-etridiazole in the groundwater).

As the representative use is only glasshouse use through the irrigation system of crops grown in non-soil associated production systems, data relating to soil were considered as not necessary to complete an environmental exposure assessment, which consequently had been based on the assumption that soil exposure would be negligible. If soil exposure is negligible then the potential for groundwater exposure would also be expected to be negligible. It needs to be highlighted that comments from Member States suggested that a complete data set for degradation and mobility in soil, and field dissipation data (non-validated laboratory DT_{50} is > 60 days for etridiazole and dichloro-etridiazole) would become necessary if other uses (e.g. outdoor uses) were to be applied for. Based on their comments, Member States did not suggest data gaps to be included in the EFSA conclusion for further soil data. However, since etridiazole is a volatile compound and its soil and aquatic metabolites (etridiazole acid and dichloro-etridiazole) are also potentially volatile, a significant exposure of the environment via volatilization and deposition in the outside area cannot be excluded, as confirmed by the results of the field leaching/monitoring study described above. It should however be borne in mind that the representativeness of this study to the EU evaluation is limited since soil application was used in this study. Due to potential volatility, a data gap was identified for assessments of groundwater

exposure for etridiazole and the metabolites dichloro-etridiazole and etridiazole acid using the FOCUS Air (FOCUS, 2008) and, if necessary, FOCUS Degradation Kinetics (FOCUS, 2006) and FOCUS Groundwater (FOCUS, 2000) guidance. It is noted that the potential for groundwater contamination is generally lower for volatile compounds. Deposition to soil and predicted environmental concentrations (PEC) in soil for etridiazole and for the major soil metabolites, etridiazole acid and dichloro-etridiazole, were calculated and the details of these calculations are described below.

In a hydrolysis study, etridiazole underwent relatively slow hydrolytic degradation forming only etridiazole acid as the transformation product. Etridiazole is not readily biodegradable.

In laboratory incubations in aerobic natural water sediment systems, etridiazole degraded relatively quickly (SFO DT_{50} < 2 days), forming the major metabolite etridiazole acid. Several other unidentified components were also formed; however the amount of these did not exceed 10 % AR in the water or in the sediment phase. The metabolite dichloro-etridiazole was also observed up to 11 % in the whole system (maximum 9.5 % in the water phase and 1.4 % in the sediment). The dissipation of this metabolite in these systems was also found to be relatively rapid (SFO DT_{50} < 3 days). Negligible partitioning of etridiazole to the sediment was observed however a significant amount was trapped in the volatile trapping systems. Mineralisation to carbon dioxide accounted for only 2.3 – 3.1 % AR at the end of the study (day 104), while residues not extracted from the sediment represented 21 – 26 % AR on day 14 of the study (by the end of the study the non-extractable residues dropped to 16 – 24 % AR). Based on a separate study, the major metabolite etridiazole acid was found to be persistent (SFO DT_{50} 427 – 517 days) in natural water sediment systems.

The necessary surface water and sediment exposure assessments (PEC_{sw}, PEC_{sed}) were calculated assuming 0.1% of the dose was emitted from the glasshouse and transferred to surface water using FOCUS calculator 1.1. It should to be noted that the soil DT_{50} values that were indicated to be used in these calculations have no impact on the results. It is also noted that for the parent compound only three Koc values are available.

PEC_{sw} as well as PEC_{soil} values were calculated considering deposition to soil or water surface after volatilisation using the approaches of EVA 1.1 and EVA 2.0 models for etridiazole and dichloro-etridiazole. In the calculations for dichloro-etridiazole, the amount considered available for volatilisation was based on the formation of this metabolite in soil and the formation from the deposited parent was also considered. The RMS, in agreement with the applicant, considered these calculations as worst-case since they assumed no formation of this metabolite in the treated media (artificial substrates, non-soil bound systems in glasshouse). EFSA notes that no information was available regarding the extent of formation of potential metabolites in the artificial media; and therefore this assumption could not be validated. It should be noted that the soil DT_{50} values that were used in these calculations cannot be considered as the agreed values by the peer-review (see details in open points 4.1 and 4.2 in the Evaluation Table). Moreover the vapour pressure value used for the metabolite dichloro-etridiazole is very uncertain; based on the estimated data it could be greater by one order of magnitude. No PEC_{sw} calculations considering this route of exposure were available for etridiazole acid. Therefore a data gap was identified for assessments of exposure of the surface water for etridiazole acid considering the route of exposure via volatilization and deposition. PEC_{soil} calculations are available for etridiazole acid in the updated DAR/AR (Netherlands, 2010). These calculations consider only the formation of the metabolite in soil from the deposited parent etridiazole; direct exposure of soil (volatilisation-deposition of the metabolite) was not considered. Therefore a data gap was identified for assessments of exposure of the soil for etridiazole acid considering both the routes of exposure via volatilization and deposition by the metabolite and formation of the metabolite after deposition of the parent etridiazole.

It is highlighted that release to the environment, especially to surface waters or sewage system plants, is possible when irrigation water of some non-soil bound growing systems, such as hydroponic systems, is changed.

5. Ecotoxicology

A data gap remains to assess the compliance of the ecotoxicological test material with the technical specification of the five-batch analysis.

The risk assessment for birds and mammals was conducted in accordance with the Birds and Mammals Guidance Document (European Commission, 2002). Some uncertainty was identified related to chemical verification of the derived acute and short-term endpoint for birds. However, endpoints were considered sufficiently reliable for risk assessment in view of the expected low exposure of birds as result of the representative uses in glasshouse. The relevant exposure routes for glasshouse use were considered to be consumption of contaminated drinking water (acute/short-term) or via contaminated fish (long-term). The risk to birds and mammals was assessed as low, as was the risk from the metabolites etridiazole acid, dichloro-etridazole and 3-hydroxymethyl etridazole.

Based on the data available, etridiazole was considered to be very toxic to aquatic organisms. In the DAR, the acute and long-term risk to aquatic organisms was assessed as low based on the Dutch emission model for the worst-case use in ornamentals. However, worst-case $PEC_{sw\ ornamentals}$ values related to atmospheric deposition were not used in the aquatic environmental risk assessment. The risk assessment for etridiazole and the relevant metabolites should be based on worst case PEC_{sw} estimates. A 5 m no-spray buffer zone was required to identify a low-risk to aquatic organisms for use in ornamentals, based on chronic toxicity data for fish and PEC_{sw} for etridiazole related to atmospheric deposition. No mitigation measures were required to address the risk to aquatic organisms for the representative use in vegetables, based on exposure via atmospheric deposition. No studies with the representative formulation were provided. Data for the active substance were however considered sufficient to assess the risk to aquatic organisms, given the margin of safety for the active substance and the low potential for direct exposure to the formulation from glasshouse use. The risk to aquatic organisms was assessed as low for dichloro-etridiazole, based on PEC_{sw} values including both deposition to water and formation of the metabolite in the off-crop area (see section 4). For etridiazole acid, the PEC_{sw} calculations only took account of deposition. Based on these PEC_{sw} values the TER trigger was exceeded by several orders of magnitude. EFSA concludes that the potential increase in PEC_{sw} by inclusion of the off-crop source would not change the conclusion for etridiazole acid. Consequently the risk to aquatic organism from etridiazole acid was assessed as low. The risk from bioaccumulation of etridiazole and metabolites was assessed as low.

No studies were available for bees. Whereas the risk to honeybees was not assessed, potential effects to bumblebees were considered. Etridiazole is applied direct to the root zone of plants. As crop residue data did indicate some potential systemic effect, bumblebees used as pollinators may be exposed to etridiazole. Member States may wish to address this further at national level in case of Annex I inclusion. The tier I risk assessment for non-target arthropods indicated a potential in-field risk to *Typhlodromus pyri* and *Aphidius rhopalosiphi* for the representative use in ornamentals. The risk was however assessed as low based on extended laboratory studies with *T. pyri*, *A. rhopalosiphi* and *Chrysoperla carnea* and exposure considerations which took account of the indirect application to plants via the substrate.

Toxicity data on earthworms, non-target soil micro-organisms, biological methods for sewage treatment and screening data for non-target terrestrial plants were assessed by the RMS, but not included in the risk assessment. The risk to earthworms, non-target soil micro-organisms, biological methods for sewage treatment and non-target plants was not assessed since the potential for exposure from the representative uses of etridiazole in glasshouses was considered by the RMS to be low. EFSA notes that a data gap remains for the applicant to address the risk to soil-dwelling organisms from volatilization-deposition of etridiazole, and all routes of formation of dichloro-etridiazole and etridiazole acid (see section 4).

6. Overview of the risk assessment of compounds listed in residue definitions triggering assessment of effects data for the environmental compartments

6.1. Soil

Compound (name and/or code)	Persistence	Ecotoxicology
etridiazole	No reliable information is available[(a)]	A data gap remains to assess the risk to soil-dwelling organisms exposed via aerial deposition.
dichloro-etridiazole	No reliable information is available[(b)]	A data gap remains to assess the risk to soil-dwelling organisms exposed via aerial deposition.
etridiazole acid	Low to moderate persistence Single first order DT_{50} 7.6 – 36.5 days (20°C, 45 % maximum water holding capacity)	A data gap remains to assess the risk to soil-dwelling organisms exposed via aerial deposition.

(a): The non-reliable information that is available indicates that the persistence of etridiazole might be classified as low to medium.
(b): The non-reliable information that is available indicates that the dissipation (degradation and volatilisation) of dichloro-etridiazole might be classified as moderate to high.

6.2. Ground water

Compound (name and/or code)	Mobility in soil	>0.1 µg/L 1m depth for the representative uses (at least one FOCUS scenario or relevant lysimeter)	Pesticidal activity	Toxicological relevance	Ecotoxicological activity
etridiazole	Medium mobility K_{Foc} 195-349 mL/g	No information available[(a)]	Yes	Yes	Very toxic to aquatic organisms. Risk assessed as low for aquatic organisms for the representative uses. Mitigation measures (e.g. non-spray buffer zones of 5 m) were required to address the risk to aquatic organisms for the representative use in ornamentals.
dichloro-etridiazole	High mobility K_{Foc} 50-128 mL/g	No information available[(a)]	No information available	Yes. Assumed to have a similar toxicity profile as the parent; etridiazole classified with R40.	Very toxic to aquatic organisms. The risk to aquatic organisms assessed as low.
etridiazole acid	Very high mobility K_{Foc} 13-22 mL/g	No information available[(a)]	No information available	Yes. Less toxic than the parent, not genotoxic, classification of the parent as R40 should be applied also to the metabolite.	Harmful to aquatic organisms. The risk to aquatic organisms assessed as low.

(a): Regarding the representative use the direct exposure of groundwater is considered to be negligible. Indirect exposure via volatilization and deposition to the soil surface cannot be excluded.

6.3. Surface water and sediment

Compound (name and/or code)	Ecotoxicology
etridiazole	Very toxic to aquatic organisms. Risk assessed as low for aquatic organisms for the representative uses. Mitigation measures (e.g. non-spray buffer zones of 5 m) were required to address the risk to aquatic organisms for the representative use in ornamentals.
dichloro-etridiazole	Very toxic to aquatic organisms. The risk to aquatic organisms assessed as low for the representative uses.
etridiazole acid	Harmful to aquatic organisms. The risk to aquatic organisms assessed as low for the representative uses.

6.4. Air

Compound (name and/or code)	Toxicology
etridiazole	Rat LC_{50} inhalation > 5.7 mg/L air /4h (nose-only), no classification proposed by the peer-review. Classified as toxic by inhalation (T; R23) in Annex I to Directive 67/548/EEC (and Annex VI to Regulation (EC) No 1272/2008).
dichloro-etridiazole	No data – assumed to present a similar toxicity profile to that of the parent etridiazole (no classification proposed).
etridiazole acid	No data – assumed to be less toxic than the parent etridiazole based on oral studies (no classification proposed).

LIST OF STUDIES TO BE GENERATED, STILL ONGOING OR AVAILABLE BUT NOT PEER REVIEWED

- New five-batch data based on industrial production (relevant for all representative uses evaluated, submission date proposed by the applicant: unknown, see section 1).
- Determination of the boiling point at atmospheric pressure (relevant for all representative uses evaluated, submission date proposed by the applicant: unknown, see section 1).
- Analytical method for residues in body fluids and tissues (relevant for all representative uses evaluated, submission date proposed by the applicant: unknown, see section 1).
- Toxicological information to address the relevance of the impurities present in the technical specification (relevant for all representative uses evaluated; submission date proposed by the applicant: unknown; see section 2).
- Toxicological information to assess the toxicity profile of the plant metabolites 5-hydroxy-ethoxyetridiazole acid and 3-hydroxymethyl etridiazole (relevant for all representative uses evaluated; submission date proposed by the applicant: unknown; see section 2 and 3).
- A full residue data set where samples are analysed according to the proposed residue definition to be provided (relevant for tomato, pepper and cucumber; submission date proposed by the applicant: unknown; see section 3).
- Assessments of exposure of surface water and soil for the metabolite etridiazole acid considering exposure via both volatilization-deposition (short-range transport) and formation of the metabolite after deposition of the parent compound (relevant for all representative uses evaluated; identified by EFSA; submission date proposed by the applicant: unknown, see section 4).
- Assessment of groundwater exposure for etridiazole, dichloro-etridiazole and etridiazole acid using FOCUS Air and, if necessary, FOCUS Degradation Kinetics and FOCUS Groundwater Guidance. Depending on the outcome a groundwater relevance assessment may be required for the metabolites dichloro-etridiazole and etridiazole acid (relevant for all representative uses evaluated; identified by EFSA; submission date proposed by the applicant: unknown, see sections 4 and 5).
- Assessment of the potential long-range transport through the atmosphere for etridiazole acid (relevant for all representative uses evaluated; identified by EFSA; submission date proposed by the applicant: unknown, see section 4).
- Assessment of the compliance of ecotoxicological test material with the technical specification of the five-batch analysis (relevant for all representative uses evaluated, submission date proposed by the applicant: unknown, see section 5).
- To address the risk to soil-dwelling organisms from the volatilization-deposition of etridiazole and all routs of formation of dichloro-etridiazole and etridiazole acid (relevant for all representative uses evaluated; submission date proposed by the applicant: unknown, see section 4 and 5).

PARTICULAR CONDITIONS PROPOSED TO BE TAKEN INTO ACCOUNT TO MANAGE THE RISK(S) IDENTIFIED

- Operator exposure is below the AOEL for the use in ornamentals when personal protective equipment (gloves) is used (see section 2).
- The use of etridiazole should be restricted to artificial substrates or non-soil bound systems in glasshouse.

- Member States would need to have appropriate waste management practices in place to handle waste water from irrigation of non-soil bound growing systems such as hydroponic systems (e.g. to collect all the waste water, transport to a waste management facility and burn or handle as hazardous chemical waste). If release of waste water into the sewage system or into natural water bodies was to be permitted, a local risk assessment would be needed.

- For glasshouse use on ornamentals in the vicinity of water bodies, no-spray buffer zones of 5 m are required in order to identify a low risk to aquatic organisms.

- Management measures should establish conditions of use to avoid exposure to residues of etridiazole with respect to crops for human and animal consumption.

ISSUES THAT COULD NOT BE FINALISED

- Technical specification as there is a data gap for five-batch data.

- Assessments of exposure of groundwater were not addressed for etridiazole, dichloro-etridiazole or etridiazole acid.

- Assessments of the potential long-range and short-range transport through the atmosphere (and consequent assessment of soil and surface water exposure) for etridiazole acid were not addressed.

- The risk to soil-dwelling organisms remains to be addressed from the volatilization-deposition of etridiazole and for etridiazole acid and dichloro-etridiazole considering both the routes of exposure via volatilization and deposition by the metabolites and formation of the metabolites after deposition of the parent etridiazole.

CRITICAL AREAS OF CONCERN

- The consumer risk assessment could not be performed for the representative uses on edible crops (tomato, pepper, cucumber) on the basis of the data available. It is noted that there is a representative use on non-edible crop (ornamentals).

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APPENDICES

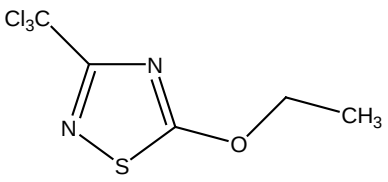
APPENDIX A – LIST OF END POINTS FOR THE ACTIVE SUBSTANCE AND THE REPRESENTATIVE FORMULATION

2.1 Identity, Physical and Chemical Properties, Details of Uses, Further Information

Identity, Physical and Chemical Properties, Details of Uses, Further Information

Active substance (ISO Common Name)	Etridiazole
Function (*e.g.* fungicide)	Fungicide
Rapporteur Member State	The Netherlands

Identity (Annex IIA, point 1)

Chemical name (IUPAC)	ethyl-3-trichloromethyl-1,2,4-thiadiazol-5-yl ether
Chemical name (CA)	5-ethoxy-3-trichloromethyl-1,2,4-thiadiazole
CIPAC No	518
CAS No	2593-15-9
EEC No (EINECS or ELINCS)	219-991-8
FAO Specification (including year of publication)	Not available
Minimum purity of the active substance as manufactured (g/kg)	970 g/kg (Provisional)
Identity of relevant impurities (of toxicological, environmental and/or other significance) in the active substance as manufactured (g/kg)	Open
Molecular formula	$C_5H_5Cl_3N_2OS$
Molecular mass	247.5
Structural formula	

Physical-chemical properties (Annex IIA, point 2)

Melting point	purity 99.7%: 22.0°C
Boiling point	purity 99.3%: 113°C (at reduced pressure; 0.53 kPa) data gap at atmospheric pressure
Temperature of decomposition	no decomposition up to a temperature of 113°C (boiling point at reduced pressure)
Appearance	pure material (99.7%) at 20°C: semisolid (mixture of a clear, colourless solid and a clear colourless liquid). pure material (99.7%) at 25°C: liquid with low viscosity and volatility. technical material (98.9%) at 20°C: semisolid (mixture of a clear, colourless solid and a yellow liquid). technical material (98.9%) at 25°C: liquid with low viscosity and volatility.
Relative density	purity 99.7%: 1.497 at 25°C
Surface tension	purity 99.8%: 71.9 mN/m (59.6 mg/L; 22°C; Ca 70% saturated solution)
Vapour pressure (in mBar and Pa, state temperature)	technical material (99.0%): 0.01073 mm Hg at 25°C (equivalent to 1.43 Pa, calculated by RMS)
Henry's law constant (Pa m^3 mol^{-1})	3.02 Pa.m^3.mol^{-1} at 25°C
Solubility in water (g/l or mg/l at 20 °C)	technical material (99.0%) at 25°C: 117.1 mg/L in water 85.8 mg/L in buffer pH 4 88.9 mg/L in buffer pH 7 89.7 mg/L in buffer pH 10
Solubility in organic solvents (in g/L or mg/L)	purity 99.5%, at 20°C: miscible in all proportions with n-Heptane, toluene, xylenes, dichloromethane, 1,2-dichloroethane, methanol, acetone, ethyl acetate and n-octanol.
Partition co-efficient (log P_{OW}) (state temperature)	purity 98.2%: Log P_{ow} (aqueous pH7 buffer/n-octanol) at 26°C to 27.5°C: 3.37. No effect of pH was required since there is no dissociation in the relevant pH range
Dissociation constant	purity 98.2%: pKa at 25°C: 2.77
UV/VIS absorption (max.) incl. ε (state purity, pH)	purity 99.7% acetonitrile solution: 0.2891x10^{-3} mol/L λmax (nm); ε (L.mol-1.cm-1) 220 5444 The maximum molar absorption coefficient of etridiazole (99.6%) over the range 290 to 800 nm was calculated to be 2.13 L.mol-1.cm-1 at 290 nm.
Flammability and auto-flammability	purity 99.8%: flashpoint (A.9): 111 °C flammability (A.10): not applicable for liquids auto-ignition temperature (A.15): 342°C
Explosive properties	not explosive (99.8% TGAI)
Oxidising properties	not oxidizing (theoretical assessment)

Classification and proposed labelling (Annex IIA, point 10)

	RMS/peer review proposal
Active substance	No classification and labelling is needed based on the physical and chemical properties of the active substance etridiazole

Summary of representative uses evaluated (etridiazole)*

Crop and/ or situation (a)	Member State or Country	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 (d-f)	Conc of as (i)	method kind (f-h)	growth stage & season (j)	number min-max (k)	interval between applications (min)	kg as/hL min-max	water L/ha min-max	kg as/ha min-max		
Non-soil boundglass house ornamental crops	EU	AATERRA ME	G	Soil and root fungi (*Pythium & Phytophthora*)	ME	700 g/l	Application through drip-irrigation	n.a.	1-2	2 weeks	-	1000 min	0.7 g/m^2 substrate (7 kg/ha)	n.a.	[2] [3]
Substrate grown tomatoes	EU	AATERRA ME	G	Soil and root fungi (*Pythium & Phytophthora*)	ME	700 g/l	Application through drip-irrigation	ca. 81	1-2	2 weeks	-	1000 min	0.28-0.56 kg/ha	3	[1] [2] [3]
Substrate grown peppers	EU	AATERRA ME	G	Soil and root fungi (*Pythium & Phytophthora*)	ME	700 g/l	Application through drip-irrigation	ca. 81	1-2	2 weeks	-	1000 min	0.28-0.56 kg/ha	7	[1] [2] [3]
Substrate grown cucumbers	EU	AATERRA ME	G	Soil and root fungi (*Pythium & Phytophthora*)	ME	700 g/l	Application through drip-irrigation	ca. 81	1-2	2 weeks	-	1000 min	0.28 kg/ha	14	[1] [2] [3]

∗ For uses where the column "Remarks" is marked in grey further consideration is necessary.

[1]: The consumer risk assessment could not be performed, since the toxicity of the two main plant metabolites was not addressed
[2]: The assessments of exposure of groundwater were not addressed for etridiazole and its metabolites
[3]: The assessments of exposure of soil and surface water for the metabolite etridiazole acid were not addressed

(a) For crops, the EU and Codex classifications (both) 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 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
(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) PHI - minimum pre-harvest interval
(m) Remarks may include: Extent of use/economic importance/restrictions

2.2 Methods of Analysis

Analytical methods for the active substance (Annex IIA, point 4.1)

Technical as (analytical technique)	Dissolution in acetone containing internal standard (pentachlorobenzene) followed by GC-FID analysis.
Impurities in technical as (analytical technique)	Dissolution in solvent containing internal standard followed by GC-FID analysis.
Plant protection product (analytical technique)	Dissolution in acetonitrile:water containing internal standard (Di-n-amyl phtalate) followed by reversed phase HPLC-UV analysis.

Analytical methods for residues (Annex IIA, point 4.2)

Residue definitions for monitoring purposes

Food of plant origin		Etridiazole, 3-hydroxymethyl etridiazole and 5-hydroxyethoxy etridiazole acid (provisional)
Food of animal origin		No residue definition required
Soil		Etridiazole, dichloro-etridiazole, etridiazole acid
Water	surface	Etridiazole, etridiazole acid
	Drinking/ground	Etridiazole
Air		Etridiazole

Monitoring/Enforcement methods

Food/feed of plant origin (analytical technique and LOQ for methods for monitoring purposes)	Single Method AC-3012A (etridiazole): GC-MS 0.01 mg/kg (peppers, crops with high water content) **Open** for metabolites 3-hydroxymethyl etridiazole and 5-hydroxyethoxy etridiazole acid
Food/feed of animal origin (analytical technique and LOQ for methods for monitoring purposes)	No methods required because no residue definition for animal products is proposed.
Soil (analytical technique and LOQ)	Method AC 6003: GC-TSD 0.01 mg/kg (etridiazole) 0.01 mg/kg (dichloro-etridiazole) 0.01 mg/kg (etridiazole acid) Confirmation with GC-MS
Water (analytical technique and LOQ)	Method AC 7001: GC-NPD 0.1 µg/L (etridiazole) 0.1 µg/L (dichloro-etridiazole) 0.1 µg/L (etridiazole acid) matrix: surface water (also applicable for drinking and groundwater) Confirmation with GC-MS

Air (analytical technique and LOQ)	Method: no method number specified GC-MS 0.9 µg/m³
Body fluids and tissues (analytical technique and LOQ)	Data gap

2.3 Impact on Human and Animal Health

Absorption, distribution, excretion and metabolism (toxicokinetics) (Annex IIA, point 5.1)

Rate and extent of oral absorption	*Ca*. 100% (based on urinary (58 - 73%), faeces (assumed biliary, based on excretion pattern comparison after iv and oral administrations, 14 - 16%), tissues (excluding residual carcass, 2.4 - 3.9%) and expired air (4.2 - 7.4%), excretion within 168 h)
Distribution	Highest residues in liver, kidney, lung, blood cells and bone at 168 h
Potential for accumulation	No evidence for accumulation
Rate and extent of excretion	Rapid and extensive within 72 h: mainly via urine (55 - 67%), 13 - 16% via faeces, 4.2 - 7.4% via expired air (168 h)
Metabolism in animals	Extensively metabolised; main metabolite etridiazole carboxylic acid
Toxicologically relevant compounds (animals and plants)	Etridiazole
Toxicologically relevant compounds (environment)	Etridiazole, dichloro-etridiazole and etridiazole acid

Acute toxicity (Annex IIA, point 5.2)

Rat LD_{50} oral	> 945 mg/kg bw	**R22**
Rabbit LD_{50} dermal	> 5000 mg/kg bw	
Rat LC_{50} inhalation	> 5.7 mg/L air /4h (nose-only)	
Skin irritation	Non-irritant	
Eye irritation	Non-irritant	
Skin sensitisation	Sensitising (M & K)	**R43**

Short-term toxicity (Annex IIA, point 5.3)

Target / critical effect	Liver: increased weight (rat & dog) and hypertrophy (rat)	
Relevant oral NOAEL	13-week, rat: 2.7 mg/kg bw/day 1-year, dog: 3.1 mg/kg bw/day	
Relevant dermal NOAEL	4-week, rat: 20 mg/kg bw/day	
Relevant inhalation NOAEL	4-week, rat: $NOAEL_{(systemic)}$ 15 mg/m^3 (corresponding to 4 mg/kg bw/day) $LOAEL_{(local)}$ 15 mg/m^3 based on local squamous/squamoid metaplasia in the larynx mucosa	**R37**

Genotoxicity (Annex IIA, point 5.4)

Etridiazole is considered not genotoxic *in vivo*	

Long-term toxicity and carcinogenicity (Annex IIA, point 5.5)

Target/critical effect	Kidney: tubular cell karyomegaly (rat), infarct (mouse); liver: hepatotoxicity (rat & mouse); spleen and heart (mouse)	
Relevant NOAEL	LOAEL 5 mg/kg bw/day; 2-year, rat 7.5 mg/kg bw/day; 18-month, mouse	
Carcinogenicity	Tumours in liver (rat and mouse), testes and thyroid (rat); kidney tumours in male rats unlikely to pose a risk to humans. NOAEL for carcinogenicity is 5 mg/kg bw/day from the rat 2-year study (LOAEL 30 mg/kg bw/day).	**R40**

Reproductive toxicity (Annex IIA, point 5.6)

Reproduction toxicity

Reproduction target / critical effect	Growth reduced and increased thyroid weight at parental toxic doses (organ weight changes, reduced body weight and food consumptions) in the rat. No effects observed on fertility or reproduction.	
Relevant parental NOAEL	5.3 mg/kg bw/day	
Relevant reproductive NOAEL	≥ 42.7 mg/kg bw/day	
Relevant offspring NOAEL	5.3 mg/kg bw/day	

Developmental toxicity

Developmental target / critical effect	Rat: *Developmental toxicity*: reduced body weight, retarded ossification, anarsarca, no irreversible structural effects. *Maternal:* mortality, reduced body weight. Rabbit: *Developmental*: reduced body weight, reduced lived foetuses, irreversible structural effects. *Maternal*: mortality, reduced body weight.	

Relevant maternal NOAEL	Rat: 30 mg/kg bw/day Rabbit: 15 mg/kg bw/day	
Relevant developmental NOAEL	Rat: 30 mg/kg bw/day Rabbit: 15 mg/kg bw/day	

Neurotoxicity (Annex IIA, point 5.7)

Acute neurotoxicity	No data - not required	
Repeated neurotoxicity	No data - not required	
Delayed neurotoxicity	No data - not required	

Other toxicological studies (Annex IIA, point 5.8)

Mechanism studies	Cell proliferation activity found in an *in vivo-in vitro* replicative DNA synthesis test indicative of hepato-carcinogenic promotion. Promoter activity detection test: etridiazole can act as a promoter, but with another profile than Phenobarbital. No initiation activity was observed. Promoter activity detection test: etridiazole at 37 mg/kg bw/day can act as a promoter based on induction of phase II liver enzymes and reduction of connexin 32 protein in liver. The NOAEL for this effect was 18 mg/kg bw/day. Liver medium-term Bioassay: etridiazole possesses promoter activity at 42 and 88 mg/kg bw/day; the NOAEL is 7 mg/kg bw/day for hepato-carcinogenicity.
Studies performed on metabolites or impurities	Studies with 5-ethoxy-1,2,4-thiadiazol-3-carboxylic acid, (etridiazole acid): rat LD_{50} oral > 2000 mg/kg bw 90-day oral, rat: NOAEL 39 mg/kg bw/day Non-genotoxic in Ames test, Chromosome aberrations study *in vitro* and *in vivo* micronucleus test. Derek modelling of the metabolites dichloro-etridiazole, 5-hydroxy-ethoxyetridiazole acid and 3-hydroxymethyl etridiazole, is negative for human health hazard.

Medical data (Annex IIA, point 5.9)

Skin irritation/sensitisation reported in workers; no evidence of further adverse effects reported in plant manufacturing workers. Based on more recent data no specific health complaints related to the handling of etridiazole have been determined.

Summary (Annex IIA, point 5.10)

	Value	Study	Safety factor
ADI	0.015 mg/kg bw/day	2-year rat study	300*
AOEL	0.03 mg/kg bw/day	1-year dog study	100
ARfD	0.15 mg/kg bw	rabbit, developmental study	100

* Additional safety factor as ADI based on a LOAEL

Dermal absorption (Annex IIIA, point 7.3)

Formulation: AATERRA ME 700 g etridiazole/L, ME formulation	High dose (1 g/L): 18% Low dose (0.01 g/L): 30% Rat *in vivo* study conducted with Terrazole 25 EC

Exposure scenarios (Annex IIIA, point 7.2)

Operator	Application via drip irrigation, minimum 1000 L/ha: German model[(1)] % of AOEL *substrate grown tomato and pepper* (0.56 kg etridiazole/ha) without PPE 35% with PPE (gloves) 0.4% *cucumber* (0.28 kg etridiazole/ha) without PPE 17% with PPE (gloves) 0.2% *ornamentals* (up to 7 kg etridiazole/ha): without PPE 288% with PPE (gloves) 3% (1) As etridiazole is a volatile a.s., inhalation exposure according to the German model was underestimated, a rough additional exposure should be considered: 0.6% of the AOEL for vegetable crops and 8% for ornamentals. UK POEM[(2)] % of AOEL *substrate grown tomato and pepper* (0.56 kg etridiazole/ha) without PPE 210% with PPE (gloves) 11%

	cucumber (0.28 kg etridiazole/ha) without PPE 140% with PPE (gloves) 7% *ornamentals* (up to 7 kg etridiazole/ha): without PPE 1400% with PPE (gloves) 70% (2) As etridiazole is a volatile a.s., inhalation exposure has to be added to the results given by the UK POEM: 0.6% of the AOEL for vegetable crops and 8% for ornamentals.
Workers	Worker exposure to etridiazole(3): without PPE: Substrate grown tomato, pepper and cucumber: 3% of AOEL Ornamentals 40% of AOEL Worker exposure to dichloro-etridiazole(3): Without PPE: Substrate grown tomato, pepper and cucumber: 0.4% of AOEL Ornamentals 4.5% of AOEL (3) using estimated air concentrations; dermal exposure not quantifiable
Bystanders	Bystander's exposure not relevant to greenhouses (bystanders should not be allowed in greenhouses).

Classification and proposed labelling with regard to toxicological data (Annex IIA, point 10)

	RMS/peer review proposal
Substance classified (etridiazole)	**Xn** "Harmful" **Xi** "Irritant" **R22** "Harmful if swallowed" **R37** "Irritating to respiratory system" **R43** "May cause sensitization by skin contact" **R40** "Limited evidence of a carcinogenic effect"
According to the criteria in Directive 67/548/EEC (Annex I)	T "Toxic" T; R23 "Toxic by inhalation" Xn; R21/22 "Harmful in contact with skin and if swallowed Carc. Cat. 3; R40 "Limited evidence of a carcinogenic effect"

According to the criteria in Regulation (EC) No 1272/2008 (Annex VI)	Skull and crossbones Health hazard Carc. 2; H351 “Suspected of causing cancer” Acute Tox. 3*; H331 “Toxic if inhaled” Acute Tox. 4*; H312 “Harmful in contact with skin” Acute Tox. 4*; H302 “Harmful if swallowed”

2.4 Residues

Metabolism in plants (Annex IIA, point 6.1 and 6.7, Annex IIIA, point 8.1 and 8.6)

Plant groups covered	Fruit crops (cucumber, substrate grown, drip application). Oilseeds (cotton, soil treatment, informative only).
Rotational crops	No studies submitted. (Not applicable, substrate grown crops).
Metabolism in rotational crops similar to metabolism in primary crops?	Not applicable.
Processed commodities	No studies submitted or required.
Residue pattern in processed commodities similar to residue pattern in raw commodities?	No studies submitted and not required.
Plant residue definition for monitoring	Sum etridiazole, 3-hydroxymethyl etridiazole (and its conjugates) and 5-hydroxyethoxy etridiazole acid (provisional, pending conclusion on the toxicological profile of these two metabolites) (fruit crops only)
Plant residue definition for risk assessment	Sum etridiazole, 3-hydroxymethyl etridiazole (and its conjugates) and 5-hydroxyethoxy etridiazole acid (provisional, pending conclusion on the toxicological profile of these two metabolites) (fruit crops only)
Conversion factor (monitoring to risk assessment)	None.

Metabolism in livestock (Annex IIA, point 6.2 and 6.7, Annex IIIA, point 8.1 and 8.6)

Animals covered	No studies submitted and not required.
Time needed to reach a plateau concentration in milk and eggs	Not applicable.
Animal residue definition for monitoring	No definition of the residue in animal products is required.
Animal residue definition for risk assessment	No definition of the residue in animal products is required.
Conversion factor (monitoring to risk assessment)	Not applicable.
Metabolism in rat and ruminant similar (yes/no)	Not applicable.
Fat soluble residue: (yes/no)	Not applicable.

Residues in succeeding crops (Annex IIA, point 6.6, Annex IIIA, point 8.5)

No studies submitted and not required for intended use.

Stability of residues (Annex IIA, point 6 introduction, Annex IIIA, point 8 Introduction)

Etridiazole residues stable for up to 14 months in tomato matrix when stored frozen at -20°C.

Residues from livestock feeding studies (Annex IIA, point 6.4, Annex IIIA, point 8.3)

Not applicable (livestock studies not submitted and not required)

Summary of residues data according to the representative uses on raw agricultural commodities and feedingstuffs (Annex IIA, point 6.3, Annex IIIA, point 8.2)

Crop	Northern Southern Region, Field or Glasshouse	Trials results relevant to the representative uses	Recommendation/comments	MRL estimated from trials according to representative use	HR	STMR
Tomato	Glasshouse	8x <0.01 (analysed for etridiazole only)	NEU glasshouse only No MRL proposed since samples analysed for the parent only and not according to the proposed residue definition.	-	-	-
Sweet pepper	Glasshouse	7x <0.01; 0.02 (analysed for etridiazole only)	NEU glasshouse only No MRL proposed since samples analysed for the parent only and not according to the proposed residue definition.	-	-	-
Cucumber	Glasshouse	6x <0.01; 0.07 (analysed for etridiazole only)	NEU glasshouse only No MRL proposed since samples analysed for the parent only and not according to the proposed residue definition.	-	-	-

Consumer risk assessment (Annex IIA, point 6.9, Annex IIIA, point 8.8)

ADI	0.015 mg/kg bw/day
TMDI (% ADI) according to EFSA PRIMo model rev.2	The chronic risk assessment could not be performed since the toxicological profile of the two major plant metabolites was not addressed and no MRLs could be derived from the submitted residue trials.
TMDI (% ADI) according to national (to be specified) diets	-
IEDI (WHO European Diet) (% ADI)	-
NEDI (specify diet) (% ADI)	-
Factors included in IEDI and NEDI	-
ARfD	0.15 mg/kg bw
IESTI (% ARfD) according to EFSA PRIMo model rev.2	The acute risk assessment could not be performed since the toxicological profile of the two major plant metabolites was not addressed and no MRLs could be derived from the submitted residue trials.
NESTI (% ARfD) according to national (to be specified) large portion consumption data	-
Factors included in IESTI and NESTI	Not applicable

Processing factors (Annex IIA, point 6.5, Annex IIIA, point 8.4)

Crop/ process/ processed product	Number of studies	Processing factors		Amount transferred (%) (Optional)
		Transfer factor	Yield factor	
Studies not submitted				

Proposed MRLs (Annex IIA, point 6.7, Annex IIIA, point 8.6)

Tomato	No MRL could be derived from the residue trials
Pepper	No MRL could be derived from the residue trials
Cucumber	No MRL could be derived from the residue trials

2.5 Fate and Behaviour in the Environment

Route of degradation (aerobic) in soil (Annex IIA, point 7.1.1.1.1)

Mineralization after 100 days ‡	8.2% after 90 d, [3-^{14}C] etridiazole (n=1) 4.7-4.8% after 100 d, [3-^{14}C] etridiazole (n=2)
Non-extractable residues after 100 days ‡	6.0% after 90 d [3-^{14}C] etridiazole (n=1) 23-40% after 100 d [3-^{14}C] etridiazole (n=2)
Metabolites requiring further consideration ‡ - name and/or code, % of applied (range and maximum)	3-dichloromethyl-5-ethoxy-1,2,4-thiadiazole (dichloro-etridiazole) max 10.2% at 30 d (n=1, value includes the residue found in the volatile trap) max 13.3/12.9% at 4/8 d (n=2, values include the residues found in the volatile trap) 5-ethoxy-1,2,4-thiadiazole-3-carboxylic acid (etridiazole acid) max 6.7% at 90 d (n=1) max 20-31% at 32-64 d (n=2)

Route of degradation in soil - Supplemental studies (Annex IIA, point 7.1.1.1.2)

Anaerobic degradation ‡

Mineralization after 100 days	2.7% after 91 d, [3-^{14}C] etridiazole (n=1)
Non-extractable residues after 100 days	58% after 91 d, [3-^{14}C] etridiazole (n=1)
Metabolites that may require further consideration for risk assessment - name and/or code, % of applied (range and maximum)	3-dichloromethyl-5-ethoxy-1,2,4-thiadiazole (dichloro-etridiazole) max 41% at 2 d (n=1, value includes the residue found in the volatile trap)

Soil photolysis ‡

Metabolites that may require further consideration for risk assessment - name and/or code, % of applied (range and maximum)	None The DT_{50} of etridiazole in irradiated soil was 12.6 days (at 330-800 nm: 151.7 W/m^2, 12 hour dark-light cycles)

Rate of degradation in soil (Annex IIA, point 7.1.1.2, Annex IIIA, point 9.1.1)

Laboratory studies ‡

No reliable degradation endpoints are available for the parent etridiazole or for the metabolite dicloro-etridiazole.

Note: direct exposure of soils is considered as negligible. Indirect exposure of the environment via volatilization and deposition cannot be excluded

Etridiazole acid	Aerobic conditions - **persistence endpoints**							
Soil type		pH	t. °C / % MWHC	DT_{50} /DT_{90} (d)	f. f. k_{dp}/k_f	DT_{50} (d)	St.	Method of calculation

						20°C	(r^2)	
Sandy loam		6.0	20°C/45%	36.0/120	-	-	0.99	SFO
loam		7.4	20°C/45%	36.5/121	-	-	0.99	SFO
sandy loam		5.1	20°C/45%	7.64/25.4	-	-	0.99	SFO
Geometric mean/median/mean								

Etridiazole acid	Aerobic conditions - **modelling endpoints**							
Soil type		pH	t. °C / % MWHC	DT_{50} /DT_{90} (d)	f. f. k_{dp}/k_f	DT_{50} (d) 20°C pF2/10kPa	St. (r^2)	Method of calculation
Sandy loam		6.0	20°C/45%	36.0/120	-	-	0.99	SFO
loam		7.4	20°C/45%	36.5/121	-	-	0.99	SFO
sandy loam		5.1	20°C/45%	7.64/25.4	-	-	0.99	SFO
Geometric mean/median/mean								

Field studies ‡

No data available – not required for the intended use in non-soil bound systems

pH dependence ‡ (yes / no) (if yes type of dependence)	No
Soil accumulation and plateau concentration ‡	No data. Not required.

Laboratory studies ‡

Parent	Anaerobic conditions (data submitted but not required for intended uses)						
Soil type		pH	t. °C / % MWHC	DT_{50} /DT_{90} (d)	DT_{50} (d) 20°C	St. (r^2)	Method of calculation
Sandy loam		6.6	25°C/flooded	0.59/1.97	-	0.98	SFO
Geometric mean/median/mean							

Dichloro-etridiazole	Anaerobic conditions							
Soil type		pH	t. °C / % MWHC	DT_{50}/ DT_{90} (d)	f. f. k_{dp}/k_f	DT_{50} (d) 20°C	St. (r^2)	Method of calculation
Sandy loam		6.6	25°C/flooded	11.5/38.2	-	-	0.99	SFO
Geometric mean/median								

Soil adsorption/desorption (Annex IIA, point 7.1.2)

Parent ‡ The study was conducted at 25°C.							
Soil Type	OC %	Soil pH	Kd (mL/g)	Koc (mL/g)	Kf (mL/g)	Kfoc (mL/g)	1/n
Sandy loam	2.4	6.6			8.21	349	0.86
Clay	4.2	7.4			8.24	195	0.92
Silt loam	1.6	7.3			5.06	323	0.84
Arithmetic mean/median					7.17/8.21	289/323	0.87/0.86
pH dependence, Yes or No			No				

Dichloro-etridiazole ‡ The study was conducted at 25°C.							
Soil Type	OC %	Soil pH	Kd (mL/g)	Koc (mL/g)	Kf (mL/g)	Kfoc (mL/g)	1/n
Sandy loam	2.4	6.6			2.77	118	0.81
Clay	4.2	7.4			2.11	50	0.89
Silt loam	1.6	7.3			1.99	128	0.83
Arithmetic mean/median					2.29/2.11	99/118	0.84/0.83
pH dependence (yes or no)			No				

Etridiazole Acid ‡ The study was conducted at 25°C.							
Soil Type	OC %	Soil pH	Kd (mL/g)	Koc (mL/g)	Kf (mL/g)	Kfoc (mL/g)	1/n
Sandy loam	2.4	6.6			0.459	20	0.95
Clay	4.2	7.4			0.547	13	0.84

Silt loam	1.6	7.3			0.344	22	0.75
Arithmetic mean/median					0.45/0.46	18/20	0.85/0.84
pH dependence (yes or no)				No			

Mobility in soil (Annex IIA, point 7.1.3, Annex IIIA, point 9.1.2)

Column leaching ‡	No reliable data available. No data required.
Aged residues leaching ‡	No study submitted and not required.
Lysimeter/ field leaching studies ‡	A field study (soil bound Chrysanthemum in glasshouse, 1 x 7 kg a.i/ha) was conducted in a sand and a loamy sand soil to monitor the leaching of etridiazole and its metabolites etridiazole acid and dichloro-etridiazole. The recent use of etridiazole on the test plots was confirmed by the presence of etridiazole acid in ground and drainage water prior to treatment. Analysis of groundwater up to 12 months post-treatment revealed etridiazole at maximum 0.14 µg/L - 0.20 µg/L (and <0.10 µg/L for all other samples). Etridiazole-acid was present before the treatment (2.0 µg/L - 0.89 µg/L), but increased to maximum 3.7 µg/L - 1.9 µg/L after the treatment. Dichloro-etridiazole was <0.05 µg/L at all time points. Maximum concentrations in drainage water were 0.39 µg/L for etridiazole, 18 µg/L for etridiazole acid and 0.14 µg/L for dichloro-etridiazole. Analysis of soil samples (100 cm) up to 9 months post-treatment revealed etridiazole and dichloro-etridiazole immediately after treatment, but not thereafter. The presence of etridiazole in irrigation water (at 0.17 µg/L, before the treatment) may be an indication of volatilization of etridiazole after application followed by deposition outside the glasshouse. The study had some limitations and the representativeness to the proposed intended uses is also limited.

PEC (soil) (Annex IIIA, point 9.1.3)

Parent Method of calculation	Direct exposure of the soil compartment is negligible for the intended uses. However estimations for PECs considering the deposition after volatilization outside the glasshouse are reported under the PECa box below.

Route and rate of degradation in water (Annex IIA, point 7.2.1)

Hydrolytic degradation of the active substance and metabolites > 10 % ‡	pH 5: 92 d at 25 °C (1st order, r^2=0.98) Etridiazole acid: 65 %AR (188 d)

	pH 7: 98 d at 25 °C (1st order, r^2=0.98) Etridiazole acid: 72 %AR (188 d)
	pH 9: 88 d at 25 °C (1st order, r^2=0.99) Etridiazole acid: 69 %AR (188 d)
Photolytic degradation of active substance and metabolites above 10 % ‡	Not required because the molar absorption coefficient of etridiazole was <10 L mol^{-1} cm^{-1}
Quantum yield of direct phototransformation in water at Σ > 290 nm	Not required because the molar absorption coefficient of etridiazole was <10 L mol^{-1} cm^{-1}.
Readily biodegradable ‡ (yes/no)	No

Degradation in water / sediment

Parent	**Persistence endpoints** Distribution (max in water 98% after 0 d. Max. sed 0.5% after 2 d)									
Water / sediment system	pH water phase	pH sed	t. °C	DT_{50}-DT_{90} whole sys.	St. (r^2)	DT_{50}-DT_{90} water	St. (r^2)	DT_{50}- DT_{90} sed	St. (r^2)	Method of calculation
Rohrspitz	8.1	7.5	20	1.92-6.38	0.98	1.29-4.29	1.0	-	-	SFO
Espel	8.0	7.7	20	1.78-5.91	0.98	1.33-4.41	0.99	-	-	SFO
Geometric mean				1.85-6.14		1.31-4.35		-		
Median				1.85-6.15		1.31-4.35		-		
Mean				1.85-6.15		1.31-4.35		-		

No pH dependent degradation is expected for etridiazole.

Parent	**Modelling endpoints**									
Water / sediment system	pH water phase	pH sed	t. °C	DT_{50} whole sys.	St. (r^2)	DT_{50} water	St. (r^2)	DT_{50} sed	St. (r^2)	Method of calculation
Rohrspitz	8.1	7.5	20	1.92	0.98	1.92	-	1.92	-	SFO
Espel	8.0	7.7	20	1.78	0.98	1.78	-	1.78	-	SFO
Geometric mean				1.85		1.85		1.85		
Median				1.85		1.85		1.85		
Mean				1.85		1.85		1.85		

Etridiazole Acid	**Persistence endpoints** Distribution (max in water 13% after 62-104 d. Max. sed 8.3% after 30 d)									
Water / sediment system	pH water phase	pH sed	t. °C	DT_{50}-DT_{90} whole sys.	St. (r^2)	DT_{50}-DT_{90} water	St. (r^2)	DT_{50}- DT_{90} sed	St. (r^2)	Method of calculation
River Rhine	8.3	7.5	20	427-1417	0.94	320-1547	0.98	291-968	0.97	SFO/DFOP[1]

Pond Ormalingen	8.4	7.3	20	517-1718	0.89	189-1649	0.97	-	-	SFO/DFOP[1]
Geometric mean				470-1560		246-1597		-		
Median				472-1568		255-1598		-		
Mean				472-1568		255-1598		291-968		

[1] SFO for whole system and sediment. DFOP for water column

Etridiazole Acid	**Modelling endpoints**									
Water / sediment system	pH water phase	pH sed	t. °C	DT_{50} whole sys.	St. (r^2)	DT_{50} water	St. (r^2)	DT_{50} sed	St. (r^2)	Method of calculation
River Rhine	8.3	7.5	20	427	0.94	427	-	427	-	SFO
Pond Ormalingen	8.4	7.3	20	517	0.89	517	-	517	-	SFO
Geometric mean				470		470		470		
Median				472		472		472		
Mean				472		472		472		

Dichloro-etridiazole	**Persistence endpoints** Distribution (max in water 9.5% after 2 d. Max. sed 1.4% after 2 d)									
Water / sediment system	pH water phase	pH sed	t. °C	DT_{50}-DT_{90} whole sys.	St. (r^2)	DT_{50}-DT_{90} water	St. (r^2)	DT_{50}- DT_{90} sed	St. (r^2)	Method of calculation
Rohrspitz	8.1	7.5	20	1.55-5.14	1.00	1.38-4.59	1.00	-	-	SFO
Espel	8.0	7.7	20	2.99-9.33	1.00	2.92-9.71	0.99	-	-	SFO
Geometric mean				2.15-6.93		2.01-6.68				
Median				2.27-7.24		2.15-7.15				
Mean				2.27-7.24		2.15-7.15				

Dichloro-etridiazole	**Modelling endpoints**									
Water / sediment system	pH water phase	pH sed	t. °C	DT_{50} whole sys.	St. (r^2)	DT_{50} water	St. (r^2)	DT_{50} sed	St. (r^2)	Method of calculation
Rohrspitz	8.1	7.5	20	1.55[1]	1.00	1.55	-	1.55	-	SFO
Espel	8.0	7.7	20	2.99[1]	1.00	2.99	-	2.99	-	SFO
Geometric mean				2.15		2.15		2.15		
Median				2.27		2.27		2.27		
Mean				2.27		2.27		2.27		

[1] dissipation

Mineralization and non extractable residues					
Water / sediment system	pH water phase	pH sed	Mineralization x % after n d. (end of the study).	Non-extractable residues in sed. Max x % after n d	Non-extractable residues in sed. Max x % after n d (end of the study)
Rohrspitz	8.1	7.5	3.1% after 104 d	max 21% after 14 d	16% after 104 d
Espel	8.0	7.7	2.3% after 104 d	max 26% after 14 d	24% after 104 d

PEC (surface water) and PEC sediment (Annex IIIA, point 9.2.3)

Parent Parameters used in FOCUSsw step 1 and 2	Version control no. of FOCUS calculator: vs 1.1 Molecular weight (g/mol): 247.5 Water solubility (mg/L): 117.1 K_{OC} (L/kg): 289 DT_{50} soil (d): 25.0 (note: value not validated, but it has no effect to the results) DT_{50} water/sediment system (d): 1.85 DT_{50} water (d): 1.85 DT_{50} sediment (d): 1.85
Parameters used in FOCUSsw step 3 (if performed)	not performed, not required
Application rate	Crop: ornamentals, peppers-tomatoes and cucumbers Crop interception: no interception (to simulate application through (drip) irrigation) Number of applications: 2 Interval (d): 14 Application rate(s): 7000 g as/ha (ornamentals); 560 g as/ha (peppers-tomatoes); 280 g as/ha (cucumbers) Application window: not relevant (no drainage/runoff) All intended uses are greenhouse applications. No greenhouse scenario is available in Step 1 and 2. Greenhouse applications were simulated by STEP 2 calculations selecting “no runoff/drainage” and correcting the drift factor to 0.1% (default for greenhouse emission).

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Ornamentals	0 h	2.343	-	2.244	-
	24 h	1.313	1.828	1.685	1.965
	2 d	0.884	1.464	1.168	1.695
	4 d	0.417	1.046	0.552	1.263

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
	7 d	0.135	0.706	0.179	0.866
	14 d	0.010	0.377	0.013	0.465
	21 d	0.001	0.253	0.001	0.312
	28 d	0.000	0.190	0.000	0.234
	42 d	0.000	0.126	0.000	0.156

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Peppers/tomatoes	0 h	0.187	-	0.180	-
	24 h	0.105	0.146	0.135	0.157
	2 d	0.071	0.117	0.093	0.136
	4 d	0.033	0.084	0.044	0.101
	7 d	0.011	0.057	0.014	0.069
	14 d	0.001	0.030	0.001	0.037
	21 d	0.000	0.020	0.000	0.025
	28 d	0.000	0.015	0.000	0.019
	42 d	0.000	0.010	0.000	0.012

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Cucumber	0 h	0.094	-	0.090	-
	24 h	0.053	0.073	0.067	0.079
	2 d	0.035	0.059	0.047	0.068
	4 d	0.017	0.042	0.022	0.051
	7 d	0.005	0.028	0.007	0.035
	14 d	0.000	0.015	0.001	0.019
	21 d	0.000	0.010	0.000	0.012
	28 d	0.000	0.008	0.000	0.009
	42 d	0.000	0.005	0.000	0.006

Etridiazole acid Parameters used in FOCUSsw step 1 and 2	Molecular weight: 174.2 Water solubility (mg/L): 117.1 (set equal to parent, no data) Soil or water metabolite: both Koc (L/kg): 18 DT_{50} soil (d): 26.7 (note: value not validated, but it has no effect to the results) DT_{50} water/sediment system (d): 472 DT_{50} water (d): 472 DT_{50} sediment (d): 472 Crop interception (%): No interception Maximum occurrence observed (% molar basis with respect to the parent) Water/sediment: 20% Soil: 31%
Parameters used in FOCUSsw step 3 (if performed)	Not performed, not required
Application rate	Crop: ornamentals, peppers-tomatoes and cucumbers Crop interception: no interception (to simulate application through (drip) irrigation) Number of applications: 2 Interval (d): 14 Application rate(s): 7000 g as/ha (ornamentals); 560 g as/ha (peppers-tomatoes); 280 g as/ha (cucumbers) Application window: not relevant (no drainage/runoff) All intended uses are greenhouse applications. No greenhouse scenario is available in Step 1 and 2. Greenhouse applications were simulated by STEP 2 calculations selecting “no runoff/drainage” and correcting the drift factor to 0.1% (default for greenhouse emission).
Main routes of entry	via air (greenhouse emission 0.1%)

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Ornamentals	0 h	0.64526	-	0.077	-
	24 h	0.6391	0.64218	0.077	0.077
	2 d	0.6391	0.64064	0.077	0.077
	4 d	0.63756	0.6391	0.07546	0.077
	7 d	0.63448	0.63756	0.07546	0.077
	14 d	0.62832	0.63448	0.07546	0.07546
	21 d	0.62062	0.6314	0.07392	0.07546
	28 d	0.61446	0.62832	0.07392	0.07546
	42 d	0.60214	0.62062	0.07238	0.07392

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Peppers/tomatoes	0 h	0.05236	-	0.00616	-
	24 h	0.05082	0.05082	0.00616	0.00616
	2 d	0.05082	0.05082	0.00616	0.00616
	4 d	0.05082	0.05082	0.00616	0.00616
	7 d	0.05082	0.05082	0.00616	0.00616
	14 d	0.05082	0.05082	0.00616	0.00616
	21 d	0.04928	0.05082	0.00616	0.00616
	28 d	0.04928	0.05082	0.00616	0.00616
	42 d	0.04774	0.04928	0.00616	0.00616

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Cucumber	0 h	0.02618	-	0.00308	-
	24 h	0.02618	0.02618	0.00308	0.00308
	2 d	0.02618	0.02618	0.00308	0.00308
	4 d	0.02618	0.02618	0.00308	0.00308
	7 d	0.02464	0.02618	0.00308	0.00308
	14 d	0.02464	0.02464	0.00308	0.00308
	21 d	0.02464	0.02464	0.00308	0.00308
	28 d	0.02464	0.02464	0.00308	0.00308
	42 d	0.02464	0.02464	0.00308	0.00308

Note: A data gap was identified for PECsw for etridiazole acid considering both these exposure routes: volatilization-deposition (short-range transport) and formation after deposition of the parent compound.

Dichloro-etridiazole Parameters used in FOCUSsw step 1 and 2	Molecular weight: 213.1 Water solubility (mg/L): 117.1 (set equal to parent, no data) Soil or water metabolite: both Koc (L/kg): 99 DT_{50} soil (d): 63.5 (note: value not validated, but it has no effect to the results) DT_{50} water/sediment system (d): 2.27 DT_{50} water (d): 2.27 DT_{50} sediment (d): 2.27 Crop interception (%): No interception Maximum occurrence observed (% molar basis with respect to the parent) Water/sediment: 11% Soil: 13.3%
Parameters used in FOCUSsw step 3 (if performed)	Not performed, not required
Application rate	Crop: ornamentals, peppers-tomatoes and cucumbers Crop interception: no interception (to simulate application through (drip) irrigation) Number of applications: 2 Interval (d): 14 Application rate(s): 7000 g as/ha (ornamentals); 560 g as/ha (peppers-tomatoes); 280 g as/ha (cucumbers) Application window: not relevant (no drainage/runoff) All intended uses are greenhouse applications. No greenhouse scenario is available in Step 1 and 2. Greenhouse applications were simulated by STEP 2 calculations selecting “no runoff/drainage” and correcting the drift factor to 0.1% (default for greenhouse emission).
Main routes of entry	via air (greenhouse emission 0.1%)

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Ornamentals	0 h	0.22388	-	0.09628	-
	24 h	0.15312	0.18792	0.07424	0.08468
	2 d	0.11252	0.16008	0.05452	0.07424
	4 d	0.06032	0.12296	0.03016	0.058
	7 d	0.02436	0.087	0.0116	0.04176
	14 d	0.00232	0.04872	0.00116	0.0232
	21 d	0	0.03248	0	0.01508
	28 d	0	0.02436	0	0.0116
	42 d	0	0.01624	0	0.00812

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Peppers/tomatoes	0 h	0.0174	-	0.00812	-
	24 h	0.01276	0.01508	0.0058	0.00696
	2 d	0.00928	0.01276	0.00464	0.0058
	4 d	0.00464	0.00928	0.00232	0.00464
	7 d	0.00232	0.00696	0.00116	0.00348
	14 d	0	0.00348	0	0.00232
	21 d	0	0.00232	0	0.00116
	28 d	0	0.00232	0	0.00116
	42 d	0	0.00116	0	0.00116

FOCUS STEP 2 Scenario	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Cucumber	0 h	0.00928	-	0.00348	-
	24 h	0.0058	0.00696	0.00348	0.00348
	2 d	0.00464	0.00696	0.00232	0.00348
	4 d	0.00232	0.00464	0.00116	0.00232
	7 d	0.00116	0.00348	0	0.00116
	14 d	0	0.00232	0	0.00116
	21 d	0	0.00116	0	0.00116
	28 d	0	0.00116	0	0
	42 d	0	0.00116	0	0

PEC (ground water) (Annex IIIA, point 9.2.1)

Method of calculation and type of study (*e.g.* modelling, field leaching, lysimeter)	Direct exposure of groundwater is negligible for the intended uses. However there is a potential for indirect exposure of the soil thus exposure of the groundwater via volatilization and deposition. Assessment on the leaching potential for etridiazole and for the relevant soil metabolites is required.
Application rate	-

Fate and behaviour in air (Annex IIA, point 7.2.2, Annex III, point 9.3)

Direct photolysis in air ‡	Not studied - no data requested
Quantum yield of direct phototransformation	Not studied - no data requested
Photochemical oxidative degradation in air ‡	etridiazole: DT_{50} of 18.67 hours (1.556 d) derived by the Atkinson model (AOP v1.91). OH (12 h) concentration assumed = $1.56x10^6$ OH/cm^3 etridiazole acid: No information is available – data required dichloro-etridiazole: DT_{50} of 17.94 hours (1.495 d) derived by the Atkinson model (AOP v1.92). OH (12 h) concentration assumed = $1.5x10^6$ OH/cm^3
Volatilisation ‡	Not studied – no data requested
	Not studied – no data requested
Metabolites	-

PEC (air)

Method of calculation	Concentrations of etridiazole and its major metabolite dichloro etridiazole in air resulting from volatilisation and concentrations in soil and surface water based on successive deposition of parent and metabolite were calculated based on the models EVA 1.1 and EVA 2.0 (Exposure via Air) • Ornamental crops: 7 kg ai/ha * 13 % * 0.861 = 0.784 kg ai/ha • Vegetable crops: 0.56 kg ai/ha * 13 % * 0.861 = 0.063 kg ai/ha However, indoor application scenarios are not implemented in EVA 1.1. Parameters referring to greenhouses were thus derived from EVA 2.0. The calculation of the emission rate with EVA 1.1 is based on the assumption that the main factor influencing the emission of a compound is its vapour pressure. Default values for greenhouse dimensions from the model EVA 2.0 were used for the calculation of concentrations in air: - floor space of buildings = 300 m^2 - volume of building = 1000 m^3

PEC(a)

Maximum concentration	See below

Time after	Air concentration	Air concentration	Air concentration	Air concentration

application (hours)	etridiazole (µg a.s./m^3) after application in ornamentals (app. rate 7 kg a.s./ha)	etridiazole (µg a.s./m^3) after application in vegetables (app. rate 0.56 kg a.s./ha)	dichloro-etridiazole (µg a.s./m^3) after application in ornamentals (app. rate 0.784 kg a.s./ha)	dichloro-etridiazole (µg a.s./m^3) after application in vegetables (app. rate 0.063 kg a.s./ha)
0 - 4	134.48	10.76	15.06	1.21
4 - 12	66.99	5.36	7.50	0.60
12 - 24	33.75	2.70	3.78	0.30
>24	0	0	0	0

Actual and time-weighted average (TWA) PEC_S of etridiazole in soil based on the entry route atmospheric deposition following volatilisation after application of 7 kg ai/ha to ornamental crops

Time after application [d]	PECs [ug/kg]					
	Distance of 1 m		Distance of 3 m		Distance of 5 m	
	Actual	TWA	Actual	TWA	Actual	TWA
0	52.7	-	49.0	-	45.6	-
1	48.8	50.7	45.4	47.2	42.2	43.9
2	45.1	48.8	42.0	45.4	39.1	42.3
4	38.7	45.3	36.0	42.2	33.5	39.3
7	30.7	40.7	28.6	37.9	26.6	35.3
14	17.9	32.2	16.6	30.0	15.5	27.9
21	10.4	26.1	9.7	24.3	9.0	22.6
28	6.1	21.6	5.6	20.1	5.3	18.7
42	2.1	15.6	1.9	14.5	1.8	13.5
100	0.0	6.8	0.0	6.3	0.0	5.9

notes: no agreed soil DT_{50} is available. DT_{50} of 8.98 days was used

Actual and time-weighted average (TWA) PECS of etridiazole in soil based on the entry route atmospheric deposition following volatilisation after application of 0.56 kg ai/ha to vegetables (tomatoes, peppers, cucumbers)

Time after application [d]	PECs [ug/kg]					
	Distance of 1 m		Distance of 3 m		Distance of 5 m	
	Actual	TWA	Actual	TWA	Actual	TWA
0	4.21	-	3.92	-	3.65	-
1	3.90	4.05	3.63	3.77	3.38	3.51

2	3.61	3.90	3.36	3.63	3.13	3.38
4	3.09	3.62	2.88	3.37	2.68	3.14
7	2.45	3.26	2.28	3.03	2.13	2.82
14	1.43	2.58	1.33	2.40	1.24	2.23
21	0.83	2.09	0.78	1.94	0.72	1.81
28	0.49	1.72	0.45	1.61	0.42	1.49
42	0.16	1.25	0.15	1.16	0.14	1.08
100	0.00	0.55	0.00	0.51	0.00	0.47

notes: no agreed soil DT_{50} is available. DT_{50} of 8.98 days was used

Based on the maximum percentage of occurrence of 31% a worst case initial PEC in soil for etridiazole acid is calculated as follows (application of 7 kg ai/ha to ornamental crops):

Time after application [d]	PECs [ug/kg]					
	Distance of 1 m		Distance of 3 m		Distance of 5 m	
	Actual	TWA	Actual	TWA	Actual	TWA
0	16.3	-	15.2	-	14.1	-

Notes: These calculations consider only the formation of the metabolite in soil from the deposited parent etridiazole; direct exposure of soil (volatilisation-deposition of the metabolite) was not considered. New calculations required. The calculations do not consider the difference in molecular weight of the parent and the metabolite.

Initial PECS of dichloro etridiazole related to atmospheric deposition following volatilisation and formation of dichloro etridiazole following deposition of etridiazole and resulting total initial PECS of dichloro etridiazole

PECs related to:	PECs [ug/kg]					
	Application to ornamental crops (7 kg/ha etridiazole)			Application to ornamental crops (0.56 kg/ha etridiazole)		
Distance of	1 m	3 m	5 m	1 m	3 m	5 m
Etridiazole (deposited)	52.67	49.03	45.64	4.21	3.92	3.65
Transformation factor	0.112					
dichloro etridiazole (formed in off-crop area)	5.90	5.49	5.11	0.47	0.44	0.41

dichloro etridiazole (deposited)	5.90	5.49	5.11	0.47	0.44	0.41
Total dichloro etridiazole	11.80	10.98	10.22	0.95	0.88	0.82

Actual and time-weighted average (TWA) PECS of dichloro etridiazole in soil after application of 7 kg/ha etridiazole to ornamental crops

Time after application [d]	PECs [ug/kg]					
	Distance of 1 m		Distance of 3 m		Distance of 5 m	
	Actual	TWA	Actual	TWA	Actual	TWA
0	11.80	_	10.98	-	10.22	-
1	11.37	11.58	10.58	10.78	9.85	10.04
2	10.95	11.37	10.19	10.58	9.49	9.85
4	10.16	10.96	9.46	10.20	8.81	9.50
7	9.09	10.38	8.46	9.67	7.88	9.00
14	7.00	9.19	6.52	8.56	6.07	7.97
21	5.39	8.18	5.02	7.62	4.67	7.09
28	4.16	7.32	3.87	6.82	3.60	6.35
42	2.47	5.96	2.30	5.55	2.14	5.17
100	0.28	3.09	0.26	2.88	0.25	2.68

notes: no agreed soil DT_{50} is available. DT_{50} of 18.6 days was used

Actual and time-weighted average (TWA) PEC_S of dichloro etridiazole in soil after application of 0.56 kg/ha etridiazole to vegetables (tomatoes, peppers, cucumbers)

Time after application [d]	PECs [ug/kg]					
	Distance of 1 m		Distance of 3 m		Distance of 5 m	
	Actual	TWA	Actual	TWA	Actual	TWA
0	0.95	-	0.88	-	0.82	-
1	0.91	0.93	0.85	0.86	0.79	0.80
2	0.88	0.91	0.82	0.85	0.76	0.79
4	0.81	0.88	0.76	0.82	0.71	0.76
7	0.73	0.83	0.68	0.77	0.63	0.72
14	0.56	0.74	0.52	0.69	0.49	0.64
21	0.43	0.66	0.40	0.61	0.37	0.57
28	0.33	0.59	0.31	0.55	0.29	0.51
42	0.20	0.48	0.18	0.44	0.17	0.41

100	0.02	0.25	0.02	0.23	0.02	0.21

notes: no agreed soil DT_{50} is available. DT_{50} of 18.6 days was used

Actual and time-weighted average PECSw of etridiazole in surface water based on the entry route atmospheric deposition following volatilisation after application of 7 kg ai/ha to ornamental crops

Time after application [d]	PECsw [ug/L] Distance of					
	1 m	3 m	5m	10 m	15m |	20m
Actual						
0	13.17	12.26	11.41	9.54	7.98	6.67
1	9.05	8.43	7.84	6.56	5.48	4.59
2	6.22	5.79	5.39	4.51	3.77	**3.15**
4	2.94	2.74	2.55	2.13	1.78	1.49
7	0.96	0.89	0.83	0.69	0.58	0.48
14	0.07	0.06	0.06	0.05	0.04	0.04
21	0.01	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00
42	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00
Time-weighted average						
1	10.98	10.22	9.52	7.96	**6.65**	5.56
2	9.27	8.63	8.03	6.71	5.61	**4.69**
4	6.82	6.35	5.91	4.94	4.13	3.46
7	4.66	4.33	4.03	3.37	2.82	2.36
14	2.50	2.32	2.16	1.81	1.51	1.26
21	1.67	1.56	1.45	1.21	1.01	0.85
28	1.26	1.17	1.09	0.91	0.76	0.64
42	0.84	0.78	0.73	0.61	0.51	0.42
100	0.35	0.33	0.30	0.25	0.21	0.18

Actual and time-weighted average PECsw of etridiazole in surface water based on the entry route atmospheric deposition following volatilisation after application of 0.56 kg ai/ha to vegetables (tomatoes, peppers, cucumbers)

Time after application [d]	**PECsw [ug/L] Distance of**					
	1 m	3 m	5m	10 m	15m |	20m
Actual						
0	1.05	0.98	0.91	0.76	0.64	0.53
1	0.72	0.67	0.63	0.52	0.44	0.37
2	0.50	0.46	0.43	0.36	0.30	0.25
4	0.24	0.22	0.20	0.17	0.14	0.12

7	0.08	0.07	0.07	0.06	0.05	0.04
14	0.01	0.01	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00
42	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00
Time-weighted average						
1	0.88	0.82	0.76	0.64	0.53	0.44
2	0.74	0.69	0.64	0.54	0.45	0.38
4	0.55	0.51	0.47	0.40	0.33	0.28
7	0.37	0.35	0.32	0.27	0.23	0.19
14	0.20	0.19	0.17	0.14	0.12	0.10
21	0.13	0.12	0.12	0.10	0.08	0.07
28	0.10	0.09	0.09	0.07	0.06	0.05
42	0.07	0.06	0.06	0.05	0.04	0.03
100	0.03	0.03	0.02	0.02	0.02	0.01

Initial PECsw of etridiazole related to atmospheric deposition following volatilisation and formation of dichloro etridiazole following deposition of etridiazole and resulting total initial PECS of dichloro etridiazole

Time after application [d]	PECsw [ug/L] Distance of					
	1 m	3 m	5m	10 m	15m	20m
Application to ornamental crops (7 kg/ha Etridiazole)						
Etridiazole (deposited)	13.167	12.257	11.410	9.540	7.976	6.669
Transformation factor	0.094					
dichloro etridiazole (formed in off-crop area)	1.238	1.152	1.073	0.897	0.750	0.627
dichloro etridiazole (deposited)	1.475	1.373	1.278	1.068	0.893	0.747
Total dichloro etridiazole	2.712	2.525	2.350	1.965	1.643	1.374
Application to vegetable crops (0.56 kg/ha Etridiazole)						
Etridiazole (deposited)	1.053	0.981	0.913	0.763	0.638	0.534
Transformation factor	0.094					
dichloro etridiazole (formed in off-crop area)	0.099	0.092	0.086	0.072	0.060	0.050

dichloro etridiazole (deposited)	0.119	0.110	0.103	0.086	0.072	0.060
Total dichloro etridiazole	0.218	0.202	0.188	0.158	0.132	0.110

Actual and time-weighted average PECsw of dichloro etridiazole in surface water after application of 0.784 kg/ha etridiazole to ornamental crops

Time after application [d]	PECsw [ug/L] Distance of					
	1 m	3 m	5m	10 m	15m |	20m
Actual						
0	2.712	2.525	2.350	1.965	1.643	1.374
1	1.999	1.861	1.732	1.448	1.211	1.012
2	1.473	1.371	1.276	1.067	0.892	0.746
4	0.800	0.744	0.693	0.579	0.484	0.405
7	0.320	0.298	0.277	0.232	0.194	0.162
14	0.038	0.035	0.033	0.027	0.023	0.019
21	0.004	0.004	0.004	0.003	0.003	0.002
28	0.001	0.000	0.000	0.000	0.000	0.000
42	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000
Time-weighted average						
1	2.337	2.176	2.026	1.694	1.416	1.184
2	2.030	1.890	1.759	1.471	1.230	1.028
4	1.566	1.458	1.357	1.135	0.949	0.793
7	1.119	1.042	0.970	0.811	0.678	0.567
14	0.626	0.582	0.542	0.453	0.379	0.317
21	0.422	0.393	0.366	0.306	0.256	0.214
28	0.317	0.295	0.275	0.230	0.192	0.161
42	0.211	0.197	0.183	0.153	0.128	0.107
100	0.089	0.083	0.077	0.064	0.054	0.045

Actual and time-weighted average PECsw of dichloro etridiazole in surface water after application of 0.56 kg/ha etridiazole to vegetables (tomatoes, peppers, cucumbers)

Time after application [d]	PECsw [ug/L] Distance of					
	1 m	3 m	5m	10 m	15m |	20m
Actual						
0	0.218	0.202	0.188	0.158	0.132	0.110
1	0.160	0.149	0.139	0.116	0.097	0.081
2	0.118	0.110	0.102	0.086	0.072	0.060
4	0.064	0.060	0.056	0.046	0.039	0.032

Time after application [d]	PECsw [ug/L] Distance of					
	1 m	3 m	5m	10 m	15m	20m
7	0.026	0.024	0.022	0.019	0.016	0.013
14	0.003	0.003	0.003	0.002	0.002	0.002
21	0.000	0.000	0.000	0.000	0.000	0.000
28	0.000	0.000	0.000	0.000	0.000	0.000
42	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000
Time-weighted average						
1	0.187	0.174	0.162	0.136	0.114	0.095
2	0.163	0.152	0.141	0.118	0.099	0.082
4	0.126	0.117	0.109	0.091	0.076	0.064
7	0.090	0.084	0.078	0.065	0.054	0.045
14	0.050	0.047	0.043	0.036	0.030	0.025
21	0.034	0.032	0.029	0.025	0.021	0.017
28	0.025	0.024	0.022	0.018	0.015	0.013
42	0.017	0.016	0.015	0.012	0.010	0.009
100	0.007	0.007	0.006	0.005	0.004	0.004

Residues requiring further assessment

Environmental occurring metabolite requiring further assessment by other disciplines (toxicology and ecotoxicology).	Soil: etridiazole, etridiazole acid, dichloro-etridiazole Surface water: etridiazole, etridiazole acid, dichloro-etridiazole Ground water: etridiazole, etridiazole acid, dichloro-etridiazole Air: etridiazole, etridiazole acid, dichloro-etridiazole

Monitoring data, if available (Annex IIA, point 7.4)

Soil (indicate location and type of study)	No data provided - none requested
Surface water (indicate location and type of study)	No data provided - none requested
Ground water (indicate location and type of study)	No data provided - none requested
Air (indicate location and type of study)	No data provided - none requested

Points pertinent to the classification and proposed labelling with regard to fate and behaviour data

Not readily biodegradable

2.6 Ecotoxicology

Effects on terrestrial vertebrates (Annex IIA, point 8.1, Annex IIIA, points 10.1 and 10.3)

Species	Test substance	Time scale	End point (mg/kg bw/day)	End point (mg/kg feed)
Birds				
Bobwhite quail	a.s.	Acute	LD50 560 (1)	
Mallard duck	a.s.	Short-term	LC50 286 (2)	
Bobwhite quail	a.s.	Long-term	NOEC 3.7	NOEC 42
Mammals				
Rat	a.s.	Acute	LD50 945	-
Rat	a.s.	Long-term	NOEC 5.3	NOEC 80
Additional higher tier studies ‡				
No data available – not required				

(1,2) Endpoint considered as less reliable, since no data to confirm purity of the test substance(1) or validation of analytical method(2) is available, but endpoints taken as sufficiently reliable for risk assessment in view of the expected low exposure of birds as result of the intended uses (glasshouse).

Toxicity/exposure ratios for terrestrial vertebrates (Annex IIIA, points 10.1 and 10.3)

Ornamentals, 2 x 7 kg a.s./ha (worst-case exposure)

Indicator species/Category	Time scale	ETE	TER	Annex VI Trigger
Tier 1 (Birds)				
Route: water	Short-term[1]	0.63	452095	10
Route: fish	Long-term	0.01	430	5
Tier 1 (Mammals)				
Route: water	Acute	4E-04	3E+06	10
Route: fish	Long-term	0.01	977	5

[1] Risk calculated with the short-term endpoint, which is lower than the acute endpoint.

Toxicity data for aquatic species (most sensitive species of each group) (Annex IIA, point 8.2, Annex IIIA, point 10.2)

Group	Test substance	Time-scale (Test type)	End point	Toxicity[(1)] (mg/L)
Laboratory tests				
Fish				
Oncorhynchus mykiss	a.s.	96 hr (flow-through)	Mortality, EC_{50}	2.4 (mm)
	a.s.	90 d (flow-through)	ELS NOEC	0.12 (mm)
	Etridiazole acid	96 hr (static)	Mortality, EC_{50}	>100 (nom)
	Dichloro-etridiazole	96 hr (flow-through)	Mortality, EC_{50}	0.77 (mm)
Cyprinodon variegatus	a.s.	96 hr (flow-through)	Mortality, EC_{50}	4.0 (mm)
Aquatic invertebrate				
Daphnia magna	a.s.	48 h (flow-through)	Mortality, EC_{50}	3.1 (mm)
	a.s.	21 d (flow-through)	Reproduction, NOEC	0.37 (mm)
	Etridiazole acid	48 h (static)	Mortality, EC_{50}	350 (mm)
	Dichloro-etridiazole	48 h (flow-through)	Mortality, EC_{50}	1.1 (mm)
Mysidopsis bahia	a.s.	96 h (flow-through)	Mortality, EC_{50}	2.5 (mm)
Crassostrea virginica	a.s.	96 h (flow-through)	Mortality, EC_{50}	3.0 (mm)
Sediment dwelling organisms				
No data submitted – no data required				
Algae				
Selenastrum capricornutum	a.s.	120 h (static)	Biomass: E_bC_{50} Growth rate: E_rC_{50}	0.17 (mm) 0.49 mm
	Etridiazole acid	72 h (static)	Biomass: E_bC_{50} Growth rate: E_rC_{50}	27 (mm) 29 (mm)
	Dichloro-etridiazole	72 h (static)	Biomass: E_bC_{50} Growth rate: E_rC_{50}	0.62 (mm) >0.98 (mm)
Anabaena flos-aquae	a.s.	120 h (static)	Biomass: E_bC_{50} Growth rate: E_rC_{50}	0.37 (mm) >1.0 (mm)

Group	Test substance	Time-scale (Test type)	End point	Toxicity[(1)] (mg/L)
Higher plant				
Lemna gibba	a.s.	14 d (static)	Biomass: E_bC_{50} Growth rate: E_rC_{50}:	7.3 (initial) 14 (initial)
Microcosm or mesocosm tests				
No data submitted – no data required				

(1) nominal ($_{nom}$) or mean measured concentrations ($_{mm}$).

Toxicity/exposure ratios for the most sensitive aquatic organisms (Annex IIIA, point 10.2)

FOCUS Step 2

Ornamentals, 2 x 7 kg a.s./ha

Test substance	Organism	Toxicity end point (µg/L)	Time scale	PEC_i (µg/L)	Non-spray buffer zone (m)	TER	Annex VI Trigger
a.s.	Fish	2400	Acute	2.343*	-	1024	100
a.s.	Fish	120	Chronic	2.343*	-	51	10
a.s.	Aquatic invertebrates	2500	Acute	2.343*	-	1067	100
a.s.	Aquatic invertebrates	370	Chronic	2.343*	-	158	10
a.s.	Algae	170	Chronic	2.343*	-	73	10
a.s.	Higher plants	7300	Chronic	2.343*	-	3116	10
					-		
a.s.	Fish	2400	Acute	13.16**	-	182	100
a.s.	Fish	120	Chronic	13.16**	-	**9.1**	10
a.s.	Fish	120	Chronic	11.41**	5	10.5	10
a.s.	Aquatic invertebrates	2500	Acute	13.16**	-	190	100
a.s.	Aquatic invertebrates	370	Chronic	13.16**	-	28.1	10
a.s.	Algae	170	Chronic	13.16**	-	12.9	10
a.s.	Higher plants	7300	Chronic	13.16**	-	536	10
Etridiazole acid	Fish	>100000	Acute	0.645*	-	>1.5E+5	100
Etridiazole acid	Aquatic invertebrates	350000	Acute	0.645*	-	5E+5	100
Etridiazole acid	Algae	27000	Chronic	0.645*	-	44E+4	10
Dichloro-etridiazole	Fish	770	Acute	2.71***	-	284	100
Dichloro-etridiazole	Aquatic invertebrates	1100	Acute	2.71***	-	406	100

Test substance	Organism	Toxicity end point (µg/L)	Time scale	PEC_i (µg/L)	Non-spray buffer zone (m)	TER	Annex VI Trigger
Dichloro-etridiazole	Algae	620	Chronic	2.71***	-	229	10

* PECsw estimation based on Dutch exposure model.
** PECsw estimation based on volatilisation.
*** Total concentration based on formation in soil from the parent and direct deposition of the metabolite.

Vegetables, 0.56 kg a.s./ha

Test substance	Organism	Toxicity end point (µg/L)	Time scale	PEC_i* (µg/L)	Non-spray buffer zone (m)	TER	Annex VI Trigger
a.s.	Fish	2400	Acute	1.05	-	2286	100
a.s.	Fish	120	Chronic	1.05	-	114	10
a.s.	Aquatic invertebrates	2500	Acute	1.05	-	2380	100
a.s.	Aquatic invertebrates	370	Chronic	1.05	-	352	10
a.s.	Algae	170	Chronic	1.05	-	162	10
a.s.	Higher plants	7300	Chronic	1.05	-	6952	10

* PECsw estimation based on volatilisation

Bioconcentration			
	Active substance	Etridiazole acid	Dichloro-etridiazole
$logP_{OW}$	3.4	0.7	2.7 (estimated)
Bioconcentration factor (BCF)[1]	165 (etridiazole)	No data available – no data required	No data available – no data required
Annex VI Trigger for the bioconcentration factor	100		
Clearance time (days) (CT_{50})	<1		
(CT_{90})	>14		
Level and nature of residues (%) in organisms after the 14 day depuration phase	14%; nature not investigated		

[1] only required if log $P_{O/W}$ >3.

Effects on honeybees (Annex IIA, point 8.3.1, Annex IIIA, point 10.4)

Test substance	Acute oral toxicity (LD_{50} µg/bee)	Acute contact toxicity (LD_{50} µg/bee)
No data submitted – data required– to be addressed at MS level		

Test substance	Acute oral toxicity (LD_{50} µg/bee)	Acute contact toxicity (LD_{50} µg/bee)
Field or semi-field tests		
No data submitted – no data required		

Effects on other arthropod species (Annex IIA, point 8.3.2, Annex IIIA, point 10.5)

Laboratory tests with standard sensitive species

Species	Test Substance	End point	Effect (LR_{50} g a.s./ha)
Typhlodromus pyri	a.s.	Mortality	5003
Aphidius rhopalosiphi	a.s.	Mortality	1494

Ornamentals, 2 x 7.0 kg a.s./ha

Test substance	Species	Effect (LR_{50} g/ha)	HQ in-field	HQ off-field	Trigger
AAterra ME	*Typhlodromus pyri*	5003	2.4	Not applicable	2
AAterra ME	*Aphidius rhopalosiphi*	1494	8.0	Not applicable	2

Tomatoes/peppers, 2 x 0.56 kg a.s./ha

Test substance	Species	Effect (LR_{50} g/ha)	HQ in-field	HQ off-field	Trigger
AAterra ME	*Typhlodromus pyri*	5003	0.2	Not applicable	2
AAterra ME	*Aphidius rhopalosiphi*	1494	0.6	Not applicable	2

Further laboratory and extended laboratory studies

Species	Life stage	Test substance, substrate and duration	Dose (g a.s./ha)	End point	% effect [(1)]	Trigger value
Typhlodromus pyri	Proto-nymphs	a.s., leaf discs, 14 days	Initial: 72 360 720 3600 7200 14400	Mortality / reduction of reproduction	 4 / 4 0 / -25 0 / -16 0 / 12 59 / - 96 / -	50 %

Species	Life stage	Test substance, substrate and duration	Dose (g a.s./ha)	End point	% effect [1]	Trigger value
Aphidius rhopalosiphi	<48 hour old wasps	a.s., plants, 48 hours	Initial: 360 2520 5040 7200 14400	Mortality / reduction of reproduction	 0 / not tested 16 / 29 12 / 30 20 / 41 96 / -	50 %
Chrysoperla carnea	2-3 day old larvae	a.s., leaves, 30 days	Initial: 5112 8208 11304 14400	Mortality / reduction of reproduction	 0 / not tested 0 / not tested 3 / -19 0 / 16	50 %

[1] The – sign means increase of reproduction

Ornamentals, 2 x 7.0 kg a.s./ha

Test substance	Species	Type effect (LR_{50} or ER_{50})	Effect (g/ha)	HQ in-field	Trigger
AAterra ME	*Typhlodromus pyri*	LR_{50}	>3600	3.3	1
AAterra ME	*Typhlodromus pyri*	ER_{50}	>3600	3.3	1
AAterra ME	*Aphidius rhopalosiphi*	LR_{50}	8280	1.4	1
AAterra ME	*Aphidius rhopalosiphi*	ER_{50}	>7200	1.7	1

Field or semi-field tests
No data submitted – no data required HQ's are based on unrealistic worst case assumptions, since product is applied through dripping: refined risk assessment under section B.9.5.3.1.1 in the DAR, based on residue data from section B.7.1, exposure can be lowered by factor 5, which brings HQ's below trigger value.

Effects on earthworms, other soil macro-organisms and soil micro-organisms (Annex IIA points 8.4 and 8.5. Annex IIIA, points, 10.6 and 10.7)

Test organism	Test substance	Time scale	End point
Earthworms			
Eisenia fetida	a.s.	Acute 14 days	No data submitted – no data required
	Preparation	Acute	LC_{50} 198 mg a.s./kg soil
	Etridiazole acid	Acute	LC_{50} >1000 mg/kg soil
Other soil macro-organisms			

Test organism	Test substance	Time scale	End point
No data submitted – no data required			
Soil micro-organisms			
Nitrogen mineralisation	a.s.		No data submitted – no data required
	Preparation	Chronic	Loamy sand soil: NOEC 3.36 mg a.s./kg soil Sandy loam soil: NOEC 3.49 mg a.s./kg soil
Carbon mineralisation	a.s.		No data submitted – no data required
	Preparation	Chronic	Loamy sand soil: NOEC 33.6 mg a.s./kg soil Sandy loam soil: NOEC 34.9 mg a.s./kg soil
Field studies[2]			
No data submitted – no data required			

Toxicity/exposure ratios for soil organisms

The risk to soil-dwelling organisms remains to be addressed from the volatilization-deposition of etridiazole and for etridiazole acid and dichloro-etridiazole considering both the routes of exposure via volatilization and deposition by the metabolites and formation of the metabolites after deposition of the parent etridiazole.

Effects on non target plants (Annex IIA, point 8.6, Annex IIIA, point 10.8)

Preliminary screening data

Etridiazole was not phytotoxic to spring wheat seeds (dose not reported).
Etridiazole was not phytotoxic to herbaceous and woody ornamental plants when applied once to the growth medium (dose not clear). Repeated application decreased the number of stem cankers.
Etridiazole was not toxic to soybean plants at doses of 1000, 2000 and 3000 mg a.s./kg seed.
Etridiazole was slightly toxic to tomatoes at doses of 30 and 60 mg Aaterra/kg.
Etridiazole did not affect corn growth at a dose of 2.5 mg a.s./kg soil.
Etridiazole increased corn yield by 78% and 25% in the first and second year after application at 0.6 kg Terrazole/ha.

Laboratory dose response tests

Most sensitive species	Test substance	ER_{50} (g/ha) vegetative vigour	ER_{50} (g/ha) emergence	Exposure (g/ha)	TER	Trigger
No data submitted – no data required						

Additional studies (e.g. semi-field or field studies)

No data submitted – no data required

Effects on biological methods for sewage treatment (Annex IIA 8.7)

Test type/organism	end point
Activated sludge	30-min EC_{50} 105 mg a.s./L 3-hour EC_{50} 32 mg a.s./L
Pseudomonas sp	No data submitted – no data required

Ecotoxicologically relevant compounds (consider parent and all relevant metabolites requiring further assessment from the fate section)

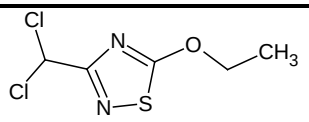
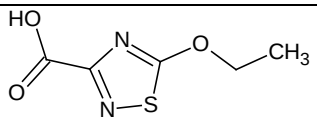
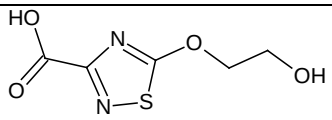
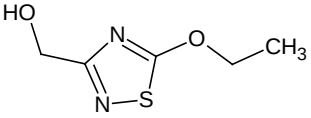
Compartment	
soil	Etridiazole
water	Etridiazole
sediment	No relevant compounds
groundwater	No relevant compounds

Classification and proposed labelling with regard to ecotoxicological data (Annex IIA, point 10 and Annex IIIA, point 12.3)

	RMS/peer review proposal
Active substance	N, R50, R53

	RMS/peer review proposal
Preparation	N, R50, R53

APPENDIX B – USED COMPOUND CODE(S)

Code/Trivial name*	Chemical name*	Structural formula*
dichloro-etridiazole	3-(dichloromethyl)-5-ethoxy-1,2,4-thiadiazole or 3-dichloromethyl-1,2,4-thiadiazol-5-yl ether	
etridiazole acid	5-ethoxy-1,2,4-thiadiazole-3-carboxylic acid	
5-hydroxy-ethoxyetridiazole acid	5-(2-hydroxyethoxy)-1,2,4-thiadiazole-3-carboxylic acid	
3-hydroxymethyl etridiazole	(5-ethoxy-1,2,4-thiadiazol-3-yl)methanol	

* ACD/ChemSketch, Advanced Chemistry Development, Inc., ACD/Labs Release: 12.00 Product version: 12.00 (Build 29305, 25 Nov 2008)

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ABBREVIATIONS

1/n	slope of Freundlich isotherm
ε	decadic molar extinction coefficient
°C	degree Celsius (centigrade)
µg	microgram
µm	micrometer (micron)
a.s.	active substance
AChE	acetylcholinesterase
ADE	actual dermal exposure
ADI	acceptable daily intake
AF	assessment factor
AOEL	acceptable operator exposure level
AP	alkaline phosphatase
AR	applied radioactivity
ARfD	acute reference dose
AST	aspartate aminotransferase (SGOT)
AV	avoidance factor
BCF	bioconcentration factor
BUN	blood urea nitrogen
bw	body weight
CAS	Chemical Abstract Service
CFU	colony forming units
ChE	cholinesterase
CI	confidence interval
CIPAC	Collaborative International Pesticide Analytical Council Limited
CL	confidence limits
d	day
DAA	days after application
DAR	draft assessment report
DAT	days after treatment
DM	dry matter
DNA	deoxyribonucleic acid
DT_{50}	period required for 50 percent disappearance (define method of estimation)
DT_{90}	period required for 90 percent disappearance (define method of estimation)
dw	dry weight
EbC_{50}	effective concentration (biomass)
EC_{50}	effective concentration
ECHA	European Chemical Agency
EEC	European Economic Community
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of New Chemical Substances
EMDI	estimated maximum daily intake
ER_{50}	emergence rate/effective rate, median
ErC_{50}	effective concentration (growth rate)
EU	European Union
EUROPOEM	European Predictive Operator Exposure Model
EVA	Exposure via Air (Model)
f(twa)	time weighted average factor
FAO	Food and Agriculture Organisation of the United Nations
FIR	Food intake rate
FOB	functional observation battery
FOCUS	Forum for the Co-ordination of Pesticide Fate Models and their Use
g	gram
GAP	good agricultural practice

GC	gas chromatography
GCPF	Global Crop Protection Federation (formerly known as GIFAP)
GGT	gamma glutamyl transferase
GM	geometric mean
GS	growth stage
GSH	glutathion
h	hour(s)
ha	hectare
Hb	haemoglobin
Hct	haematocrit
hL	hectolitre
HPLC	high pressure liquid chromatography or high performance liquid chromatography
HPLC-MS	high pressure liquid chromatography – mass spectrometry
HQ	hazard quotient
IEDI	international estimated daily intake
IESTI	international estimated short-term intake
ISO	International Organisation for Standardisation
IUPAC	International Union of Pure and Applied Chemistry
iv	intravenous
JMPR	Joint Meeting on the FAO Panel of Experts on Pesticide Residues in Food and the Environment and the WHO Expert Group on Pesticide Residues (Joint Meeting on Pesticide Residues)
K_{doc}	organic carbon linear adsorption coefficient
kg	kilogram
K_{Foc}	Freundlich organic carbon adsorption coefficient
L	litre
LC	liquid chromatography
LC_{50}	lethal concentration, median
LC-MS	liquid chromatography-mass spectrometry
LC-MS-MS	liquid chromatography with tandem mass spectrometry
LD_{50}	lethal dose, median; dosis letalis media
LDH	lactate dehydrogenase
LOAEL	lowest observable adverse effect level
LOD	limit of detection
LOQ	limit of quantification (determination)
m	metre
M/L	mixing and loading
MAF	multiple application factor
MCH	mean corpuscular haemoglobin
MCHC	mean corpuscular haemoglobin concentration
MCV	mean corpuscular volume
mg	milligram
M&K	Magnusson and Kligman test
mL	millilitre
mm	millimetre
MRL	maximum residue limit or level
MS	mass spectrometry
MSDS	material safety data sheet
MTD	maximum tolerated dose
MWHC	maximum water holding capacity
NESTI	national estimated short-term intake
ng	nanogram
NOAEC	no observed adverse effect concentration
NOAEL	no observed adverse effect level

NOEC	no observed effect concentration
NOEL	no observed effect level
OM	organic matter content
Pa	Pascal
PD	proportion of different food types
PEC	predicted environmental concentration
PEC_{air}	predicted environmental concentration in air
PEC_{gw}	predicted environmental concentration in ground water
PEC_{sed}	predicted environmental concentration in sediment
PEC_{soil}	predicted environmental concentration in soil
PEC_{sw}	predicted environmental concentration in surface water
pH	pH-value
PHED	pesticide handler's exposure data
PHI	pre-harvest interval
PIE	potential inhalation exposure
pK_a	negative logarithm (to the base 10) of the dissociation constant
POEM	Predictive Operator Exposure Model
P_{ow}	partition coefficient between *n*-octanol and water
PPE	personal protective equipment
ppm	parts per million (10^{-6})
ppp	plant protection product
PT	proportion of diet obtained in the treated area
PTT	partial thromboplastin time
QSAR	quantitative structure-activity relationship
r^2	coefficient of determination
RPE	respiratory protective equipment
RUD	residue per unit dose
SC	suspension concentrate
SD	standard deviation
SFO	single first-order
SSD	species sensitivity distribution
STMR	supervised trials median residue
$t_{1/2}$	half-life (define method of estimation)
TER	toxicity exposure ratio
TER_A	toxicity exposure ratio for acute exposure
TER_{LT}	toxicity exposure ratio following chronic exposure
TER_{ST}	toxicity exposure ratio following repeated exposure
TK	technical concentrate
TLV	threshold limit value
TMDI	theoretical maximum daily intake
TRR	total radioactive residue
TSH	thyroid stimulating hormone (thyrotropin)
TWA	time weighted average
UDS	unscheduled DNA synthesis
UV	ultraviolet
W/S	water/sediment
w/v	weight per volume
w/w	weight per weight
WBC	white blood cell
WG	water dispersible granule
WHO	World Health Organisation
wk	week
yr	year