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CONCLUSION ON PESTICIDES PEER REVIEW

Peer review of the pesticide risk assessment of the active substance choline hydrogen phosphonate

European Food Safety Authority (EFSA) | Fernando Álvarez | Maria Arena | Domenica Auteri | Sofia Batista Leite | Marco Binaglia | Anna Federica Castoldi | Arianna Chiusolo | Angelo Colagiorgi | Mathilde Colas | Federica Crivellente | Chloe De Lentdecker | Isabella De Magistris | Mark Egsmose | Gabriella Fait | Franco Ferilli | German Giner Santonja | Varvara Gouliarmou | Alessio Ippolito | Frederique Istace | Dimitra Kardassi | Aude Kienzler | Anna Lanzoni | Roberto Lava | Renata Leuschner | Alberto Linguadoca | Mariano Lopez Romano | Jochem Louisse | Christopher Lythgo | Oriol Magrans | Iris Mangas | Silvia Mazzega | Andrea Mioč | Ileana Miron | Tunde Molnar | Laura Padovani | Vincenzo Padricello | Martina Panzarea | Juan Manuel Parra Morte | Simone Rizzuto | Miguel Santos | Rositsa Serafimova | Rachel Sharp | Csaba Szentes | Anne Theobald | Manuela Tiramani | Giorgia Vianello | Laura Villamar-Bouza

Correspondence: Ask a Question

The declarations of interest of all scientific experts active in EFSA's work are available at https://open.efsa.europa.eu/experts.

Abstract

The conclusions of the European Food Safety Authority (EFSA) following the peer review of the initial risk assessments carried out by the competent authority of the rapporteur Member State Belgium for the pesticide active substance choline hydrogen phosphonate and the assessment of an application for maximum residue levels (MRLs) are reported. The context of the peer review was that required by Regulation (EC) No 1107/2009 of the European Parliament and of the Council. The conclusions were reached on the basis of the evaluation of the representative uses of choline hydrogen phosphonate as a fungicide on grapevine and sports turf. MRLs were assessed in honey. The reliable endpoints, appropriate for use in regulatory risk assessment and the proposed MRLs, are presented. Missing information identified as being required by the regulatory framework is listed.

KEYWORDS

choline hydrogen phosphonate, fungicide, maximum residue level, peer review, pesticide, risk assessment

CONTENTS

SUMMARY

Choline hydrogen phosphonate (a salt of phosphonic acid) is a new active substance for which, in accordance with Article 7 of Regulation (EC) No 1107/2009 of the European Parliament and of the Council, the rapporteur Member State (RMS), Belgium, received an application from Certis Belchim BV on 19 October 2020 for approval. In addition, in accordance with Article 8(1)(g) of the Regulation, Certis Belchim BV submitted applications for maximum residue levels (MRLs) as referred to in Article 7 of Regulation (EC) No 396/2005. Complying with Article 9 of the Regulation, the completeness of the dossier was checked by the RMS and the date of admissibility of the application was recognised as being 1 April 2021.

An initial evaluation of the dossier on choline hydrogen phosphonate was provided by the RMS in the draft assessment report (DAR) and, subsequently, a peer review of the pesticide risk assessment on the RMS evaluation was conducted by EFSA in accordance with Article 12 of Regulation (EC) No 1107/2009. The following conclusions are derived.

The uses of choline hydrogen phosphonate according to the representative uses as a fungicide on grapevine and sports turf, as proposed at EU level, resulted in a sufficient fungicidal efficacy against the target fungi.

Neither critical areas of concern nor issues that could not be finalised have been identified for any areas subject of the peer review.

In the area of residues, the MRL request for honey was fully supported by the available data. Since the acceptable daily intake (ADI) for phosphonic acid was lowered, an exceedance of the newly derived ADI cannot be excluded (NL toddler and DE children). Considering these results indicating consumer intake concerns, a revision of the assessment of existing MRLs for phosphonic acid and its salts, expressed as phosphonic acid, is recommended.

According to points 3.6.5 and 3.8.2 of Annex II to Regulation (EC) No 1107/2009, as amended by Commission Regulation (EU) 2018/605, it can be concluded that choline hydrogen phosphonate is not an endocrine disruptor.

BACKGROUND

Regulation (EC) No 1107/2009 of the European Parliament and of the Council[1] (hereinafter referred to as 'the Regulation') lays down, inter alia, the detailed rules as regards the procedure and conditions for approval of active substances. This regulates for the European Food Safety Authority (EFSA) the procedure for organising the consultation of Member States and the applicant(s) for comments on the initial evaluation in the draft assessment report (DAR), provided by the rapporteur Member State (RMS) and the organisation of an expert consultation, where appropriate.

In accordance with Article 12 of the Regulation, EFSA is required to adopt a conclusion on whether an active substance can be expected to meet the approval criteria provided for in Article 4 of the Regulation (also taking into consideration recital (10) of the Regulation) within 120 days from the end of the period provided for the submission of written comments, subject to an extension of 30 days where an expert consultation is necessary and a further extension of up to 150 days where additional information is required to be submitted by the applicant(s) in accordance with Article 12(3).

Choline hydrogen phosphonate is a new active substance for which, in accordance with Article 7 of the Regulation, the RMS, Belgium (hereinafter referred to as the 'RMS'), received an application from Certis Belchim BV on 19 October 2020 for approval of the active substance choline hydrogen phosphonate. In accordance with Article 8(1)(g) of the Regulation, Certis Belchim BV submitted applications for maximum residue levels (MRLs) as referred to in Article 7 of Regulation (EC) No 396/2005. Complying with Article 9 of the Regulation, the completeness of the dossier was checked by the RMS and the date of admissibility of the application was recognised as being 1 April 2021.

The RMS provided its initial evaluation of the dossier on choline hydrogen phosphonate in the DAR, which was received by EFSA on 7 December 2023 (Belgium, 2024). The peer review was initiated on 26 August 2024 by dispatching the DAR to the Member States and the applicant, Certis Belchim BV, for consultation and comments. EFSA also provided comments. In addition, EFSA conducted a public consultation on the DAR. The comments received were collated by EFSA and forwarded to the RMS for compilation and evaluation 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 response were evaluated by the RMS in column 3.

The need for expert consultation and the necessity for additional information to be submitted by the applicant in accordance with Article 12(3) of the Regulation were considered in a teleconference between EFSA, the RMS, ECHA and co-RMS AT on 12 February 2025. On the basis of the comments received, the applicant's response to the comments and the RMS's evaluation thereof, it was concluded that additional information should be requested from the applicant and that EFSA should conduct an expert consultation in the areas of mammalian toxicology, residues and ecotoxicology.

The outcome of the teleconference, together with EFSA's further consideration of the comments is reflected in the conclusions set out in column 4 of the reporting table. 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 an expert consultation, were compiled by EFSA in the format of an evaluation table.

The conclusions arising from the consideration by EFSA, and as appropriate by the RMS, of the points identified in the evaluation table, together with the outcome of the expert consultation and the written consultation on the assessment of additional information, where these took place, were reported in the final column of the evaluation table.

In accordance with Article 12 of the Regulation, EFSA should adopt a conclusion on whether choline hydrogen phosphonate can be expected to meet the approval criteria provided for in Article 4 of the Regulation, taking into consideration recital (10) of the Regulation.

A final consultation on the conclusions arising from the peer review of the risk assessment and on the proposed MRLs took place with Member States via a written procedure in June 2026.

This conclusion report summarises the outcome of the peer review of the risk assessment on the active substance and the formulation(s) for representative uses evaluated on the basis of the representative uses of choline hydrogen phosphonate as a fungicide on grapevine and sports turf as proposed by the applicant. In accordance with Article 12(2) of Regulation (EC) No 1107/2009, risk mitigation options identified in the DAR and considered during the peer review, if any, are presented in the conclusion. MRLs were assessed in honey.

A list of the relevant end points for the active substance and the formulation and the proposed MRLs is provided in Appendix B. In addition, the considerations as regards the cut-off criteria for choline hydrogen phosphonate according to Annex II of Regulation (EC) No 1107/2009 are summarised in Appendix A.

A key supporting document to this conclusion is the peer review report (EFSA, 2026), 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 comprises the following documents, in which all views expressed during the course of the peer review, including minority views, where applicable, can be found:

- the comments received on the DAR;
- the reporting table (February, 2025);
- the evaluation table (June, 2025);
- the reports of the scientific consultation with Member State experts (where relevant);

[1]Regulation (EC) No 1107/2009 of 21 October 2009 of the European Parliament and of the Council concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC. OJ L 309, 24.11.2009, pp. 1–50.

- the comments received on the assessment of the additional information (where relevant);
- the comments received on the draft EFSA conclusion.

Given the importance of the DAR, including its revisions (Belgium, 2026), and the peer review report, both documents are considered as background documents to this conclusion and thus are made publicly available.

It is recommended that this conclusion and its background documents would not be accepted to support any registration outside the EU for which the applicant has not demonstrated that it has regulatory access to the information on which this conclusion report is based.

THE ACTIVE SUBSTANCE AND THE FORMULATION FOR REPRESENTATIVE USES

The name of this active substance is choline hydrogen phosphonate (IUPAC). Choline hydrogen phosphonate is a salt of phosphonic acid.

The formulation for the representative uses evaluated was 'BCP 1030F', a soluble concentrate (SL) formulation containing 823.6 g/L of pure choline hydrogen phosphonate.

The information on the active substance and the formulation for representative uses, including the co-formulants in this formulation, was considered in the overall assessment during the peer review. None of the co-formulants is an unacceptable co-formulant listed in Annex III of Regulation (EC) No 1107/2009,[2] nor considered as an active substance in accordance with Regulation (EC) No 1107/2009.

The representative uses evaluated were foliar spray application as a fungicide on grapevine against downy mildew (*Plasmopara viticola*) and on sports turf against fusarium patch (*Microdochium nivale*).

Data were submitted to conclude that the uses of choline hydrogen phosphonate according to the representative uses proposed at EU level result in a sufficient fungicidal efficacy against the target organisms, following the guidance document SANCO/10054/2013-rev. 3 (European Commission, 2013).

CONCLUSIONS OF THE EVALUATION

General aspects

Choline hydrogen phosphonate is a salt of the phosphonic acid. In aqueous solution, it dissociates into choline and a phosphonate moiety. Choline is an essential nutrient with key physiological functions, including neurotransmission as a precursor of acetylcholine and the maintenance of cell membrane structure through phospholipid synthesis; it is a ubiquitous substance being naturally present in animal, plant and human cells. The levels of choline ions added to soil from the representative uses assessed are expected to be within the naturally occurring levels in soil organic matter. Accordingly, from a risk assessment perspective, the phosphonate moiety is the (eco)toxicologically and environmentally relevant component of the compound which this conclusion focuses on.

The (eco)toxicological profile of the formulation for representative uses 'BCP 1030F' was discussed at the Pesticides Peer Review Teleconferences 195 and 196 in January 2026 (see Sections 2 and 5). The available information was considered sufficient to characterise the full toxicological profile of the formulation for representative use(s) with respect to acute, genotoxicity, short- and long-term toxicity, and ecotoxicological profile.

1 | IDENTITY, PHYSICAL/CHEMICAL/TECHNICAL PROPERTIES AND METHODS OF ANALYSIS

The following guidance documents were followed in the production of this conclusion: European Commission (2000a, 2000b, 2010, 2020).

Choline hydrogen phosphonate is produced as a technical concentrate (TK). The proposed specification is based on batch data from pilot scale production. The proposed specification range for the TK is 672–714 g/kg (799–849 g/L) choline hydrogen phosphonate and 7.15–31 g/kg (8.5–36.8 g/L) of excess phosphonic acid (free). The minimum purity in the theoretical dry weight material is 993 g/kg choline hydrogen phosphonate and 11.1 g/Kg of phosphonic acid in excess (free).[3] A data gap was set for data, of at least five batches, analysed for the content of an impurity and for information on its ecotoxicological and environmental relevance (**data gap**, see Section 10). It is noted that new batch analysis data should be provided once industrial scale production methods and procedures of the active substance are stabilised (see also Section 2). The batches used in the ecotoxicological assessment support the proposed specification (see Section 5). In absence of mammalian toxicity studies conducted with choline hydrogen phosphonate (see Section 2 along with specific

[2]Commission Regulation (EU) 2021/383 of 3 March 2021 amending Annex III to Regulation (EC) No 1107/2009 of the European Parliament and Council listing co-formulants which are not accepted for inclusion in plant protection products. OJ L 74, 4.3.2021, pp. 7–26.

[3]Refer to Open point 1.1 in the confidential evaluation table (EFSA, 2026).

considerations on certain impurities of potential concern), read-across approach was deemed appropriate. No FAO specification exists.

The main data regarding the identity of choline hydrogen phosphonate and its physical and chemical properties are given in Appendix B.

Adequate methods are available for the generation of data required for the risk assessment. Methods of analysis are available for the determination of the active substance and impurities in the technical concentrate and in the formulation for representative uses.

Residue definition for monitoring in food/feed of plant and animal origin, in soil and water and in body fluids and tissues was set as: phosphonic acid and its salts, expressed as phosphonic acid. No residue definition was set for monitoring in air.

Phosphonic acid and its salts can be monitored in food and feed of plant origin by using liquid chromatography with tandem mass spectrometry (HPLC–MS/MS) with limit of quantification (LOQ) of 0.1 mg/kg of phosphonic acid in each commodity group. Extraction procedure used in the method was not verified (**data gap**, see Section 10).

Phosphonic acid and its salts in food/feed of animal origin can be monitored using HPLC–MS/MS with a LOQ of 0.01 mg/kg of phosphonic acid in meat, fat, milk, egg and liver. Extraction procedure used in the method was not verified. Residues of choline hydrogen phosphonate in honey can be monitored by an HPLC–MS/MS with a LOQ of 0.01 mg/kg of phosphonic acid.

Phosphonic acid and its salts in soil and water can be monitored by HPLC–MS/MS with a LOQ of 0.025 mg/kg of phosphonic acid in soil, and a LOQ of 0.1 µg/L of phosphonic acid in water (surface and drinking). Choline hydrogen phosphonate residues in air can be determined by HPLC-MS/MS with a LOQ of 10 µg/m^3 of phosphonic acid.

Phosphonic acid and its salts can be monitored in blood by HPLC–MS/MS with LOQ of 0.05 mg/L. Residues of choline hydrogen phosphonate in body tissues can be determined by the HPLC-MS/MS provided for monitoring in food/feed of animal origin.

2 | MAMMALIAN TOXICITY

Choline hydrogen phosphonate was discussed at the Pesticide Peer Review Teleconference (TC) 195 and 196 in January 2026. The assessment is based on the following guidance documents: European Commission (2003, 2012a), EFSA (2022), EFSA PPR Panel (2012), ECHA (2024).

Impurities of potential concern should be investigated in industrial scale production batches to ascertain whether maximum limits should be included in the reference specifications (data gap, see Section 10).[4]

Except for acute studies and a 28-day oral study in rats, no other toxicity studies are available on choline hydrogen phosphonate itself. Based on a robust read-across analysis and complementary quantitative structure–activity relationship (QSAR) information, the data for fosetyl-Al and other substances releasing phosphonates were considered acceptable to complete the data set for the risk assessment of choline hydrogen phosphonate.[5] The ECHA Risk Assessment Committee Opinion on choline hydrogen phosphonate also supported the read-across with the substance fosetyl-Al for concluding on genotoxicity, carcinogenicity and reproductive toxicity of choline hydrogen phosphonate (ECHA, 2025). Additionally, studies with monosodium phosphite, phosphonic acid and disodium phosphonate provided supportive evidence for some hazard classes.

Choline enters endogenous metabolic pathways, undergoing oxidation via betaine to glycine, which is further metabolised and ultimately mineralised to carbon dioxide (CO_2) and ammonium. Choline does not accumulate and excess amounts are efficiently metabolised with no adverse effects reported.

While most of the data considered relevant for the assessment of the ADME properties of choline hydrogen phosphonate pertain to fosetyl-Al, it is noted that some ADME properties of other molecules (e.g. phosphorous acid, etc.) are different. Based on data on fosetyl-Al, **oral absorption** of choline hydrogen phosphonate is estimated to exceed 80% of the administered dose. The organic part of fosetyl-Al is degraded via ethanol and acetate, and then either exhaled as CO_2 or further incorporated into the physiological metabolic pathways. Phosphonate is not further oxidised to phosphate in mammals and is excreted largely unchanged, primarily in urine and faeces. Faeces are the main route of excretion following repeated administration. Distribution is widespread throughout the body, with the highest levels being reached in the kidneys, fat (including renal fat), adrenal glands, skin, gonads, lungs and spleen, and no evidence of accumulation.

Metabolism is considered qualitatively similar across mammalian species, given (i) the ionic nature of the substance, (ii) the well characterised, conserved metabolism of choline and (iii) the limited biotransformation of phosphonates. A waiver for an in vitro comparative metabolism study with choline hydrogen phosphonate was therefore considered acceptable.

No metabolism has been observed in human or rat liver microsomes based on the bridging of experimental data from fosetyl-Al or phosphonate releasing or containing active substances.

The **residue definition** for body fluids and tissues was defined as phosphonic acid.

Choline hydrogen phosphonate has no **acute** toxicity by oral, dermal and inhalation exposure, and has no skin or eye irritating or sensitising properties.

[4]See specific details under data Requirement 1.3 and 1.4 in the Confidential Evaluation Table (EFSA, 2026).

[5]Refer to experts' consultation point 2.1 in the Report of Pesticides Peer Review Experts' TC 195&196 (EFSA, 2026).

Testing for phototoxicity and photomutagenicity is not required for choline hydrogen phosphonate, according to provisions of Regulation (EU) No 283/2013.

All the no observed adverse effect levels (NOAELs) derived from the toxicity studies were adjusted for the molecular weight of choline hydrogen phosphonate.

Short-term oral toxicity studies were provided for rats, mice, dogs with monosodium phosphite and fosetyl-Al.

The dog was the most sensitive species with a NOAEL of 430 mg/kg bw per day based on effects observed in gonads and prostate observed in the 90-day study with fosetyl-Al. In rats, adverse effects were observed mostly in kidney, while no target organs were identified in the mouse.

Based on the **genotoxicity** studies available for substances releasing phosphonates, the substance is unlikely to be genotoxic.

After **long-term exposure**, target organs for toxicity included kidney, urinary tract and testes. The relevant systemic NOAEL is 452 mg/kg body weight per day in both the 2-year rat study performed with hydrated monosodium phosphite and the 2-year dog study carried out with fosetyl-Al. The relevant effects observed in rats were calculi, hyperplasia and inflammation of the urinary bladder, and in dogs were slight decrease of body weight gain, renal vacuolar tubular lesions in females and testicular degeneration. The relevant NOAEL for carcinogenicity is 546 mg/kg bw per day, based on transitional cell papilloma and carcinoma observed in urinary bladder of male rats in the high-dose group in the 2-year study, that were concluded as not relevant for humans (EFSA, 2025a). No tumours were observed in mice and dogs.

Choline hydrogen phosphonate was therefore concluded unlikely to be carcinogenic for humans, in line with the ECHA RAC opinion (ECHA, 2025).

In relation to reproductive toxicity, relevant NOAELs were derived from the multigeneration rat study with fosetyl-Al. The parental NOAEL is 756 mg/kg bw per day based on decreased body weight during pre-mating period in generation F2B; the reproductive NOAEL is 1498 mg/kg bw per day based on the decrease in corpora lutea in F0 and F1B generations. For offspring, the lowest observed adverse effect level (LOAEL) is 756 mg/kg bw per day, based on decreased absolute weight of the spleen in the F3B generation showing a dose–response relationship from the lowest dose.

With regard to foetal development, effects were observed in rats and rabbits in studies on fosetyl-Al. In the rat teratogenicity study, both the maternal and developmental NOAELs are 1570 mg/kg bw per day, based on mortality, decreased body weight and body weight gain (maternal effects), and minor changes in litter parameters and marginally increased incidence of foetal anomalies (developmental effects). In the rabbit teratogenicity study, the maternal NOAEL is 471 mg/kg bw per day (the highest tested dose) and the developmental NOAEL is 157 mg/kg bw per day, based on increased incidence of dilated ureter observed at 471 mg/kg bw per day.

The substance was concluded unlikely to be a reproductive toxicant in humans, in line with the ECHA RAC opinion (ECHA, 2025).[4]

Choline hydrogen phosphonate was concluded to be devoid of any neurotoxicity and immunotoxicity potential.

The health-based guidance values (HBGVs) set for fosetyl-Al (EFSA, 2025a) are applicable to choline hydrogen phosphonate and phosphonic acid after adjustment for the molecular weight.[6]

The **ADI** and the **acceptable operator exposure level** (**AOEL**) are 1.57 mg/kg bw per day for choline hydrogen phosphonate, corresponding to 0.70 mg/kg bw per day of phosphonic acid, based on the developmental toxicity study in rabbit performed with fosetyl-Al, applying a standard uncertainty factor (UF) of 100.

The setting of **acute reference dose** (**ARfD**) and of the **acute acceptable operator exposure level** (**AAOEL**) was not considered necessary.

Dermal absorption of choline hydrogen phosphonate (measured for the phosphonate moiety in the phosphonic acid) in the representative product BCP1030 F has been assessed in an in vitro study with human skin. Based on the EFSA guidance (EFSA, 2017), the dermal absorption values to be used for risk assessment for phosphonic acid are 0.29% for the concentrate and 8.12% for the 1:250 spray dilution.

The **non-dietary exposure** estimates were calculated with the EFSA model (EFSA, 2022) based on the phosphonic acid content for the representative uses on grapes and sports turf. Estimates for operators and residents (children and adult), including recreational exposure, are below the AOEL without specific risk mitigation measures. For the workers, the use of workwear is sufficiently protective during the re-entry activities for sports turf. For grapes use, inspection and irrigation activities lead to an exposure below the AOEL, while estimates for hand-harvesting re-entry activities exceed the AOEL. In the absence of an AAOEL, the exposure assessment for residents also covers bystander exposure.

No residue or groundwater metabolites were considered relevant for the hazard assessment.

3 | RESIDUES

The assessment in the residue section is based on the following guidance documents: European Commission, 2011.

Choline hydrogen phosphonate was discussed in Pesticide Peer Review Teleconference TC 200 (10 February 2026).

Choline hydrogen phosphonate belongs to the chemical group of phosphonate compounds. For phosphonates, metabolism has been shown to proceed via transformation into phosphonic acid as the sole relevant metabolite, based on

[6]Refer to experts' consultation point 2.5 in the Report of Pesticides Peer Review Experts' TC 195&196 (EFSA, 2026).

evidence from public literature for related peer reviewed substances (e.g. fosetyl-Al, disodium and potassium phosphonates). On this basis, the metabolism of choline hydrogen phosphonate is expected to follow the same pathway, resulting exclusively in phosphonic acid. Therefore, the **residue definition for enforcement and risk assessment** (**plants**) is proposed as follows: **phosphonic acid and its salts, expressed as phosphonic acid**. This residue definition is also applicable to livestock, processed commodities and honey.

3.1 | Representative use residues

The available storage stability data for phosphonic acid cover the residue definition for enforcement and risk assessment and the time for that the samples were stored. Sufficient residue trials on grapes with choline hydrogen phosphonate were submitted to support the representative use. The consumer risk assessment was conducted using the EFSA Pesticide Residues Intake model (PRIMo) rev.3.1. The highest chronic exposure was for the PT general population (7% of the ADI). Acute consumer risk assessment is not relevant since setting an ARfD was not considered necessary.

3.2 | Maximum residue levels

An MRL application was submitted to set an EU MRL for phosphonic acid in honey of 8 mg/kg, to cover the representative uses of choline hydrogen phosphonate. Sufficient residue data was submitted to support this MRL application. However, it is noted that the currently in place EU MRL for honey is set at 100 mg/kg.[7] The received MRL application pertaining to choline hydrogen phosphonate has therefore become redundant.

Since the ADI was lowered compared with the ADI used in the latest chronic exposure assessment (EFSA, 2025b), EFSA updated the chronic exposure by using the new lower ADI of 0.69 mg/kg bw per day (phosphonic acid). Based on this screening exercise, there was an exceedance of the ADI for two diets: NL toddler (123% of the ADI) and DE children (115% of the ADI). Considering these results indicating consumer intake concerns, a revision of the assessment of existing MRLs for phosphonic acid and its salts, expressed as phosphonic acid, is recommended.

4 | ENVIRONMENTAL FATE AND BEHAVIOUR

Fate and behaviour of choline hydrogen phosphonate into the environment have been peer reviewed by a written procedure during 2025 and 2026 (EFSA, 2026).

In soil laboratory incubations under aerobic conditions in the dark, hydrogen phosphonate/phosphonate (quantified as phosphonic acid) exhibited moderate to high persistence, being oxidised to phosphate ions. The levels of phosphate ions that will be produced by this oxidation are within recommendations for the addition of inorganic phosphate fertiliser to agricultural soils. However, for environments especially vulnerable to eutrophication, MSs may need to take into account the use of phosphonates (like choline hydrogen phosphonate) as an additional input to the global phosphorous added to the environment. Dissipation studies in field to further investigate the fate of choline hydrogen phosphonate or other phosphonates in soil under natural realistic conditions are not available (**data gap**, see Section 10).

Phosphonic acid exhibits medium to slight mobility in soil.

Phosphonic acid is stable to hydrolysis and to direct photochemical degradation in sterile aqueous buffer (pH 7 and 20°C for 7 days). Information on the rate of transformation of the soluble salts of phosphonic acid in aerobic natural sediment water systems was not available. Consequently, two environmental exposure assessments were carried out. Slow oxidation of salts of phosphonic acid to phosphate ions in receiving water and sediment was assumed (DT_{50} 1000 days). One set of calculation was performed with a K_{oc} value of 10 mL/g (worst case for water conc.) and another one set with a K_{oc} value of 10.000 mL/g (worst case for sediment conc.).

The necessary surface water and sediment exposure assessments (Predicted environmental concentrations in surface water and sediment (PEC_{SW} and PEC_{SED})) calculations were conducted for phosphonic acid in water bodies adjacent to treated areas using FOCUS Steps 1–2 (v 3.2) for grapevine (early and late vines) and sports turf (grass/alfalfa). The worst-case GAP considered was a multiple application to grapevine and sports turf at rate of up to 1468.43 g phosphonic acid / ha per application (equivalent to 3316 g choline hydrogen phosphonate/ha). For grapevine uses, Step 2, PEC_{SW} exceeded the regulatory acceptable concentration (RAC) of 239.3 µg/L. Refined Step 2 calculations incorporating a 10 m vegetated buffer strip to mitigate spray drift and runoff were performed by adjusting default FOCUS inputs, including drift values (FOCUS drift calculator, 2007; BBA, 2000) and assuming a 60% reduction in runoff mass loading. This approach was considered acceptable and followed by the RMS for the additional calculations. In line with FOCUS Surface Water Repair WG recommendations, drift values for 'vines early' were disregarded; consequently, the 'vines late' scenario was applied across the entire application period as a conservative assumption. Additional calculations covering March–May were conducted using 'vines late' with minimal crop cover. The applicability of FOCUS surface water models to inorganic substances such

[7]Commission Regulation (EU) 2024/2619 of 8 October 2024 amending Annexes II and III to Regulation (EC) No 396/2005 of the European Parliament and of the Council as regards maximum residue levels for fosetyl, potassium phosphonates and disodium phosphonate in or on certain products C/2024/6886 OJ L, 2024/2619, 9.10.2024.

as phosphonic acid remains uncertain, as these models were not designed or calibrated for such compounds; however, the use of Steps 1–2 is considered conservative. PEC sw/sed values were not provided for the phosphate ions resulting from phosphonic acid oxidation. Estimated worst-case phosphate concentrations (based on molecular weight correction) exceed typical natural background levels in surface waters (0.01–0.025 mg/L, De Vos et al., 2006) and may surpass thresholds relevant for eutrophication (e.g. 0.1 mg/L for streams and rivers, US EPA, 1986). Therefore, in vulnerable environments, the contribution of phosphonates to overall phosphorus inputs may need to be considered by risk managers. Maximum PEC_{SW} for the representative product BCP1030F were calculated with FOCUS drift calculator following one application of 12 L/ha (product density of 1.188 g/mL), assuming a 30 cm deep static water body.

The necessary groundwater exposure assessments were carried out using FOCUS (FOCUS, 2009) scenarios and the models PELMO 5.5.3 and PEARL 4.4.4 for phosphonic acid. Generally, the standard FOCUS model parameterisations are not designed for the simulation of the leaching of inorganic compounds. However, the oxidation of phosphonic acid had been demonstrated to be a microbially mediated process. Thus, the standard substance transformation rate factor reductions with depth down the soil profile and routines for adjusting substance transformation rate with changing soil moisture content and temperature were maintained. However, since the adsorption of phosphonic acid is not expected to be well correlated with the organic carbon content down the soil profile, the KF value was manually implemented and kept constant in all soil horizons in modelling for each FOCUS scenario. This approach is consistent with the one accepted for PEC_{GW} modelling of phosphonic acid for other active substances releasing phosphonates, i.e. disodium phosphonate (EFSA, 2013a) and fosetyl-Al (EFSA, 2018). The potential for groundwater exposure from the representative uses by phosphonic acid and its salts was estimated to be < 0.1 µg/L at the seven FOCUS groundwater scenarios parameterised for vines (early and late applications) and the nine FOCUS scenarios for grass, (1m depth annual average recharge values).

The technical concentrate of choline hydrogen phosphonate is volatile with a Henry's Law coefficient greater than 1 Pa m^3 mol^{-1} and therefore may have the potential to volatilise from aqueous systems. Independent of these properties, it will enter the atmosphere, as aerosols will be formed at the time of spraying. Therefore, phosphonic acid, its ions and salts, may be subject to medium range atmospheric transport. RMS and EFSA agreed that atmospheric transport was not necessary to be considered for the available exposure assessment to the aquatic systems as only limited mitigation in worst case FOCUS Step 2 calculations had been considered. However, MSs may need to consider volatilisation deposition route to surface water when less worst-case assumptions or additional mitigation is considered for their national assessments. Long-range atmospheric transport is considered unlikely as the high-water solubility of phosphonic acid, its ions and salts will be washed out of the atmosphere by precipitation.

With regard to water treatment following abstraction of surface water that might contain the active substance and its metabolites, it is not expected the production of substances more hazardous than those produced from those naturally occurring in water.

The PEC in soil, surface water, sediment and groundwater covering the representative use assessed can be found in Appendix B of this conclusion.

5 | ECOTOXICOLOGY

The risk assessment was based on the following documents: European Commission (2002), SETAC (2001), EFSA (2009, 2013b) and EFSA PPR Panel (2013).

Choline hydrogen phosphonate was discussed at the Pesticides Peer Review Meeting Teleconferences 196 and 197 (January–February 2026).

Acute and long-term studies with **birds** and **wild mammals** were available with the active substance, other phosphonates or the formulation for representative uses 'BCP 1030F'. At the expert meeting, it was agreed that data with 'BCP 1030F' are representative for the active substance, and that data with other phosphonates could be used when data with choline hydrogen phosphonate are lacking.[8] The selection of the endpoint for acute toxicity to birds was also agreed at the expert meeting.[9]

Low acute and long-term risk to birds was concluded at the screening step for all uses, except for long-term risk for uses in grapevine, which was concluded at Tier 1.

High acute and long-term risk to wild mammals (small herbivorous mammals) was indicated for all uses at Tier 1. The refined risk assessment for wild mammals was discussed at the expert meeting.[10] For uses in grapevine, the experts agreed to refine the deposition factors and to use the common vole as the focal species for small herbivorous mammals in the Central zone along with refinement of the proportion of its diet based on relevant foraging data. For uses in sports turf, the experts agreed that due to the short length of grass in highly managed sports turf, small herbivorous mammals are not expected in the treated area. A low risk had been indicated at Tier 1 for other feeding guilds, and therefore no further refinement was necessary for these groups.

[8]Refer to experts' consultation point 5.4 in the Report of Pesticides Peer Review Experts' TCs 195 and 196 (EFSA, 2026).

[9]Refer to experts' consultation point 5.1 in the Report of Pesticides Peer Review Experts' TCs 195 and 196 (EFSA, 2026).

[10]Refer to experts' consultation point 5.2 in the Report of Pesticides Peer Review Experts' TCs 195 and 196 (EFSA, 2026).

Based on the refined risk assessment, low acute risk to wild mammals was concluded for uses in grapevine, and low acute and long-term risk to wild mammals was concluded for uses in sports turf. High long-term risk to small herbivorous mammals for uses in grapevine remained unresolved.[11]

Low risk to birds and wild mammals via the consumption of contaminated water and from secondary poisoning was concluded for all uses.

A risk assessment for metabolites for birds and mammals was not required.

To evaluate the risk for **aquatic organisms**, acute and chronic studies with fish, aquatic invertebrates, sediment-dwelling organisms (*Chironomus* sp.) and algae were available with the formulation for representative uses 'BCP 1030F'. A risk assessment for sediment-dwellings was not triggered since choline hydrogen phosphonate does not bioaccumulate in sediment; therefore, the experts agreed that a test with *Lumbriculus* was not required.[12] Low risk to all aquatic taxa was concluded at FOCUS Step 2 for uses in grapevine and sports turf. No relevant metabolites were identified for choline hydrogen phosphonate; therefore, no specific risk assessment for metabolites was required.

Acute (oral and contact), chronic and brood studies with honey **bees** were available with the formulation for representative uses 'BCP 1030F'. Low acute risk from oral and contact exposure was concluded for all representative uses following EC (2002) and EFSA (2013b) schemes. Likewise, a low risk to bee larvae was concluded at the screening step for all representative uses. However, a high chronic risk to adult honey bees was indicated at Tier 1 for uses in grapevine ('treated crop' and 'flowering weeds' scenarios)[13] and sports turf ('flowering weeds' scenario) based on EFSA (2013b). The experts agreed that the flowering weeds scenario is not relevant for highly managed grass vegetation such as sports turf, which is characterised by intensive mowing regimes that prevent weed flowering. Therefore, an overall low chronic risk was concluded for adult honey bees for sports turf uses. For uses in grapevines, suitable higher tier data were not available to refine the risk assessment, and the high chronic risk indicated at Tier 1 could not be further refined. No studies addressing accumulative and sub-lethal effects were available (**data gap** for sub-lethal effects; see Section 10). Bumble bee acute (oral and contact) studies were available with 'BCP 1030F'. A low acute risk was concluded at the screening step for all representative uses following EFSA (2013b). Chronic toxicity data for bumble bees were not available. No studies were available with solitary bees.

To address the risk for **non-target arthropods other than bees**, extended laboratory studies with the formulation for representative uses 'BCP 1030F' were available with the standard species *Aphidius rhopalosiphi* and *Typhlodromus pyri*, as well as with the rove beetle *Aleochara bilineata* and the green lacewing *Chrysoperla carnea*. Based on the available data and risk assessment, low in-field and off-field risk to non-target arthropods other than bees was concluded for all representative uses of choline hydrogen phosphonate.

Chronic toxicity studies were conducted with **earthworms** (*Eisenia fetida*) and **soil meso- and macrofauna** (the collembolan *Folsomia candida* and the predatory mite *Hypoaspis aculeifer*) for the formulation for representative uses 'BCP 1030F'. The endpoint for use in the risk assessment for earthworms was agreed at the expert meeting.[14] Low chronic risk to earthworms and soil meso- and macrofauna was concluded for choline hydrogen phosphonate for all representative uses. A nitrogen transformation study with the formulation for representative uses was available to assess the risk to **soil microorganisms**. Low risk to soil microbial activity was concluded for all representative uses. No relevant soil metabolites were identified for choline hydrogen phosphonate; therefore, no specific risk assessment for soil metabolites was required.

A low risk to organisms involved in biological methods for **sewage treatment** could be concluded for all representative uses.

6 | ENDOCRINE DISRUPTION PROPERTIES

Choline hydrogen phosphonate was discussed in the Peer Review Experts' Teleconference 196 (January 2026).

With regard to the assessment of the endocrine disruption potential of choline hydrogen phosphonate for humans according to the ECHA/EFSA guidance (2018), in determining whether Choline Hydrogen Phosphonate interacts with the oestrogen, androgen and steroidogenesis (EAS) and thyroid (T) mediated pathways, the number and type of effects induced; and the magnitude and pattern of responses observed across studies were considered. Only a 28-day oral study in rats was available with Choline hydrogen phosphonate. Following the approach used for the other endpoints, based on a robust read-across analysis and complementary QSAR information, the data on fosetyl-Al and other substances releasing phosphonates were considered acceptable to complete the data set for the assessment of the endocrine disruption potential of choline hydrogen phosphonate. The assessment is therefore providing a weight-of-evidence analysis of the potential interaction of choline hydrogen phosphonate and the other bridged substances with the EAS and T signalling pathways using the available evidence in the dataset.

[11] A low long-term risk to small herbivorous mammals could be concluded in case the GAP is limited to applications in grapevine at BBCH > 70; therefore, the unresolved high long-term risk applies to applications at BBCH 17–69.

[12] Refer to experts' consultation point 5.3 in the Report of Pesticides Peer Review Experts' TCs 195 and 196 (EFSA, 2026).

[13] A low chronic risk to adult honey bees could be concluded in case the GAP is limited to applications in grapevine at BBCH > 70; therefore, the high chronic risk identified at Tier 1 applies to applications at BBCH 17–69.

[14] Refer to experts' consultation point 5.8 in the Report of Pesticides Peer Review Experts' TCs 195 and 196 (EFSA, 2026).

With regard to **T-modality**, the data set was considered complete, and a pattern of T-mediated adversity was not identified. Therefore, the ED criteria for humans for the T-modality are not met, and scenario 1a of the ECHA/EFSA ED Guidance (2018) is applicable.[15] This is aligned with the conclusion on fosetyl-Al (EFSA, 2025a).

For the **EAS-modalities**, EAS-mediated parameters were not sufficiently investigated; however, no EAS-mediated adversity was observed in the available dataset of studies. The endocrine activity was sufficiently investigated (i.e. the following level 2 and 3 studies OECD TG 455, OECD TG 456, OPPTS 890.1200, OECD TG 458, OECD TG 440 and OECD TG 441 were available) and negative. Therefore, the ED criteria for humans for the EAS-modalities are not met, and scenario 2a(ii) of the ECHA/EFSA ED Guidance (2018) is applicable.[16]

The outcome of the assessment reported above for humans also applies to **wild mammals as non-target organisms**.

For the ED assessment of **non-target organisms other than mammals**, in line with the bridging adopted for the ED assessment for humans and wild mammals (see above), it was proposed to include the available data from the ED assessment of Fosetyl, in the overall WoE.

An amphibian metamorphosis assay (AMA, OECD TG 231) and a fish short-term reproduction assay (FSTRA, OECD TG 229) were available with the formulation for representative uses 'BCP1030F'. Based on the composition of the formulated product, this was considered acceptable (see also Section 5). An extended amphibian metamorphosis assay (EAMA) and a FSTRA were available with Fosetyl.

In both the AMA with BCP 1030F and the EAMA with Fosetyl, the effects observed did not follow any pattern of T-mediated activity and adversity. Therefore, when considering the available WoE including the mammalian dataset, the ED criteria were considered not met for the T-modality for non-target organisms.

In the FSTRA with BCP 1030F, no treatment-related effects were observed. However, the hazard was not considered properly characterised, based on the tested concentrations (in terms of phosphonic acid) being too low (i.e. below the MTC). In the FSTRA with Fosetyl, no evidence of a pattern of EAS-mediated endocrine activity was observed.[17] Overall, considering the available WoE including the mammalian dataset, the ED criteria were considered not met for the EAS-modalities for non-target organisms.

According to points 3.6.5 and 3.8.2 of Annex II to Regulation (EC) No 1107/2009, as amended by Commission Regulation (EU) 2018/605, it can be concluded that choline hydrogen phosphonate is not an endocrine disruptor.

7 | OVERVIEW OF THE RISK ASSESSMENT OF COMPOUNDS LISTED IN RESIDUE DEFINITIONS TRIGGERING ASSESSMENT OF EFFECTS DATA FOR THE ENVIRONMENTAL COMPARTMENTS (TABLES 1–4)

TABLE 1 Soil.

Compound (name and/or code)	Ecotoxicology
Choline hydrogen phosphonate[a]	Low risk to earthworms, soil meso- and macrofauna other than earthworms and soil microorganisms

[a]The ecotoxicologically relevant unit in the active substance is phosphonic acid.

TABLE 2 Groundwater.[a]

Compound (name and/or code)	>0.1 μg/L at 1 m depth for the representative uses[b] Step 2	Biological (pesticidal) activity/relevance Step 3a	Hazard identified Steps 3b and 3c	Consumer RA triggered Steps 4 and 5	Human health relevance
Phosphonic acid	No	Yes	-	-	Yes

[a]Assessment according to European Commission guidance of the relevance of groundwater metabolites (2003).

[b]FOCUS scenarios or relevant lysimeter. Ranges indicated for FOCUS scenarios include the result from the model giving the highest concentration at each scenario, as needed to comply with European Commission (2014) guidance.

TABLE 3 Surface water and sediment.

Compound (name and/or code)	Ecotoxicology
Choline hydrogen phosphonate[a]	Low risk to aquatic organisms

[a]The ecotoxicologically relevant unit in the active substance is phosphonic acid.

TABLE 4 Air.

Compound (name and/or code)	Toxicology
Choline hydrogen phosphonate	LC_{50} rat > 5.03 mg/L air/4 h (nose only)

[15]Refer to experts' consultation point 2.3 in the Report of Pesticides Peer Review Experts' TC 195&196 (EFSA, 2026).

[16]Refer to experts' consultation point 2.3 in the Report of Pesticides Peer Review Experts' TC 195&196 (EFSA, 2026).

[17]Refer to experts' consultation point 5.7 in the Report of Pesticides Peer Review Experts' TC 147 (September 2024) (EFSA, 2026).

8 | PARTICULAR CONDITIONS PROPOSED TO BE TAKEN INTO ACCOUNT BY RISK MANAGERS

Risk mitigation measures (RMMs) identified following consideration of Member State (MS) and/or applicant's proposal(s) during the peer review, if any, are presented in this section. These measures applicable for human health and/or the environment leading to a reduction of exposure levels of operators, workers, bystanders/residents, environmental compartments and/or non-target organisms for the representative uses are listed below. The list may also cover any RMMs as appropriate, leading to an acceptable level of risks for the respective non-target organisms.

It is noted that final decisions on the need of RMMs to ensure the safe use of the plant protection product containing the concerned active substance will be taken by risk managers during the decision-making phase. Consideration of the validity and appropriateness of the RMMs remains the responsibility of MSs at product authorisation, taking into account their specific agricultural, plant health and environmental conditions at national level.

8.1 | Particular conditions proposed for the representative uses evaluated

No particular conditions are proposed for the representative uses.

8.2 | Particular conditions proposed for the maximum residue level applications

No particular conditions are proposed for the MRL applications.

9 | CONCERNS AND RELATED DATA GAPS

9.1 | Issues that could not be finalised

An issue is listed as 'could not be finalised' if there is not enough information available to perform an assessment, even at the lowest tier level, for one or more of the representative uses in line with the uniform principles in accordance with Article 29(6) of Regulation (EC) No 1107/2009 and as set out in Commission Regulation (EU) No 546/2011[18] and if the issue is of such importance that it could, when finalised, become a concern (which would also be listed as a critical area of concern if it is of relevance to all representative uses).

An issue is also listed as 'could not be finalised' if the available information is considered insufficient to conclude on whether the active substance can be expected to meet the approval criteria provided for in Article 4 of Regulation (EC) No 1107/2009.

The following issues or assessments that could not be finalised have been identified, together with the reasons including the associated data gaps where relevant, which are reported directly under the specific issue to which they are related:

No issues not finalised have been identified.

9.2 | Critical areas of concern

An issue is listed as a critical area of concern if there is enough information available to perform an assessment for the representative uses in line with the uniform principles in accordance with Article 29(6) of Regulation (EC) No 1107/2009 and as set out in Commission Regulation (EU) No 546/2011, and if this assessment does not permit the conclusion that, for at least one of the representative uses, it may be expected that a plant protection product containing the active substance will not have any harmful effect on human or animal health or on groundwater, or any unacceptable influence on the environment.

An issue is also listed as a critical area of concern if the assessment at a higher tier level could not be finalised due to lack of information, and if the assessment performed at the lower tier level does not permit the conclusion that, for at least one of the representative uses, it may be expected that a plant protection product containing the active substance will not have any harmful effect on human or animal health or on groundwater, or any unacceptable influence on the environment.

An issue is also listed as a critical area of concern if, in the light of current scientific and technical knowledge using guidance documents available at the time of application, the active substance is not expected to meet the approval criteria provided for in Article 4 of Regulation (EC) No 1107/2009.

[18]Commission Regulation (EU) No 546/2011 of 10 June 2011 implementing Regulation (EC) No 1107/2009 of the European Parliament and of the Council as regards uniform principles for evaluation and authorisation of plant protection products. OJ L 155, 11.6.2011, pp. 127–175.

The following critical areas of concern are identified, together with any associated data gaps, where relevant, which are reported directly under the specific critical area of concern to which they are related:

No critical areas of concern have been identified.

9.3 | Overview of the concerns identified for each representative use considered

If a particular condition proposed to be taken into account to manage an identified risk, as listed in Section 8, has been evaluated as being effective, then 'risk identified' is not indicated in Table 5.

TABLE 5 Overview of concerns reflecting the issues not finalised, critical areas of concerns and the risks identified that may be applicable for some but not for all uses or risk assessment scenarios.

Representative use		Grapevine Foliar spray	Sports turf
Operator risk	Risk identified		
	Assessment not finalised		
Worker risk	Risk identified	X[c]	
	Assessment not finalised		
Resident/bystander risk	Risk identified		
	Assessment not finalised		
Consumer risk	Risk identified		
	Assessment not finalised		
Risk to wild non-target terrestrial vertebrates	Risk identified	X[d]	
	Assessment not finalised		
Risk to wild non-target terrestrial organisms other than vertebrates	Risk identified	X[e]	
	Assessment not finalised		
Risk to aquatic organisms	Risk identified		
	Assessment not finalised		
Groundwater exposure to active substance	Legal parametric value breached		
	Assessment not finalised		
Groundwater exposure to metabolites	Legal parametric value breached[a]		
	Parametric value of 10 µg/L[b] breached		
	Assessment not finalised		

Note: The superscript numbers relate to the numbered points indicated in Sections 9.1 and 9.2. Where there is no superscript number, see Sections 2–7 for further information.

[a]Based on classification made in the context of this evaluation procedure under Regulation (EC) No 1107/2009. It should be noted that harmonised classification and labelling is formally proposed and decided in accordance with Regulation (EC) No 1272/2008. Or it should be noted that the classification proposed in the context of this evaluation procedure under Regulation (EC) No 1107/2009 concurs with the harmonised classification and labelling in accordance with Regulation (EC) No 1272/2008.

[b]Value for non-relevant metabolites prescribed in SANCO/221/2000-rev. 10 final, European Commission (2003).

[c]Only for hand-harvesting re-entry activities.

[d]High long-term risk to small herbivorous mammals for applications at BBCH 17–69 (see footnote 11 in Section 5).

[e]High chronic risk for adult honey bees identified at tier 1 based on EFSA guidance (2013), for applications at BBCH 17–69 (see footnote 13 in Section 5).

10 | LIST OF OTHER OUTSTANDING ISSUES

Remaining data gaps not leading to critical areas of concern or issues not finalised but considered necessary to comply with the data requirements, and which are relevant for some or all of the representative uses assessed at EU level. Although not critical, these data gaps may lead to uncertainties in the assessment and are considered relevant.

These data gaps refer only to the representative uses assessed and are listed in the order of the sections:

- Analysis data of at least five batches for the content of an impurity are not available (relevant for all representative uses, see Section 1).
- The presence of impurities of potential concern should be investigated in industrial scale production batches to ascertain whether maximum limits should be included in the reference specifications (for all representative uses, see Sections 1 and 2).
- Data to demonstrate the extraction efficiency of the procedures used in pre- and post- registration methods in plant commodities are not available (relevant for the representative use on grapevine, see Section 1).

- Dissipation studies in field to further investigate the fate of choline hydrogen phosphonate or other phosphonates in soil under natural realistic conditions are not available (relevant for all representative uses, see Section 4).
- Further data were not available to address the risk to honey bees from sub-lethal effects (relevant for all representative uses, see Section 5).

ABBREVIATIONS

AAOEL	acute acceptable operator exposure level
ADI	acceptable daily intake
AMA	amphibian metamorphosis assay
AOEL	acceptable operator exposure level
ARfD	acute reference dose
bw	body weight
CAS	Chemical Abstracts Service
DAR	draft assessment report
DT_{50}	period required for 50% dissipation (define method of estimation)
DT_{90}	period required for 90% dissipation (define method of estimation)
dw	dry weight
EAS	oestrogen, androgen and steroidogenesis modalities
ECHA	European Chemicals Agency
EEC	European Economic Community
FAO	Food and Agriculture Organization of the United Nations
FOCUS	Forum for the Co-ordination of Pesticide Fate Models and their Use
FSTRA	fish short-term reproduction assay
GAP	Good Agricultural Practice
HBGVs	health-based guidance values
HPLC	high-pressure liquid chromatography or high-performance liquid chromatography
ISO	International Organization for Standardization
IUPAC	International Union of Pure and Applied Chemistry
K_{doc}	organic carbon linear adsorption coefficient
K_{Foc}	Freundlich organic carbon adsorption coefficient
LOAEL	lowest observable adverse effect level
LOQ	limit of quantification
MRL	maximum residue level
MS	Member State
MS/MS	tandem mass spectrometry
NOAEL	no observed adverse effect level
OECD	Organisation for Economic Co-operation and Development
PBT	persistent, bioaccumulative and toxic
PEC_{gw}	predicted environmental concentration in groundwater
PEC_{sed}	predicted environmental concentration in sediment
PEC_{sw}	predicted environmental concentration in surface water
POP	persistent organic pollutant
PRIMo	EFSA Pesticide Residues Intake model
QSAR	quantitative structure–activity relationship
RAC	regulatory acceptable concentration
RMM	Risk mitigation measures
RMS	rapporteur Member State
SFO	single first-order
SMILES	simplified molecular-input line-entry system
T	thyroid
TK	technical concentrate
UF	uncertainty factor
WHO	World Health Organization
WOE	weight-of-evidence

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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APPENDIX A

Consideration of cut-off criteria for Choline hydrogen phosphonate according to Annex II of Regulation (EC) No 1107/2009 of the European Parliament and of the Council

Properties		Conclusion[a]
CMR	Carcinogenicity (C)	Choline hydrogen phosphonate is not proposed for harmonised classification as carcinogen (Regulation (EC) No 1272/2008) and its Adaptations to Technical Process (Table 3.1 of Annex VI of Regulation (EC) No 1272/2008 as amended): according to ECHA RAC Opinion (December 2025)
	Mutagenicity (M)	Choline hydrogen phosphonate is not proposed for harmonised classification as mutagen (Regulation (EC) No 1272/2008) and its Adaptations to Technical Process (Table 3.1 of Annex VI of Regulation (EC) No 1272/2008 as amended): according to ECHA RAC Opinion (December 2025)
	Toxic for Reproduction (R)	Choline hydrogen phosphonate is not proposed for harmonised classification as toxic for reproduction (Regulation (EC) No 1272/2008) and its Adaptations to Technical Process (Table 3.1 of Annex VI of Regulation (EC) No 1272/2008 as amended): according to ECHA RAC Opinion (December 2025)
Endocrine disrupting properties		According to points 3.6.5 and 3.8.2 of Annex II to Regulation (EC) No 1107/2009, as amended by Commission Regulation (EU) 2018/605, it can be concluded that choline hydrogen phosphonate is not an endocrine disruptor
POP	**Persistence** **Bioaccumulation** **Long-range transport**	Choline hydrogen phosphonate is not considered to be a persistent organic pollutant (POP) according to point 3.7.1 of Annex II of Regulation (EC) 1107/2009
PBT	**Persistence** **Bioaccumulation** **Toxicity**	Choline hydrogen phosphonate is not considered to be a persistent, bioaccumulative and toxic (PBT) substance according to point 3.7.2 of Annex II of Regulation (EC) 1107/2009
vPvB	**Persistence** **Bioaccumulation**	Choline hydrogen phosphonate is not considered to be a very persistent, very bioaccumulative substance according to point 3.7.3 of Annex II of Regulation (EC) 1107/2009

[a]Origin of data to be included where applicable (e.g. EFSA, ECHA RAC, Regulation).

APPENDIX B

List of end points for the active substance and the formulation(s) for representative uses

Appendix B can be found in the online version of this output ('Supporting Information' section): https://doi.org/10.2903/j.efsa.2026.10288.

APPENDIX C

Wording EFSA used in Section 4 of this conclusion, in relation to DT and K_{oc} 'classes' exhibited by each compound assessed

Wording	DT_{50} normalised to 20°C for laboratory incubations[19] or not normalised DT_{50} for field studies (SFO equivalent, when biphasic, the DT_{90} was divided by 3.32 to estimate the DT50 when deciding on the wording to use)
Very low persistence	< 1 day
Low persistence	1 to < 10 days
Moderate persistence	10 to < 60 days
Medium persistence	60 to < 100 days
High persistence	100 days to < 1 year
Very high persistence	A year or more

Note: These classes and descriptions are unrelated to any persistence class associated with the active substance cut-off criteria in Annex II of Regulation (EC) No 1107/2009. For consideration made in relation to Annex II, see Appendix A.

Wording	K_{oc} (either K_{Foc} or K_{doc}) mL/g
Very high mobility	0 to 50
High mobility	51 to 150
Medium mobility	151 to 500
Low mobility	501 to 2000
Slight mobility	2001 to 5000
Immobile	> 5000

Note: Based on McCall et al. (1980).

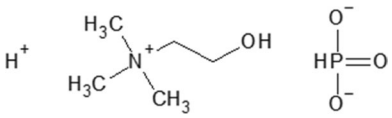
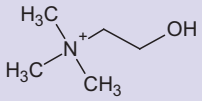
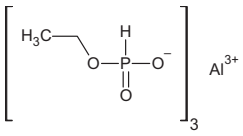
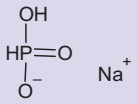
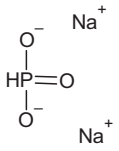
Wording used in Section 5 of this conclusion to communicate outcome of the environmental risk assessment

Wording	Interpretation
Low risk	A low risk to the non-target organism was indicated based on screening, Tier 1 or higher Tier assessment
High risk	A high risk to the non-target organism was indicated based on either Tier 1 or higher Tier assessment
High risk not excluded	Only a screening level assessment was available, which did not show a low risk. This assessment is not considered to confirm a high risk to the non-target organism
Pending an identified data gap in another section, further consideration may be needed	Based on the available information, it is not known if a risk assessment for non-target organisms is triggered

[19] For laboratory soil incubations normalisation was also to field capacity soil moisture (pF2/10kPa). For laboratory sediment water system incubations, the whole system DT values were used.

APPENDIX D

Used compound codes

Code/trivial name[a]	IUPAC name/SMILES notation/InChiKey[b]	Structural formula[c]
Choline hydrogen phosphonate	2-hydroxy-*N*,*N*,*N*-trimethylethanaminium hydrogen phosphonate (1:1:1) [H+].C[N+](C)(C)CCO.[O-]P([O-])=O PUYVSHRDHSTMLZ-UHFFFAOYSA-M	
Choline	2-hydroxy-*N*,*N*,*N*-trimethylethanaminium OCC[N+](C)(C)C OEYIOHPDSNJKLS-UHFFFAOYSA-N	
Fosetyl-aluminium	Aluminium tris(ethyl phosphonate) [Al+3].O=P([O-])OCC.[O-]P(=O)OCC.[O-]P(=O)OCC ZKZMJOFIHHZSRW-UHFFFAOYSA-K	
Monosodium phosphite	Sodium hydrogen phosphonate [Na+].[O-]P(O)=O FCOCXFOQAWJIIT-UHFFFAOYSA-M	
Disodium phosphonate	Disodium phosphonate [Na+].[Na+].[O-]P([O-])=O YPPQYORGOMWNMX-UHFFFAOYSA-L	

[a]The name in bold is the name used in the conclusion.

[b]ACD/Name 2018.2.2 ACD/Labs 2018 Release (File version N50E41, Build 103230, 21 July 2018).

[c]ACD/ChemSketch 2018.2.2 ACD/Labs 2018 Release (File version C60H41, Build 106041, 7 December 2018).