TDE-P01 Protocol

Fungicides: exclusion from the soil panel and plant-based phosphonic acid monitoring · Technical decision note · Version 1.0 · 8 November 2026

Criterion status: TDE methodological choice adopted for operational use, with validation of the sentinel matrix still to be completed.

1. Purpose and decision

The TDE protocol aims to select organic agricultural areas where the risk of transferring unwanted residues into products is particularly low. It is not intended to provide exhaustive chemical characterisation of contaminated soil for remediation purposes.

TDE criterion: exclude fosetyl-aluminium, phosphonic acid and dithiocarbamates from the routine TDE-P01 soil panel. For phosphonic acid, which is persistent and can be taken up by crops, monitoring is shifted to sentinel plants growing in the soil concerned. For other fungicides and their metabolites, targeted investigations remain possible where there is evidence of risk.

2. Technical and scientific rationale

2.1 Fosetyl-aluminium and phosphonic acid

According to the EFSA 2025 assessment, fosetyl-aluminium has very low persistence in soil (DT50 0.01–0.06 days); phosphonic acid, by contrast, shows moderate to high persistence (DT50 28–130 days under a single-phase model; 31 to over 1,000 days under biphasic kinetics). Transfer from the root environment into plant tissues has been observed in rotational-crop experiments, but available data do not support a general relationship between mg/kg in soil and mg/kg in edible tissue. [1, 2]

Consequently, total soil concentration alone is not, on current evidence, a reliable and generalisable quantitative criterion for qualifying TDE production. Determination in plant tissues is closer to the outcome of concern to the project, although it is not automatically representative of every crop grown by a farm.

2.2 Dithiocarbamates: reason for routine exclusion

Dithiocarbamate active substances of agricultural relevance often degrade relatively rapidly in soil. In EFSA’s assessment of mancozeb, for example, the active-substance DT50 was 0.017–0.159 days under the experimental conditions examined. Searching for the parent compound in soil therefore has limited ability to document historical treatments or predict future residues in food products. [3]

Exclusion does not mean that all derivatives are harmless or rapidly eliminated: metabolites such as ETU are documented for mancozeb and may show moderate persistence under certain conditions. EFSA’s dithiocarbamate evaluation also highlights analytical specificity issues and differing residue profiles. Targeted tests of relevant metabolites and products remain possible where there is substantiated concern. [3, 4]

3. Regulatory basis and origin of the TDE threshold

EU maximum residue levels (MRLs) under Regulation (EC) No. 396/2005 apply to food commodities according to their category; they are not environmental background thresholds. Regulation (EU) 2024/2619 adopted, for the residues concerned, the definition “phosphonic acid and its salts, expressed as phosphonic acid”. [5, 6]

In Italy, Ministerial Decree No. 309/2011, as amended by Decree No. 7264/2020 and later extensions, provides under the ordinary regime a numerical threshold of 0.05 mg/kg for phosphonic acid in the absence of simultaneous detection of ethylphosphonic acid. A derogation, extended by Decree No. 689096 of 22 December 2025 until 31 December 2027, sets thresholds of 0.5 mg/kg for herbaceous crops and 1.0 mg/kg for tree crops. These rules concern marketing as organic under specified contamination conditions; they are NOT natural background concentrations or evidence that residues are exclusively historical. The cause of contamination must still be investigated. [7, 8]

Parameter	Value	Interpretation
LOQ documented for a food matrix (reference only; not transferable to other matrices)	0.0075 mg/kg	Phosphonic acid and salts expressed as phosphonic acid
Italian organic herbaceous-crop threshold (derogation until 31 December 2027)	0.50 mg/kg	Transitional regulatory threshold
Ordinary Italian threshold, without derogation	0.05 mg/kg	More stringent than proposed TDE criterion
Proposed internal TDE threshold for herbaceous sentinels	0.25 mg/kg	50% of transitional 0.50 mg/kg; voluntary, provisional criterion

The choice of 0.25 mg/kg does not derive from a dose-response curve or a statistical distribution of plant background concentrations. It is a precautionary management threshold proposed by TrustyFood, equal to half the transitional reference for organic herbaceous crops. It must be reviewed if legislation changes, new data become available for sentinel species, or experimental findings prove incompatible.

4. Flexible selection of sentinel plants

Growing alfalfa is not mandatory. One or more common herbaceous species already present on the farm or in the area may be used, provided they are botanically identified, readily available at multiple sites and suitable for reproducible sampling. Candidates for assessment, not species already validated for phosphonic acid, include clovers (Trifolium spp.), plantains (Plantago spp.), dandelion (Taraxacum officinale agg.), grasses and spontaneous grassland with identified species. Other locally widespread species may also be used. Materials from different species must not be mixed in a single sample.

Species selection must consider rooting system, persistence in the field, sample availability, consistency of the sampled plant part and compatibility with a validated analytical method for the matrix. Concentrations in non-food species must not automatically be equated to those in lettuce, wheat or grapes; the TDE value of 0.25 mg/kg is therefore PROVISIONAL for unvalidated species.

Alternatively, a sentinel plot with one or two short-cycle food crops may be used where suitable spontaneous plants are unavailable. Such a plot is not mandatory and does not require establishment of perennial alfalfa. For this test, sentinel plants must grow in TDE soil, not an artificial substrate, because the objective is to check transfer under actual soil conditions.

5. Minimum sampling and application protocol

• Identify the species, field, internal coordinates/site, date, sampled plant part and phenological stage; preferably use the same species and period in subsequent campaigns.

• Collect multiple aliquots representative of the area, avoiding roadsides, discharge points or atypical areas except for additional targeted samples. Record irrigation, fertilisation and potential phosphite/phosphonate inputs.

• Determine phosphonic acid separately and, where useful for investigating causes, fosetyl/ethylphosphonic acid. Ask the laboratory to confirm method validation and LOQ for each species/matrix used.

• Express results in mg/kg fresh weight for the same plant part, or perform a documented dry-to-fresh conversion using experimentally determined moisture. Do not directly compare dry-weight mg/kg with fresh-weight thresholds.

• Initially apply the proposed 0.25 mg/kg threshold to herbaceous sentinel species actually characterised. If exceeded, repeat/verify the result, investigate sources and assess the farm crops concerned before taking a final decision.

6. Proposed decision rule

Sentinel-plant result	Operational consequence
< 0.25 mg/kg, without additional evidence	Phosphonic acid criterion met for the sentinel used; maintain monitoring.
≥ 0.25 mg/kg	TDE anomaly: analytical confirmation, representativeness assessment, source investigation and targeted checks of the production concerned.
Confirmed exceedance incompatible with the TDE requirement	Failure to grant/suspension and, if unresolved, revocation of qualification for the relevant area.

The threshold does not replace food-safety requirements or organic certification rules. Each result must be interpreted under the control body’s procedures and current legislation. Applying the value to spontaneous non-food species requires preliminary comparison with edible crops and must not be presented as a legally recognised equivalence.

7. Conclusion for the soil protocol

The fungicide chapter of TDE-P01 does not require routine soil determinations. Phosphonic acid is primarily monitored through locally selected sentinel plants; dithiocarbamates and other compounds are not subject to generalised soil testing, without prejudice to targeted investigations where concrete evidence warrants them. The internal 0.25 mg/kg threshold is a provisional management proposal, subject to review and matrix-specific validation.

Regulatory and bibliographic references

[1] EFSA et al. (2025). Updated peer review of the pesticide risk assessment of the active substance fosetyl. EFSA Journal. DOI: 10.2903/j.efsa.2025.9513. https://efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2025.9513

[2] EFSA (2026). Modification of the existing maximum residue levels for potassium phosphonates in various crops. EFSA Journal. DOI: 10.2903/j.efsa.2026.10290. https://efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2026.10290

[3] EFSA (2020). Peer review of the pesticide risk assessment of the active substance mancozeb. EFSA Journal. DOI: 10.2903/j.efsa.2020.5755. https://efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2020.5755

[4] EFSA (2023). Review of the existing maximum residue levels for dithiocarbamates according to Article 12 of Regulation (EC) No 396/2005. EFSA Journal. DOI: 10.2903/j.efsa.2023.7987. https://efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2023.7987

[5] Regulation (EC) No 396/2005 of the European Parliament and of the Council on maximum residue levels of pesticides in or on food and feed. https://eur-lex.europa.eu/eli/reg/2005/396/oj

[6] Commission Regulation (EU) 2024/2619 of 8 October 2024 amending Annexes II and III to Regulation (EC) No 396/2005 for fosetyl and phosphonates. https://eur-lex.europa.eu/eli/reg/2024/2619/oj

[7] Ministerial Decree of 10 July 2020, No. 7264, amendments to Ministerial Decree of 13 January 2011 No. 309, Annex 2, accidental contamination with phosphonic and ethylphosphonic acid in organic farming (Official Gazette, 9 September 2020). https://www.gazzettaufficiale.it/atto/vediMenuHTML?atto.codiceRedazionale=20A04775&atto.dataPubblicazioneGazzetta=2020-09-09&tipoSerie=serie_generale&tipoVigenza=originario

[8] Ministerial Decree of 22 December 2025, No. 689096, extending the derogation to 31 December 2027, published in the Official Gazette of 12 January 2026, code 26A00037. https://www.gazzettaufficiale.it/atto/serie_generale/caricaArticoloDefault/originario?atto.codiceRedazionale=26A00037&atto.dataPubblicazioneGazzetta=2026-01-12&atto.tipoProvvedimento=DECRETO

[9] CREA (2020). Organic agriculture: decree on phosphonate limits in organic products released. Interpretation of possible residue sources. https://www.crea.gov.it/-/biologico-sbloccato-il-decreto-sui-limiti-di-fosfonato-nei-prodotti-bio

Reference value for a food matrix: LOQ 0.0075 mg/kg for phosphonic acid and its salts expressed as phosphonic acid. This does not document validation for non-food plant species.