TRUSTYFOOD | LANDS OF EXCELLENCE

SENTINEL VEGETATION — Non-Dioxin-Like PCBs (Non-DL PCBs)

TDE technical note • 9 November 2026 • Provisional operational criterion

1. Operational decision

Matrix: leaves of wild vegetation growing in the candidate TDE area. Determine the six indicator non-DL PCBs: PCB 28, 52, 101, 138, 153 and 180.

Parameter	TDE criterion
Σ6 non-DL PCBs	≤ 0.5 ng/g dry weight (equivalent to 0.5 µg/kg dw)
Σ6 ≤ 0.5 ng/g	Indicator meets the provisional guidance value
Σ6 > 0.5 ng/g	Indicator assessment suspended; integrated comparison with other living indicators and environmental matrices
Function	Supplementary check, particularly useful as an alternative when mosses are unavailable

Exceeding the guidance value does not automatically exclude a TDE area: territorial suitability depends on overall assessment. Compliance with this single leaf PCB parameter is not equivalent to qualification of the territory.

2. Origin and limits of the guidance value

The numerical reference comes from Serpe et al. (2013), who measured the sum of six indicator PCBs in maize leaves at seven farms classified as unaffected and two classified as affected in Campania. Results are in ng/g dry weight.

Category	Samples	Σ6 non-DL PCBs (ng/g dw)
Unaffected farms	1–7	0.1; 0.1; 0.2; 0.3; 0.2; 0.1; 0.3
Affected farms	8–9	1.9; 2.9
Proposed internal TDE threshold	—	0.5

The 0.5 ng/g value lies above all unaffected samples and below the two affected samples in this series. It is a precautionary project choice, NOT a validated threshold for the leaves of all broadleaf trees. The original dataset is limited (n = 9) and concerns maize, not wild trees. It was published as an extended contribution in the Ecomondo 2013 proceedings, not as a multicentre study establishing background concentrations.

The original study also lists PCB 118 among individual congeners, but the authors' Σ PCB (6) parameter includes only 28, 52, 101, 138, 153 and 180: PCB 118 must not be included in Σ6.

3. Environmental interpretation

Concentrations may vary with species, leaf area and cuticular composition, season, weather, leaf age, canopy height and source characteristics. Leaves integrate air exchange and deposition; they do not directly measure ambient-air concentrations.

Nizzetto et al. (2008) documented different responses among congeners and species in Alpine forests: less chlorinated PCBs may respond rapidly to changes in air, while more chlorinated congeners accumulate more slowly. This supports plant biomonitoring but also highlights the need for caution when transferring thresholds among species.

Where Σ6 exceeds the guidance value, consider plant species, the six-congener profile, soil evidence and, where available, moss and other biological matrices. Conflicting evidence requires a reasoned interpretation rather than automatic preference for one indicator.

4. Analytical requirements

A suitable, validated method for the six congeners in leaves is required, with documented individual recoveries and LOQs. Analytical performance must be confirmed for the specific leaf matrix. LOQs established for food matrices cannot automatically be transferred to leaves.

Non-quantified results and summation approach (lower-bound/upper-bound) must be stated to avoid false compliance decisions when LOQs approach the guidance value. Species selection, collection, sample numbers and compositing procedures must be defined in the general TDE sampling plan.

5. Summary of the TDE criterion

SENTINEL VEGETATION — NON-DL PCBs. The six PCBs (28, 52, 101, 138, 153 and 180) are measured in leaves as a supplementary check, particularly where mosses are absent. The provisional guidance value is Σ6 ≤ 0.5 ng/g dry weight. A higher value suspends assessment of the indicator and requires integrated evaluation; it does not, by itself, cause exclusion. The criterion is based on Italian maize-leaf data and must be verified for different wild plant species, using suitably validated leaf methods and LOQs.

6. References and sources

1. Serpe F.P., Esposito M., Testa C., Cavallo S., Chiaravalle E., Manca M.C., Brambilla G. (2013). Environmental quality criteria in animal food producing systems: a matter of food safety and food security. Environmental Engineering and Management Journal 12(S11), 157–160. Ecomondo 2013 proceedings, Table 1, pp. 158–159. https://www.ecomondo.com/Data/Ecomondo/Pubblicazioni%20Scientifiche/Environmental/supplement_eemj_ecomondo_2013.pdf

2. Nizzetto L., Pastore C., Liu X., et al. (2008). Accumulation Parameters and Seasonal Trends for PCBs in Temperate and Boreal Forest Plant Species. Environmental Science & Technology 42(16), 5911–5916. https://doi.org/10.1021/es800217m

3. Dreyer A., Nickel S., Schröder W. (2018). (Persistent) organic pollutants in Germany: results from a pilot study within the 2015 moss survey. Environmental Sciences Europe 30, 43. https://doi.org/10.1186/s12302-018-0172-y

Criterion status: provisional voluntary TDE reference; not a universal legal threshold for leaves.