

EPPO STANDARD ON EFFICACY EVALUATION OF PLANT PROTECTION PRODUCTS

PP 1/243 (3) Effects of plant protection products on biological transformation processes

Specific scope: This Standard provides details on the requirements for when and how to address possible effects of plant protection products on biological processes involved in the transformation of harvested crops.

Specific approval and amendment: First approved in 2005–09. Revision to update references approved in 2014–09. Revision approved in 2025–09.

1 | BIOLOGICAL TRANSFORMATION PROCESSES

Many crops are processed post-harvest, and the end-product may be totally different in nature from the raw crop. These processes can be physical, chemical, or biological. Examples of physical or chemical processes are the milling of cereals, the extraction of specific crop components such as sugar from sugar beet (BEAVA) or oil from oilseed rape (BRSNN), freezing, canning, or juicing of fruits or vegetables. In these processes, residues of plant protection products (PPPs) applied to the growing crop may remain in the harvested crop or the processed product, but they do not substantially impact the process (physical or chemical) itself. It is to be noted that some PPPs can affect quality e.g., taint (see EPPO Standard PP 1/242 *Taint tests*).

Biological transformation processes which depend on biological activity of microorganisms e.g., *Saccharomyces cerevisiae* (SACCCE) and other yeasts, or lactic and propionic acid bacteria etc., may be adversely affected by PPP. Where this is likely to occur, it is necessary to consider the risk associated with the use of PPPs.

2 | WHEN AND HOW TO ADDRESS POSSIBLE ADVERSE EFFECTS ON BIOLOGICAL TRANSFORMATION PROCESSES

The following step-wise approach provides a list of considerations in determining the requirements (if any) for additional data on the effects of PPP on biological transformation processes.

Step 1: Is the crop subjected to biological transformation processes? Biological transformation processes to be considered include baking (cereals), winemaking (grapes) and brewing (cereals and hops).¹ Other processes involving the biological activity of yeasts, include fermentation in cider production (pome fruit) and production of other alcoholic fruit beverages, or conservation by fermentation. No further information is required if the product is not to be used on such crops.

Step 2: Can a case be made that the active substance has no significant fungicidal or growth regulatory activity, and therefore is unlikely to affect yeasts or bacteria such as lactic or propionic acid bacteria. The highest risk arises from the use of fungicides applied close to or after harvest, or where the use of similar products has been found to have an adverse effect, e.g., use of plant growth regulators applied in pome fruit close to or after harvest, or PPPs based on micro-organism species expected to proliferate in situ on the plant parts, and that are applied close to harvest to harvestable parts. Preliminary data (e.g. published information describing the mode of action for the active substance or where PPPs containing the same active substance and similar use pattern have not caused issues in the past) may be useful in supporting a case that transformation processes will not be adversely affected. No further information is required if there is sufficient weight-of-evidence that the active substance has no significant fungicidal or growth regulatory activity, making effects on yeasts or lactic or propionic bacteria less likely.

Step 3: If there is not enough evidence that transformation processes will not be adversely affected at Step 2, then a case based on residues may be considered. Where residues in harvested parts intended to be transformed are above the Limit of Quantification (LOQ) or where residue tests are unavailable (e.g. some PPPs based on micro-organisms) and the product is applied to harvestable plant parts evidence is required that the product will have no adverse effect on transformation processes either by demonstrating a lack of fungicidal or growth regulatory activity

¹Malting of barley is not considered to be a transformation process and is addressed by seed germination studies as described under EPPO Standard PP 1/135 *Phytotoxicity*. This transformation assessment relates to the extent to which the brewing process may be subsequently affected.

or investigating the effect on transformation processes. Alternatively appropriate label warnings may be applied.

If data are required, note that in the case of grapes, specific EPPO guidance on testing methods is provided in PP 1/268 *Study of unintentional effects of plant protection products on fermentation processes and characteristics of wine*. For other crops, guidance on appropriate testing methodologies can be obtained from relevant organizations (e.g. brewing and baking industries).

Note that where there are changes to the use of the PPP (e.g. change in application timing), the effect on transformation processes may need to be reassessed.

Registration authorities in different EPPO Member Countries may accept data from studies made in other Member Countries provided they are conducted by appropriate and reputable organizations.

[Appendix 1](#) presents an appropriate decision-support scheme.

APPENDIX 1 - DECISION-SUPPORT SCHEME ON THE EXTENT OF TESTING NEEDED TO EXAMINE EFFECTS OF PPPS ON TRANSFORMATION PROCESSES

