

Emissions of plant protection products from protected crops to the environment

Document destined for the applicant of an authorisation of a plant protection product.

National approach following the entry into force of the Guidance Document on protected crops (SANCO/12184/2014 – rev. 5.1 of 14 July 2015).



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All information on agricultural practices in Flanders and Wallonia in this document was made available by the Flemish and Walloon agricultural sector. The FPS Health, Food Chain Safety and Environment is not responsible for the correctness of this information.

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1. Introduction

In recent years, a lot of work was performed in the European Union on environmental fate and behaviour guidance on how to carry out environmental risk assessment of plant protection products (PPPs) emitted from protected crops.

The European Food Safety Authority (EFSA) published in 2014 a Guidance Document on clustering and ranking of emissions of active substances of plant protection products and transformation products of these active substances from protected crops (greenhouses and crops grown under cover) to relevant environmental compartments¹.

The EFSA report was adopted as Guidance Document (SANCO/12184/2014) by the Standing Committee on Plants, Animals, Food and Feed on 27 January 2015. On 14 July 2015, it was decided by the Standing Committee to postpone the implementation date of May 1, 2015 to December 1, 2015.

Throughout this document, further reference to the guidance is made as *EFSA Guidance Document on protected crops (2014)*.

This national document is intended to provide the industry guidance on how emissions of plant protection products (PPPs) from protected crops are handled in Belgium in the light of the EFSA Guidance Document on protected crops (2014) when granting an authorisation for plant protection products. Two different aspects are considered within this document:

- guidance for the interzonal core assessment with Belgium acting as interzonal Rapporteur Member State (izRMS) and
- guidance for the national assessment for Belgium.

This document represents the views of the Belgian Authorisation Board for pesticides for agricultural use.

This guidance does not replace the legislation in force.

¹ EFSA Journal 2014;12(3):3615, 43 pp., doi:10.2903/j.efsa.2014.3615.
Available online at: <http://www.efsa.europa.eu/en/efsajournal/pub/3615.htm>

2. Interzonal core assessment with Belgium acting as izRMS

2.1 Application introduced from December 1, 2015

The EFSA Guidance Document on protected crops (2014) must be applied for all applications for authorisation, or for amendment or renewal of an authorisation, submitted from the 1st of December 2015.

Before the submission of an application, applicants are invited to prepare an elaborated proposal on how to conduct this assessment and to discuss this proposal with the Belgian authority (Service Plant Protection Products and Fertilisers) in order to clarify the practical implementation of this guidance document on a case by case basis. The applicant's proposal should be presented during the pre-submission meeting.

2.2 Application introduced before December 1, 2015

In the absence of a harmonised approach within the EU Central Zone, the Belgian authority applies the national approach described hereafter.

The **soil and groundwater** exposure assessment for uses of plant protection products in protected crops should preferably be based on an exposure assessment for similar field uses. A soil and groundwater exposure assessment is not required where the use is restricted to non-soil bound cultivation (cultivation on substrates or in containers). However, special attention is required for the disposal of the used growing media, e.g. potential soil exposure should be estimated if spent mushroom substrates, treated with the plant protection product, may be used as soil improver on agricultural soils.

The **surface water and sediment** exposure resulting from the use of a plant protection product in a greenhouse or closed building is calculated using an Excel-spreadsheet, assuming 0.2 % emission, a water depth of 30 cm, water density of 1 kg/L, sediment depth of 5 cm and sediment density of 0.8 kg/L. The estimations may be refined using an emission factor of 0.1 %

if the product is applied at spray volumes of at least 50 L/ha. This refinement is not possible at ultra low spray volumes (less than 50 L/ha).

3. National assessment in Belgium

3.1 Authorisation certificate in Belgium

Types of covering structures

According to the EFSA Guidance Document on protected crops (2014), distinction should be made in the exposure assessment to environmental receptors between the following types of structures: (i) partially open and/or low structures, (ii) walk-in tunnels², (iii) greenhouses³ and (iv) closed buildings⁴.

On the authorisation certificates in Belgium, distinction is only made between crops grown *under cover* and crops grown in *open field*; applications in mushrooms and chicory (witloof) in closed buildings are considered as special cases.

The following definition is applied for **crops grown under cover** in Belgium:

Crop that is covered at the moment of application of the plant protection product till the end of the cultivation, with the structure being large enough to walk in and with the upper side and sidewalls closed with a water-impermeable cover.

This definition includes most of the greenhouses and walk-in tunnels as defined by the EFSA Guidance Document on protected crops (2014). However, walk-in tunnels that are removed before the end of the cultivation or walk-in tunnels from which the sides are open are not included in the Belgian definition for crops grown under cover.

Soil-bound vs. soil-less cultivation

According to the Guidance Document on protected crops, distinction is made in the exposure assessment to environmental receptors between the following two types of production systems: soil-bound and soil-less cultivation.

² The EFSA Guidance Document on protected crops (2014) describes walk-in tunnels as follows: “A walk-in tunnel is an unheated structure used for growing plants. It usually consists of a single layer of plastic supported by plastic or metal arches or hoops. These structures are large enough to walk in and work inside, and generally they are temporary, in that they or their coverings are generally removed at the end of cultivation.”

³ In the Regulation (EU) No. 1107/2009, the following definition is given to greenhouses: “A ‘greenhouse’ means a walk-in, static, closed place of crops production with a usually translucent outer shell, which allows controlled exchange of material and energy with the surroundings and prevents release of plant protection products (PPPs) into the environment. For the purpose of this Regulation, closed places of plant production where the outer shell is not translucent (for example for production of mushrooms or witloof) are also considered as greenhouses.”

⁴ In the EFSA Guidance Document on protected crops (2014) closed buildings means warehouses; defined areas for post-harvest treatment of PPPs.

On the authorisation certificates in Belgium, there is no distinction made between these two cultivation systems. For some PPPs, the following restriction phrase is mentioned on the authorisation certificate: *“The product can be used only in closed water circulation systems”*⁵.

This phrase makes it possible to approve a PPP to be used in certain soil-less crop systems where an unacceptable risk for the environment would be identified for use in soil-bound crop systems. This phrase is considered sufficient to handle the distinction made in the exposure assessment.

3.2 National exposure assessment in Belgium

3.2.1 Semi-covered crops

The exposure assessment to environmental receptors has to be done as for open field for all crops grown in protection structures that are not covered by the definition applicable in Belgium for crops grown under cover and crops not grown in closed buildings.

These semi-covered crops, such as crops in low covering structures which are open at the moment of PPP application or the cultivation of soft fruits under a cover without sidewalls, should be considered as a crop grown in open field on the authorisation certificate.

3.2.2 Greenhouses

In accordance with the EFSA report on general recurring issues in ecotoxicology⁶, the exposure in permanent greenhouses is not considered relevant for birds, mammals, bees (with exception of introduced pollinators), non-target arthropods and non-target plants.

Soil-bound cultivation

Soil: According to the Guidance Document on protected crops, only a risk assessment for persistent substances (DT90 >1 year, according to the Uniform Principles (Regulation (EU) No. 546/2011)) is necessary. This should be done to account for possible change of destination of the soil within the structure in the longer term (e.g. if the soil is removed and used outside and/or the structure is removed).

⁵ Dutch / French version: *“Het product mag uitsluitend gebruikt worden op gewassen geteeld in gesloten watercirculatiesystemen / Le produit peut uniquement être utilisé sur plantes cultivées en systèmes de circulation d'eau fermés”*.

⁶ EFSA (European Food Safety Authority), 2015. Technical report on the outcome of the pesticides peer review meeting on general recurring issues in ecotoxicology. EFSA supporting publication 2015:EN-924. 62 pp.

However, according to the Flemish agricultural sector, there is in fact no removal of soil out of a permanent greenhouse which is used for growing ornamentals, fruits or vegetables.

It is therefore agreed that, for this type of cultivation system in Belgium, there is only a soil risk assessment needed for persistent substances in order to demonstrate that there is no accumulation in soil at such levels that unacceptable residues in succeeding crops occur and/or that unacceptable phytotoxic effects on succeeding crops occur, in accordance with the principles laid down in the Uniform Principles (Regulation (EU) No. 546/2011). Exceptions can be made for special cases where an elevated risk is expected after application of the PPP due to specific substance properties and/or the special type of use conditions.

Groundwater: According to the Flemish agricultural sector, the losses to the groundwater through percolation in protected crops in Belgium are negligible, because the irrigation in protected crops is controlled in function of the needs of the crop⁷.

It is therefore agreed that there is no groundwater exposure assessment needed for this type of cultivation system in Belgium; however, an exception can be made for special cases (e.g., soil disinfectants) where an elevated risk is expected after application of the PPP due to specific substance properties and/or the special type of use conditions.

Surface water:

- There is no exposure of surface water by drift because closing of the windows, doors and sidewalls of the greenhouse when treating the crops with PPPs is considered good agricultural practice in Belgium.

- There is no exposure of surface water by run-off because the physical barriers of the greenhouse prevent run-off.

- According to the Flemish agricultural sector, the exposure of surface water by drainage in soil-bound crops grown in greenhouses is negligible because the irrigation in protected crops is controlled in function of the needs of the crops⁶.

It is therefore agreed that there is no surface water exposure assessment needed for this type of cultivation systems in Belgium; however, an exception can be made for special cases (e.g., soil disinfectants) where an elevated risk is expected after application of the PPP due to specific substance properties and/or the special type of use conditions.

⁷ Detailed information on the irrigation in greenhouses in Belgium is available in the Appendix – Note 3.

Cultivation in a closed water circulation system

Both in Flanders and in Wallonia, there is 100% recirculation in cultivation systems with a closed water circulation system. Drain is only formed periodically (e.g. when rinsing the filters and/or when concentration of sodium in supply water is too high).

- In Flanders, discharge of the drain in surface water is prohibited by the regional legislation⁸.
- In Wallonia, there is no regional legislation as regards the discharge of the drain. Discharge in surface water can thus not be excluded. The soil-less cultivation in greenhouses in Wallonia concerns 8-10 ha of vegetables. There is no soil-less cultivation of ornamentals or strawberries in greenhouses in Wallonia.

It is considered that exposure of PPPs in surface water following the discharge of drain from soil-less cultivation systems in greenhouses in Wallonia is negligible, given the very limited area concerned (8-10 ha).

When applying PPPs in greenhouses, losses are also possible through leakage, such as condensed particles that enter the environment after opening of the windows, etc. The exposure to the environment through leakage losses is considered negligible, given the limited area of greenhouses in Belgium (2058 ha, corresponding with 0.15% of the total agricultural area⁹).

3.2.3 Walk-in tunnels

The crops grown in walk-in tunnels included in the Belgian definition for *crops grown under cover* are covered at the moment of application of the PPP till the end of the cultivation with the structure being large enough to walk in and with the upper side and sidewalls closed with a water-impermeable cover.

Such types of walk-in tunnels are mostly used in Belgium for growing small fruits and strawberries. The total agricultural area of walk-in tunnels in Belgium is estimated to amount to 367.5 ha, representing 0.03% of the agricultural area in Belgium. Details of the types of crops grown in walk-in tunnels and the concerned agricultural surfaces in Belgium are given in note 2 of the Appendix.

The common agricultural practice in Belgium for growing these crops in walk-in tunnels is considered to reduce strongly the emissions of PPPs to the different environmental compartments. Details are given in note 2 of the Appendix .

⁸ Meststoffendecreet / MAP 5

⁹ Detailed information on agricultural surfaces in Belgium is available in the Appendix – Note I.

It is considered that the additional environmental risk due to the emission of PPPs from walk-in tunnels is very limited, given the limited area of walk-in tunnels in Belgium and the common agricultural practice in walk-in tunnels in Belgium.

Furthermore, the exposure in permanent greenhouses is not considered relevant for birds, mammals, bees (with exception of introduced pollinators), non-target arthropods and non-target plants. Given these elements (i.e., the limited area and the common agricultural practice), it is concluded that, like for permanent greenhouses, the risk for these organisms is negligible after application of PPPs in walk-in tunnels - meaning those types of crops grown in walk-in tunnels that are included in the definition of crops grown under cover.

3.2.4 Closed buildings

Emissions from PPPs after application in witloof and mushrooms in closed buildings and the post-harvest treatment of potatoes and chicory (witloof) roots should be regarded case-by-case.

E.g., for the environmental risk assessment for the indoor application of PPPs in mushrooms, the exposure to all relevant environmental compartments has to be estimated following the use of contaminated chompost as fertilizer on agricultural fields.

The Authorisation Committee has developed Good Agricultural Practices for post-harvest treatments of potatoes and chicory (witloof) roots with plant protection products, in order to avoid contamination of the environment. These recommendations are available on www.fytoweb.be (in Dutch and French only). An applicant requesting authorisation for such use of a plant protection product may assume that these Good Practices will be applied by the operator, and can refer to these documents in his risk assessment for Fate and Behaviour in the Environment (national approach for Belgium). For active substances that are not covered by these recommendations, an additional risk assessment needs to be carried out.

Appendix - Additional notes

1. Agricultural area in Belgium

Based on the agricultural data from 2015 (with publication date 26/04/2016), made available by the FPS Economy, S.M.E.s, Self-employed and Energy, the total agricultural area in Belgium is 1 344 328 ha. The total area of greenhouses in Belgium amounts to 2058 ha, which corresponds with 0.15% of the total agricultural area.

2. Walk-in tunnels in Belgium

The following information is made available by the agricultural sector in Flanders and Wallonia.

Concerned crops in closed walk-in tunnels + estimated total surfaces:

- glasshouse vegetables: max. 10 ha in Flanders, all biological agriculture;
- strawberries: 234 ha in Flanders + 100 ha in Wallonia;
- raspberries: 11 ha in Flanders + 3 ha in Wallonia;
- blackberries: 5 ha in Flanders;
- red currants: 2 ha in Flanders;
- blueberries: max. 2.5 ha in Flanders.

The total area of crops cultivated in closed walk-in tunnels in Belgium amounts to max. 367.5 ha (including minimum 10 ha biological agriculture). Of this 367.5 ha, about 334 ha is cultivated with strawberries.

The most common agricultural practice for walk-in tunnels in Flanders is:

- Strawberries: Placing of the walk-in tunnels and planting of the strawberries is done in autumn. The crop handling is done in spring (whether or not with advancing the crop). Deconstruction of the walk-in tunnel is done in the period June/July, after that the strawberry crops are tilled in the soil and a succeeding crop - mostly grass - is sown.
- Small fruit (raspberries, blackberries): There is a continuous set-up of walk-in tunnels. The plants are cultivated in pots and are replanted up to two times per year. The plastic is being changed after 5 or 6 years, but the tunnel remains on the same spot.

3. Irrigation in soil-bound crops in greenhouses in Belgium

The following information is made available by the agricultural sector in Flanders.

Since January 2006¹⁰, the use of methyl bromide-based soil disinfectants is prohibited in Belgium. At that time, flushing the soil with 300 L/m² (light soils) and 450 L/m² (heavy soils) was recommended when using methyl bromide.

Since then, no plant protection products or active substances were approved for which flushing of the soil is recommended. No flushing is recommended for the currently approved soil disinfectants (authorized via the regular procedure or via an Article 53 procedure).

For a soil-bound crop, irrigation (= one watering) has to amount more than 140-150 L/m² before there is reception of water in the drainage system¹¹. These are water quantities that are not necessary and are definitely not common for irrigation. Irrigation management is based on the need of the plants and is done in function of experience, in which the taking of soil and the pressing between the fingers is a commonly used method in the determination of the soil moisture levels. For many years research was/is being conducted to still further refine the models used for irrigation in function of the plant needs. Recently, lettuce companies (soil-bound) are surveyed¹² and found that the (median) irrigation by crop varies from 41 (winter crop) to 93 (summer crop) L/m². This quantity is dosed by several water gifts. To make a sandy loam soil 'broadly' wetter anew, an amount of 100 L/m² is required; for a sandy soil 50 L/m² is sufficient.

It can be concluded that there are no losses via drainage in a protected soil-bound crop.

¹⁰ Fytoweb, (2006): Press communication withdrawal methyl bromide authorisation.

¹¹ Pollet, S., P.Bleyaert, R; Lemeur. (2001) Beperking van nutriëntenuitspoeling bij de grondgebonden serreteelt door plantaafhankelijke watergift en teelt los van de ondergrond.

¹² Crappé, S., I. Vandeveld, S. Craeye, P. Bleyaert, S. De Neve. (2015). Enquête 'Irrigatie en bemesting in de slateelt'. Proeftuinnieuws 14: 23-25.