



STATE ON NON-PROFESSIONAL PLANT PROTECTION PRODUCTS RISK ASSESSMENT IN ITALY

Pesticides are often used by non-professional users in gardens, glasshouses and apartments. On the market, a good number of products for non-professional users are available. Nevertheless, a specific guidance for the risk assessment for non-professional use of pesticides is not available. The actual risk assessment follows the standard guidelines for professional use, even if the two types of uses differ in many ways. In Italy, recently decree n. 33 of 22nd January 2018 came into force establishing stringent measures and requirements to ensure a safe use of plant protection products (PPPs) by non professional users. These provisions concern mitigation measures (Spe phrases not allowed), classification (a.s. with specific classification not allowed), formulation (size restrictions). It is very difficult to get a registration for PPPs for non professional uses (PFnP), considering also the limitations on use due to restriction to packaging/volume and the maximum area that could be considered treatable by non professional use products.

ENVIRONMENTAL FATE MODEL FOR PEC CALCULATION IN SOIL, GROUNDWATER AND SURFACE WATER: proposal for PFnP

ICPS developed a specific approach for the non-professional uses, taking into account the different characteristics of this use (dimension of the treated areas, types of crops, types of application, etc.) established in the new Italian Ministry decree law n. 33 enacted on 22 January 2018. Italian decree identifies two types of non-professional products: non-professional formulated products on ornamental crop used in homes and balcony and home gardens (PFnPO) and non-professional products on edible crops are used in vegetable gardens, in orchards, in vineyards, in olive groves and in cereals cultivations (PFnPE). A new calculation approach is developed for PEC_{SOIL} , PEC_{GW} and $PEC_{SW/SED}$, starting from the "standard" environmental risk assessment. Reduction in the application rate and in the target area is foreseen, based on consideration about the garden areas and their composition. No risk assessment is provided for ready to use product, since they have low application rates. No granular formulations are allowed except for baits, since they are commonly used and applied directly on the ground, so it would have been more conservative and safe to do the risk assessment. A simple tool is created in Microsoft Excel: PEC_{SOIL} and $PEC_{SW/SED}$ calculations are performed directly in the spreadsheet, while PEC_{GW} calculations must be performed with PEARL/PELMO. The tool calculates the application rate to be used. Ecotoxicological risk assessment is included.

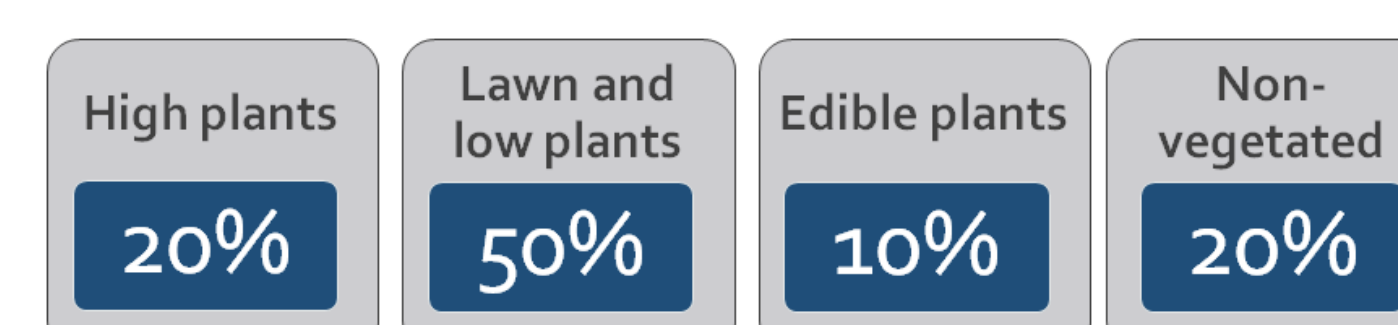
PFnPO – HOME AND BALCONY

NO RISK ASSESSMENT: distance from vulnerable environmental compartments and volumes of application consistently low are assumed to be conditions considerably factual.

PFnPO – DOMESTIC GARDENS

APPLICATION RATE ADJUSTMENTS

- Adjusted according to the different categories of plants that could be present in domestic gardens (French garden model developed by Thouvenin and Pontal in 2005):



- In PEC_{GW} calculations reduction to 1/2 for application on lawn and 1/3 for application on plant are considered since it is expected that not all adjacent gardens are treated at the same time.

CONTAMINATION ROUTES ADJUSTMENTS

- Runoff: not expected. However a default value of 2% is selected to guarantee a worst-case approach (lowest value from Step2 FOCUS sw scenarios)
- Drainage: not expected except for artificially drained soils (pedological estimates).
- Drift values are selected from German BBA in paper from 2003: drift test programme for domestic gardens and allotments.

APPLICATION RATE ADJUSTMENTS

- In PEC_{GW} calculations, application rate is multiplied by 2/3 to consider that FOCUS model perform calculation on 1 ha. It is assumed that maximum 20 gardens/orchards are contained in 1 ha because of walkways/borders. Furtherly, it is unlikely that every vegetable gardens/orchards in 1 ha are treated at the same time.
- In Tier 2 assessment for PEC_{SOIL} , PEC_{GW} and $PEC_{SW/SED}$ calculations, application rate is reduced considering that vegetable garden contain many different crops. It is assumed that if the product is intended to be applied on just one crop, application rate could be divided by 2, otherwise the whole dose is assumed. On orchards, the space occupied by the plants is relatively small compared to the entire area, so the application dose should be divided by 2. Herbicides, however, are usually intended to be applied between the plants, and not on the plants, so they will cover the greater part of the soil. For this reason, dose for herbicides on orchards should be multiplied by 3/4.

CONTAMINATION ROUTES ADJUSTMENTS

- Runoff: not expected. However a default value of 2% is selected to guarantee a worst-case approach (Step2 scenarios FOCUS model)
- Drainage: not expected except for artificially drained soils (pedological estimates).
- Drift values selected from German BBA in this paper from 2003: drift test programme for domestic gardens and allotments

PFnPE – VEGETABLE GARDENS AND ORCHARDS

Maximum dimension considered for vegetable gardens and orchards (500 m²) but dimension of water body considered in FOCUS approach is kept to maintain the same protection goal. Obviously, the field/water body ratio is corrected from 10 to 0.5, since gardens are 20 times smaller than 1 ha field.

PFnPE – VINES, OLIVES AND CEREALS

Maximum dimension considered for vines, olives and cereals (5000 m²) but dimension of water body considered in FOCUS approach was kept to maintain the same protection goal. Obviously, the field/water body ratio is corrected from 10 to 5, since vines, olives and cereals are half time smaller than 1 ha field.

NON-PROFESSIONAL PRODUCTS ENVIRONMENTAL FATE RISK ASSESSMENT TESTING, RESULTS AND FURTHER CONSIDERATION

A list of active substances most representative for non professional uses has been selected. Different labels of PFnPs registered in Italy were taken from the Ministry of Health web database and evaluated to derive the application pattern. EFSA Conclusions and LoEPs of the active substances have been examined to derive DT50 and Koc values to be used in PEC calculations and ecotoxicological data to calculate RACs. The table below compare different PEC_{SW} and PEC_{SOIL} results obtained with classical FOCUS approach (respectively using FOCUS sw Step2 and FOCUS soil guidance equations) and with our proposed model.

ACTIVE SUBSTANCE	Aquatic compartment					Soil compartment				
	PEC _{sw} max FOCUS (ug/L)	PEC _{sw} max PFnP model (ug/L)	RAC surface water	Acceptable risk FOCUS	Acceptable risk PFnP model	PEC _{soil} max FOCUS (mg/kg)	PEC _{soil} max PFnP model (mg/kg)	RAC soil (mg/kg)	Acceptable risk FOCUS	Acceptable risk PFnP model
METHALDEHYDE	-	-	-	-	-	0.7	0.7	6.4	Yes	Yes
PELARGONIC ACID	2500	75.4	192	No	Yes	47.8	23.9	10.5	No	No
FOSETYL-AL	55	3.37	296	Yes	Yes	2.67	0.67	100	Yes	Yes
TAU-FLUVALINATE	13.24	0.001	0.0064	No	Yes	2.65	0.0167	0.288	No	Yes
FENOXAPROP P ETILE	0.38	0.004	1.9	Yes	Yes	0.055	0.028	50	Yes	Yes
CHLORPYRIFOS	22.8	0.42	0.03	No	No	1.293	0.486	0.015	No	No
ACETAMIPRID	9.71	0.05	0.36	No	Yes	0.096	0.0072	0.152	Yes	Yes
DELTAMETHRIN	0.32	0.0017	0.0032	No	Yes	0.013	0.0236	129	Yes	Yes
PYRETHRIN	0.64	0.05	0.19	No	Yes	0.031	0.019	0.05	Yes	Yes
CYPERMETHRIN	2.46	0.0106	0.0077	No	No	0.053	0.006	0.475	Yes	Yes
GLYPHOSATE	96	0.5	100	Yes	Yes	4.8	1.78	94.56	Yes	Yes
TETRACONAZOLE	2.43	0.86	42	Yes	Yes	0.188	0.08	1.64	Yes	Yes
MECOPROP-P	19.33	0.17	2.69	No	Yes	0.28	0.1	9.88	Yes	Yes

From these calculations arise that our model can successfully reduces PEC either in soil either in surface water. Many substances that initially had an unacceptable risk turned into safe products that could be used by non professional users. A part of three substances (marked in **bold**), the remaining ten (in *italics*) would not be allowed for PFnP since they do not meet the cut-off criteria specified in Italian decree n.33. In particular, tau-fluvalinate, chlorpyrifos, cypermethrin and tetraconazole are classified as persistent in soil (DT₅₀>60 days); however, as showed in the table, tau-fluvalinate and tetraconazole have an acceptable risk, so the choice to forbid them based only on the classification of the active substance seems to be a questionable approach.