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For quality of life

Modelling emissions of plant protection products from protected cultivation to surface water

Theme: Risk assessment procedures for registration of plant protections products BO-06-010-009

Problem

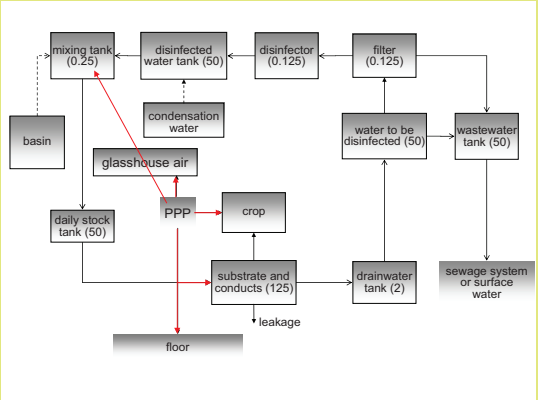
For authorisation purposes in the Netherlands, a fixed emission percentage of 0.1% (relative areal deposition on surface water) is used to assess the risk for aquatic organisms. Findings of horticulture related plant protection products and higher water quality standards have led to the question whether this emission percentage is still adequate for current growing systems. A working group has been formed to further analysis and quantification of these emissions.

Approach

We arranged the total scope of emissions and the modelling along the following line:

1. Cultivation systems: limited to glasshouse production
2. Watering systems: figure below
3. Focus on emission routes: system discharge, filter cleaning and leakage
4. Discharge strategy based on Na^+-accumulation
5. Discharge: occasional discharge of bigger volumes (as opposed to more or less continuous discharge of smaller volumes)

Scheme of hydroponic growing system



Ordering of emission based on 4 types of watering systems.

Results

A result of the model is presented in the table below.

Calculated emissions as influenced by weather conditions, size of water basin and [Na^+] in the secondary water source (here: tap water) for an example substance using an application scheme with 6 applications.

Fate model	model crop	Emission (% of application)	
		Low end	High end
Application via nutrient solution	cucumber	0.03	11
	pepper	0.02	10
	rose	0.11	16
Crop application by spraying	cucumber	0.01	0.5
Crop application eb/flow	ficus	0.01	0.5

Calculations are fictional, using realistic dimensions. Situations differ per crop.

Future use in risk assessment

- Derivation of representative scenarios for authorisation
- Development of a risk assessment tool allowing for variations in water fluxes and sanitation technologies
- Development of scenarios for soil-bound production
- Participation in the relevant EFSA working group

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