

Biofilters in the Netherlands: testing, demonstration and implementation

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Outline presentation

- Testing 2008 - 2009
- Response growers & stakeholders
- Implementation in regulation
- Current activities in the NL



Activities 2008-2009

Main goals:

- Test effectiveness for 'Dutch pesticide mixes' and under Dutch circumstances
- Check practical aspects

But also:

- Discuss possibilities with growers and other stakeholders
- Increase awareness of point source pollution risks

Testing 2008-2009: Vredepeel

Workshop Gent 2007: Test location 'PPO Vredepeel' in preparation (Olga Clevering)

- Phytobac©-type
- +/- 4.5 m³ composted biomix (50% straw, 25% compost, 25% local field soil)



Testing 2008-2009: Vredepeel

- April – Sept. 2008: Influent spiked with herbicides
 - 7,5 – 75 mg/L (internal sprayer cleaning)
 - Bentazon, dimethenamid-P, terbutylazin, nicosulfuron, sulcotrion
 - Mobile – moderately mobile (Koc: 36 – 219)
 - Non-persistent – moderately persistent (terbutylazine)
- Sept 2008 – Oct. 2009: Influent = clean water
 - Delayed leaching?



Vredepeel: effectiveness

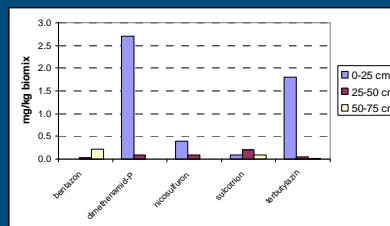
- [effluent] versus [influent]:
Reduction concentration $\geq 99,5\%$; bentazon 88%
- Breakdown: influent – effluent – substrate:
 - 90 - >99%; bentazon: 80%
- Evaporation first year: +/- 50%
 - may – sept: (300L / m²)
 - grass cover died



Flow in biomix

Biomix after clean water period:

- Bentazon: gone from top layer: 0 – 25 cm, low concentration (0.2 mg/kg) in bottom layer
- Dimethenamid-P, nicosulfuron, terbutylazin: mainly in top layer



Testing 2008-2009: flower bulbs

Flower bulb grower: 2-unit biofilter

Contract sprayer: 3- unit biofilter: 10-15 L / day



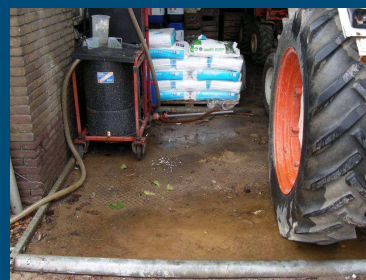
Contract sprayer

- Wide range of PPP's
- High peaks: remnant and rinsing sprayer
 - Glyphosate / AMPA, MCPA, metolachloor: 20 – 80 mg /L
 - Effectiveness overall: $\geq 99\%$
- Nutrients: increase in concentration (nutrient rich biomix)

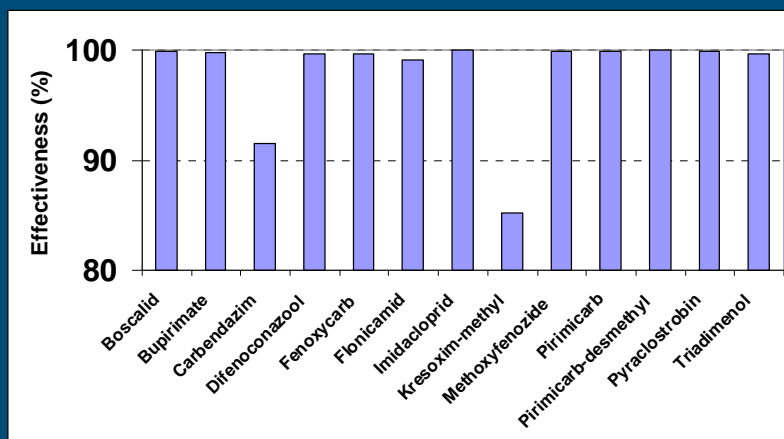


Testing 2008-2009: fruit farm

Fruit: experimental farm and commercial farm:
2-unit biofilters, 10 L / day

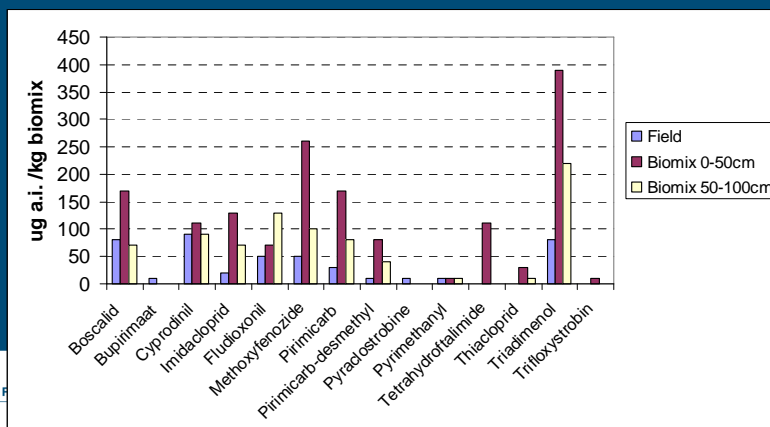


Results Fruit farm



Results Fruit farm

- Risk of biomix disposal in the field?
- Concentration in biomix 2009 compared to field soil:



Overall results

- Effectiveness: mostly > 99%. Not 100%
 - High percentage degradation
- High peaks of herbicides: no visible negative effects
- Evaporation: limited ($\leq 50\%$) for biofilter 5 L / m³ /day)

Demonstrations & presentations



Demonstrations & presentations

- Growers & contract sprayer:
 - Simple and low cost = attractive
 - No problem with substrate and effluent?
 - Part of growers: preference for cleaning in the field
- Contract sprayers
 - Highly interested (more than average grower)
 - Need good facilities at the yard
 - Capacity?

Implementation in regulations?

Update of regulations ongoing; Biopurification subject of discussion

Stakeholders positions (roughly):

Farmers Union (LTO):

- No obligated cleaning facilities at the yard for the average farmer: clean in the field or at non-paved surface at the yard for external cleaning.

Contract sprayers (Cumela):

- Stimulate good facilities like biofilter at contract sprayers yards
- No discrimination between spraying farmer and contract sprayer

Phytopharmacy (Nefyto, Bayer Crop Science)

- Stimulate innovative solutions to reduce point source pollutions

Current proposal (roughly):

■ Internal cleaning:

no specific regulation (in the field, directly after spraying)

Current proposal (roughly):

■ External cleaning:

- Not to sewage system (exceptions possible)

Emission to soil allowed IF:

- in the field where the PPP's were applied

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- purified (specifications not yet defined)

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- at the yard, in case of $\leq 2x$ cleaning per year and no contract spraying

If cleaning on non-paved surface: ≥ 5 m from surface water

2010-2011

- Continuation tests and demonstrations
- 3 extra locations
- Mobile demo-filter at farmers field days (Agrifirm)

Related research:

- Carbon filters for condensation water
- Sentinel for flower bulb treatment solution
- Lamella separator + ozon (+ carbon filter) for fruit sorting water
- Hydrogen peroxide + UV for nutrient solution glass houses



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