Biofilters in the Netherlands: results of on-farm testing and opportunities for implementation

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The high density of watercourses in the Netherlands enlarges the risks of point source pollution of surface water with plant protection products (PPP's) in agricultural and horticultural areas. Biopurification may be a method to reduce the risk of several point sources in a practical way. Based on positive results in Belgium and other surrounding countries, several on farm tests and demonstrations of biopurification have been carried out in the Netherlands since 2008 and are still ongoing. The goal of these tests and demonstrations is to determine the effectiveness of biopurification systems under Dutch circumstances and to make potential users aware of its possibilities. A secondary goal is to facilitate the discussion between policy makers and the agribusiness on the implementation of biopurification in regulations and in practice.

The on-farm tests took place at experimental and at commercial farms: a flower bulb farm, a fruit growing farm and at the yard of a contract sprayer working in arable farming and bulb production. A system comparable to the Phytobac© and four so called 'biofilters' were built. These biopurification systems were used for the treatment of contaminated water from filling and cleaning areas for sprayers and other machinery used to apply PPP's. Furthermore leachate from composting flower bulb waste and condensation water from flower bulb storage cells, in which ppp's were applied, were used as influent.

In most cases, the concentrations of PPP in the influent were reduced at least 99%.. As observed in other studies the purification was less effective for bentazon (88%) compared to other herbicides applied. At the other locations in the Netherlands the effectiveness for most of a wide range of PPP's was also close to 100%. The treatment was less effective for carbendazim, thiofanate-methyl and kresoxim-methyl. Relatively high (up to 70 mg/L) concentrations of herbicides, due to spray liquid remnants emitted during internal cleaning, seemed not to decrease the effectiveness in the on farm tests.

The Dutch government is interested in the possibilities of biopurification. A stakeholders committee including government and agribusiness has proposed to approve biopurification as a suitable method for cleaning water from external cleaning of sprayers in case this cleaning takes place frequently on the farmyard. If approved by the involved ministry, further conditions need to be defined for effective setup and use of biopurification and the disposal of effluent and filter substrate.