Sektion 15 - Umweltverhalten von Pflanzenschutzmitteln II

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Presence of Glyphosate and its soil metabolite aminomethylphosphonic acid (AMPA) in surface water

Glyphosat und sein Abbauprodukt Aminomethylphoshonsäure (AMPA) – Vorkommen in Oberflächengewässern

Glyphosate is non-selective herbicide, widely used for the post-emergence annual and perennial weed control in a variety of situations. In some countries, glyphosate is approved for (semi-) aquatic use, involving direct application onto surface water. This use as well as bad agricultural practice eg point source contamination, spray drift, runoff and drainage, could lead to glyphoste surface water entries. In addition, Aminomethylphosphonic acid (AMPA), the major metabolite of glyphosate in the environment, is largely included in surface water monitoring programs for plant protection products, particularly because it can be co-determined with glyphosate. The results show that AMPA is more frequently found in surface waters than glyphosate, and very often at higher levels. Studies (2, 3) provide evidence that detergent addititives and sequestering agents can be a source of AMPA. They are directly discharged into the environment through drains, contributing significantly to the AMPA load in surface water. A potential presence of AMPA in technical phosphonates is also highlighted by OECD data on ATMP (amino tris(methylenephosphonate) (3), listing AMPA as a 1 % impurity in technical ATMP. In most of the situations, the laundry washing effluents go through a sewage treatment plant before being rejected to surface water. However, monitoring data from Dutch sewage influents and effluents (4) show that AMPA is not (significantly) removed in a sewage treatment plant. Thus, the AMPA load from detergents should not be underestimated in surface water, if compared to the indirect contamination that could occur following the use of glyphosate.

The levels of pesticides and their metabolites in surface water are very often compared to the political drinking water trigger of 0.1 µg/L, which is of any toxicological nor ecotoxicological significance. In order to estimate the risk to the aquatic environment, the measured concentration has to be compared to a biological effect value, which is typically much higher than the 0.1 µg/L. In the case of glyphosate and its 'non-relevant'metabolite AMPA, the threshold for ecotoxicological concern is at least 2-3 orders of magnitude higher than the drinking water threshold (1) and the risk to the aquatic environment from the levels observed in surface water monitoring programs is negligible. The human exposure to surface water is through abstracted drinking water. Numerous studies have shown that glyphosate and AMPA are readily removed by chemical/oxidative disinfections, which are standard surface water treatment processes used for drinking water production. These data show that glyphosate is not a genuine problem for the drinking water producers. Horth et al (2008) conducted a review of the detection of glyphosate and AMPA in drinking water in nine European countries (1) where only sporadic occurrence was observed above the legal limit of 0.1 µg/L. None of these were considered significant, but attributed to analytical problems. More recent reports from France (6) and The Netherlands (7) don't show any glyphosate exceedance of the very stringent drinking water standard. Exceeding this limit will not pose a risk to the consumers, as the health based standards for glyphosate and AMPA in drinking water are several orders of magnitude higher than the EU trigger value (WHO health based value (2009): 6000 µg/L). Therefore, the presence of glyphosate and AMPA in surface water at the level observed in European monitoring studies is not a concern for the aquatic environment nor a threat to human health. Nevertheless, industry is committed to implement stewardship programmes to reduce the levels of glyphosate and related AMPA in surface water.

REFERENCES

(1) Toolbox for the sustainable use of glyphosate (http://www.egeis-toolbox.org/toolbox.html).

(2) Jadas-Hecart A. et al. (2010) Aminophosphonates des lessives: une potentielle source d'AMPA?.

(3) OECD (2005) http://inchemsearch.ccohs.ca.

(4) Withagen et al. (2004), Nota 297. http://www.dob-verhardingen.nl/nl/Publicaties.

(5) ISL (2009) Analyse de donne de suivi de l'AMPA et du glyphosate dans les eaux de France – Periode 1999-2006.

(6) France (2008) drinking water report : Ministère de la Santé et des Sports, Bilan de la qualité de l'eau au robinet du consommateurs vis-à-vis des pesticides en 2008.

(7) Netherland (2008) drinking water report: http://www.rivm.nl/bibliotheek/rapporten/703719046.html.