

Monsanto Company

In June, 2003, following its environmental evaluation of glyphosate, the Danish Environmental Protection Agency proposed a restriction of certain uses of glyphosate occurring after September 15th. This proposed restriction was based primarily on the results of the Pesticide Leaching Assessment Programme (PLAP) which is run by GEUS (Geological Survey of Denmark and Greenland) for the Danish EPA¹. Since then, the Danish EPA has evaluated additional information, and on December 14, 2004, they stated that they had no technical grounds for imposing restrictions on the autumn application of glyphosate in Denmark.

The PLAP is intended to serve as an early warning system for the Danish Government to evaluate whether pesticides would leach to the groundwater at levels exceeding the maximum allowable concentration of 0.1 µg/L. Drinking water quality in all European countries is governed by the requirements of the European Drinking Water Directive, which limits the maximum allowable concentration in drinking water to 0.1 µg/L for any single pesticide, regardless of toxicity. In comparison, the U.S. EPA has set a Maximum Contaminant Level of 700 µg/L for glyphosate in drinking water, based on a toxicological risk assessment.

As part of the Danish PLAP, a glyphosate herbicide was applied at five of the six locations utilized in the monitoring program. Glyphosate was applied in the autumn following crop harvest and at the maximum recommended rate, and water monitoring included sampling of water in both the unsaturated and saturated zones, using suction sampling cells and vertical and horizontal bore holes. In addition, at the four sites with clayey soil, field drainage water was sampled from the existing tile drainage systems.

In the samples collected following the glyphosate applications, there were no detections of glyphosate or its metabolite, aminomethylphosphonic acid (AMPA), exceeding 0.1 µg/L in any of the groundwater samples taken from the suction cells (1 and 2 meters below ground surface (m.b.g.s.)), the vertical bore holes (approx. 1.5 – 5.5 m.b.g.s.) and the horizontal bore holes (approx. 3.5 m.b.g.s.). The detections that were considered by the Danish EPA to represent an unacceptable risk to drinking water were found only in the field drainage water. The detections in the drainage water occurred primarily in the autumn. The highest measured concentrations were 5.1 µg/L for glyphosate and 5.4 µg/L for AMPA. The calculated average annual concentrations in drainage water of glyphosate and AMPA were 0.54 and 0.17 µg/L, respectively, at one location, and 0.12 µg/L and 0.06 µg/L, respectively, at a second location. At a third location, glyphosate and AMPA were detected but both average concentrations were below 0.1 µg/L. Based on these results, the Danish Minister of the Environment proposed a restriction on glyphosate use after September 15th each year, on certain clay soils.

Three of the glyphosate manufacturers (Cheminova, Monsanto, and Syngenta) submitted a response to the Danish EPA that explained why the proposed restrictions on the use of glyphosate were unjustified. It was suggested that in poorly drained agricultural soils, sediment-laden water can flow to sub-surface tile drains and out of the field. Studies have shown that

¹ The Danish Pesticide Leaching Assessment Programme. Monitoring Results May 1999 – June 2002. 3rd Report. Editor: Jeanne Kjaer. Printed: June 2003. ISBN 87-7871-115-0.
http://pesticidvarsling.dk/monitor_uk/2002_uk/index.html

glyphosate forms strong complexes with soil constituents. Thus, glyphosate bound to the suspended soil particles may reach the drains, but there is no indication that it will leach to any significant degree to groundwater. Hydrostatic pressures dictate that the soil water will preferentially flow to the drains rather than leach to groundwater.

Organizations such as the National Federation of Danish Agriculture, Danish Association for Conservation Agriculture, and the Royal Veterinary and Agriculture University of Denmark also suggested to the Danish government that the quality of the field drainage water could not be compared with the quality of the groundwater especially for soil particle-born substances such as glyphosate.

The issue of a special transport mechanism for glyphosate through drainpipes was evaluated in a scientific seminar held on September of 2004, organized by the Danish Institute of Agricultural Sciences. In this meeting, Danish expert scientists evaluated new research concerning the lack of detection of glyphosate below the drainpipes and confirmed the existence of a special transport mechanism for glyphosate bound to small soil particles through the drainpipes. As a result of this conference, the Danish Environmental Protection Agency concurred with the experts that field drainage water cannot be used as an indicator of leaching to groundwater for substances such as glyphosate that are strongly bound to soil particles.

In an updated evaluation status of glyphosate released on December 14, 2004, the Danish Environmental Protection Agency revoked the earlier proposal for restriction of glyphosate use and issued the following ruling in regard to the autumn application of glyphosate in Denmark (translated from Danish):

“...the Danish Environmental Protection Agency believes that no unacceptable risk of pollution of the groundwater is associated with the currently approved agricultural use of glyphosate. The Agency thus does not consider that the updated state of our knowledge provides any technical grounds for the imposition of restrictions on the autumn application of glyphosate.”

Related Documents:

- [Backgrounder: Glyphosate and Water Quality](#)