



Leaching of bentazon from Danish agricultural fields

Annette Elisabeth Rosenbom (1), Jeanne Kjær (2), Walter Brüscher (1), and Preben Olsen (3)

(1) Department of Geochemistry, Geological Survey of Denmark and Greenland, DK-1350 Copenhagen K, Denmark. E-mail: aer@geus.dk, (2) Rambøll Denmark, Hannemanns Allé 53, DK-2300 København S, Denmark, (3) University of Aarhus, Department of Agroecology, P.O. Box 50, DK-8830 Tjele, Denmark

Bentazon (CAS No. 25057-89-0) is a broad-spectrum herbicide used for a variety of crops. Rapid photo degradation occurs in soil and water; however, bentazon is very mobile in soil and moderately persistent in the environment. Bentazon has been reported to occur in surface water, groundwater and drinking water at concentrations of a few micro g per L or less. With its high affinity for the water compartment in the soil media, it does not seem to accumulate in the subsurface.

Results from 12 evaluations/applications on six intensive-monitored and agricultural fields (two sandy and four loamy soils) in the Danish Pesticide Leaching risk Assessment Programme (PLAP) verified these findings. Bentazon was applied in the timeframe May - beginning of June. It was detected in 1 m depth (suctions cups and drains) at all the PLAP-fields. In 4 out of 12 applications, the average concentration of the period after the first detection until July the following year, was found to exceed 0.1 micro g per L in 1 meters depth. At all of the fields groundwater level was dropping at the time of bentazon application. This seemed to result in detection in groundwater at the loamy but not the sandy fields, which indicate the presence of rapid preferential transport in the macropore systems of the loamy fields and a piston-like transport in the sandy fields. Even though detections in 1 m depth indicated a relative high mass of bentazon leaching as a pulse through sandy soil, bentazon was not found below this depth. The degree of detections in the groundwater at the loamy fields seemed to be impacted by the hydraulic contact to deeper fracture systems in the soil. At the loamy fields with a good hydraulic contact, bentazon was detected in groundwater from both vertical and horizontal filters shortly after application – also in concentrations exceeding 0.1 micro g per L. By applying bentazon on different crops, results clearly showed that the leaf-area-index at application and the ability of the crop to take up bentazon can play an important role in the amount of bentazon reaching the soil media and potentially leach.