Results and Interpretation of a Field Scale Bioaccumulation and Biomagnification Monitoring Programme

Alan Lawrence[1], Adrian Terry[1], Franziska Kröger[2], Soenke Lakaschus[3], Anna Lau[3], Thomas Kellner[4], Marcel Münderle[4]

[1]Cambridge Environmental Assessments, Boxworth, UK; [2]Eurofins Agroscience Services GmbH, Carl-Goerdeler-Weg 5, D-21684 Stade, Germany; [3]Eurofins Agroscience Services Chem GmbH, Grossmoorbogen 25, D-21079 Hamburg, Germany; [4]RIFCON GmbH, Goldbeckstraße 13, 69493 Hirschberg, Germany.

Email: alan.lawrence@cea-res.co.uk

Introduction

A field monitoring programme was conducted to address the following confirmatory data requirement for the renewal of the active substance bifenthrin: "*The applicant shall present to the Commission, the Member States and the Authority a monitoring programme to assess the potential for bioaccumulation and biomagnification in the aquatic and terrestrial environment...*" **The methods are described in TU168 (Kröger et al)**. This poster summarises the results and interpretation of the monitoring programme (three studies covering autumn and spring seasons). **Further interpretation and modelling is presented in TU170 (Armitage et al)**.

Sponsored by: FMC Chemical sprl - Agricultural Solutions, Brussels, Belgium and FMC Corporation, United States.

Aquatic environment - Results

Exposure routes

Field ponds surrounded by crop, fed by ditches

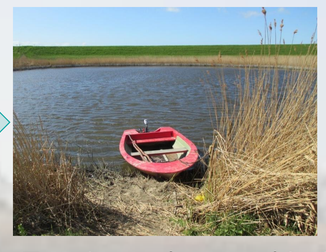
Potential for exposure

Maximum label rate application

Run-off, drift

Test item detected in run-off water and ditch water following artificial irrigation

Pond exposed?



Test item detected in field pond water = confirmed exposure of aquatic environment ✓

Sampling of food chain

Sampling of aquatic environment

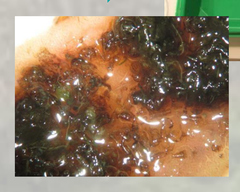
Primary producers

No test item detected in macrophytes (<LOD)

Invertebrates

No test item detected in benthic macroinvertebrates (or sediment) (<LOD)

Fish



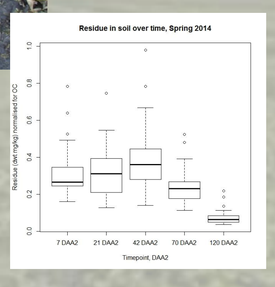
Test item occasionally detected in fish body, surface mucus and gut contents at low levels

Aquatic environment – Conclusion: While exposure of aquatic systems was confirmed (the active substance was detected in pond and run-off water, and occasionally in fish mucus, body and gut contents), the samples of pond water, sediment, macrophytes, macroinvertebrates and fish provided *no evidence for bioaccumulation nor biomagnification in the aquatic environment.*

Terrestrial environment - Results

Soil exposure

Residues in field soil declined significantly over time

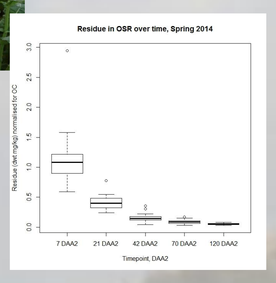


Exposure of crop

Crop → herbivore (vole) food chain

Soil → earthworm → omnivore/vermivore (woodmouse,shrew) food chain

Residues in OSR declined significantly over time

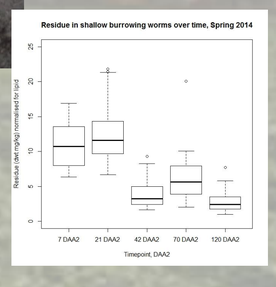


Consumption of crop by herbivore

Residues in voles were always lower than in crop (typically <LOD), and declined

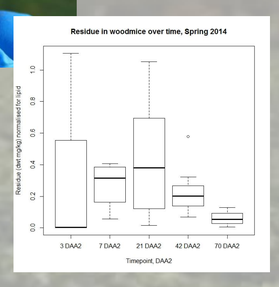
Exposure of earthworms

Residues in earthworms typically declined significantly over time



Consumption of worms by omnivore

Residues in shrews and mice were always lower than in earthworms, and declined



Terrestrial environment – Conclusion: Residues in crop and soil declined significantly over time. Residues in earthworms also typically declined significantly over time. Residues in herbivorous voles were always lower than those in crop vegetation, and those in shrews and mice were always lower than those in earthworms (and those in crop). *Overall, there was no evidence for biomagnification in the terrestrial environment.* **Further interpretation and modelling of residues in earthworms is presented in poster TU170 (Armitage et al)**.