

BIOBEDS: A PRACTICAL AND EFFICACIOUS METHOD OF DISPOSING OF PESTICIDE WASTE AND WASHINGS

Pesticide waste and washings should be disposed of in accordance with the Code of Practice for the Safe Use of Pesticides on Farms and Holdings (1998) and the Groundwater Regulations (1999). Under these Regulations a site authorisation is required for the disposal of pesticides to land.

The Code of Practice recommends the following methods of disposal of dilute pesticide wastes and washings:

- Application of the waste to untreated or under-dosed parts of the field;
- Storage in a suitable container pending collection by a licensed waste contractor;
- Use of suitable equipment designed to treat liquid waste containing pesticides, eg Sentinel (carbon filter system);
- Disposal to a designated area of un-cropped land that has minimal wildlife value and minimal risk to groundwater, providing that appropriate Environment Agency approval has been granted.

Due to the practicalities and the costs associated with these disposal options, many users do not comply with the Code guidelines. Recent studies have shown that washings from sprayers and apparently minor farmyard spills of pesticides may account for more than 50 percent of pesticide pollution in some rivers. Disposal of pesticide waste and washings may be an important source of surface water and groundwater contamination..

A collaborative project to design and evaluate a biological system, called a biobed, for the disposal of pesticides was funded by the Environment Agency, Crop Protection Association (CPA), Monsanto, DETR and MAFF, now DEFRA.

A biobed is a composted mixture of straw, peat (or peat substitute) and topsoil, with high microbial activity, designed to collect, retain and degrade pesticides. Biobeds are cheaper to build and run than alternative systems and have been successfully used to treat low volumes of pesticides arising from accidental spillages of concentrated and dilute pesticides in Sweden. The aim of this R&D project was to develop a biobed system that would cope with large volumes of waste, such as those arising from tank and machinery washings, and with small spillages.

The project involved a combination of laboratory, semi-field and field studies which assessed the degradability and leachability of six pesticides that would normally be applied to a winter cereal crop. Two biobed systems were investigated, a lined system (with butyl liner) and an unlined system (without butyl liner). Studies indicated that biobeds can adsorb high concentrations of pesticide and subsequently degrade them. Whilst a proportion of the applied pesticide may leach (less than 0.2%), the amounts leached are likely to be small and similar to leachate from currently available systems (eg Sentinel). Field and semi-field studies showed that the 'lined' biobed system is prone to water-logging. The management of water is, therefore, an important factor in the working of the biobed and the current design for a 'lined' system is inadequate for the high volumes of waste generated on UK farms. Further studies are required to refine the current design and test it at the pilot stage.

Two pilot studies were also undertaken to investigate the use of a biobed for the disposal of horticultural pesticides and sheep dip:

- The degradability of five commonly used active substances in horticulture were investigated in laboratory studies. The results of the studies indicate that pesticides used in the horticultural sector may not be treatable using a biobed system. The concentrations of pesticides applied, however, were based on 'worst case' estimates. It is likely that the actual amounts applied in the field would be lower than those tested and that degradation in a full-scale biobed system would be faster. Further research is required to confirm this.

In the sheep dip biobed pilot study, the degradability of two active substances, cypermethrin and diazinon, were investigated in laboratory and semi-field studies. Both compounds degraded in the biomix. Sheep dip waste, however, also contains substances such as lanolin, detergents and biosolids. Further research is required to determine the effect that these substances, and the volume of sheep dip waste, will have on the biobeds.

R&D Technical Summary PS382 relates to information from R&D Project P2-129 which has provided the following outputs:

R&D Technical Report P415 – Biobeds: The development and evaluation of a biological system for the disposal of pesticide waste and washings.

R&D Technical Report P416 – A pilot study to determine the effectiveness of biobeds for the treatment of horticultural pesticide waste.

R&D Technical Report P417 – A pilot study to determine the effectiveness of biobeds for the disposal of spent sheep dip.

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External Status: Released to Public Domain

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Copies of R&D Technical Reports P415, P416 and P417 are available internally from your regional library and externally from Soil Survey and Land Research Centre, Cranfield University, Shardlow Hall, Shardlow, Derby DE72 2GN.
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