

Assessment of Soil Quality and Human Health from Organic Contaminants in Materials Commonly Spread on Land (Scotland)

Spreading organic materials to land as soil amendments can supply nutrients and organic matter and has the potential to improve soil quality. It also promotes the sustainable use of materials that are considered wastes under some circumstances. The spreading of these materials to land is controlled by regulations, which ensure that the benefits are realised, and that any potential risks to either the environment or human health are minimised.

There may be cases where the levels of chemicals in soil amendments from some sources present potential risks to human health or the environment, despite regulations being in place. This project was aimed at identifying chemicals in soil amendments that might be spread to land in Scotland and their likely concentrations, and gathering together environmental and human health related effects data, as well as behaviour and fate information. This information was then used to perform an assessment of the potential risks to identify the form, magnitude, and characteristics of risks from chemicals present in organic wastes applied to land in different parts of Scotland.



Animal manures represent the bulk of soil amendments going to land in Scotland (over 95%) and, due to their numbers and larger size, the majority of this comes from cattle rather than poultry, pigs or sheep. Other important sources of chemicals from the use of organic soil amendments are processed sewage sludge, produced by municipal sewage treatment plants, and the products of certain processes which are exempt from waste management licensing, such as off-specification composts, anaerobic digestates and paper manufacture by-products.

An initial screening risk assessment of 80 chemicals identified from the literature was performed to produce a priority list of 8-10 chemicals which presented the greatest potential environmental and human health risks. The chemicals investigated in detail were:

- Tetracycline,
- Ivermectin,
- Triclosan,
- Benzo-a-pyrene,
- Galaxolide (HHCB),
- Polybrominated diphenylethers,
- Polychlorinated biphenyls (PCBs)
- Dioxins and dioxin-like PCBs

The exposures of all of these chemicals were modelled to assess potential risks from organic material spreading across Scotland. These assessments demonstrated that the greatest potential risks for human health and soil quality mostly occurred in Central Scotland. This was true for both contaminants mainly associated with slurries and manures (e.g.

