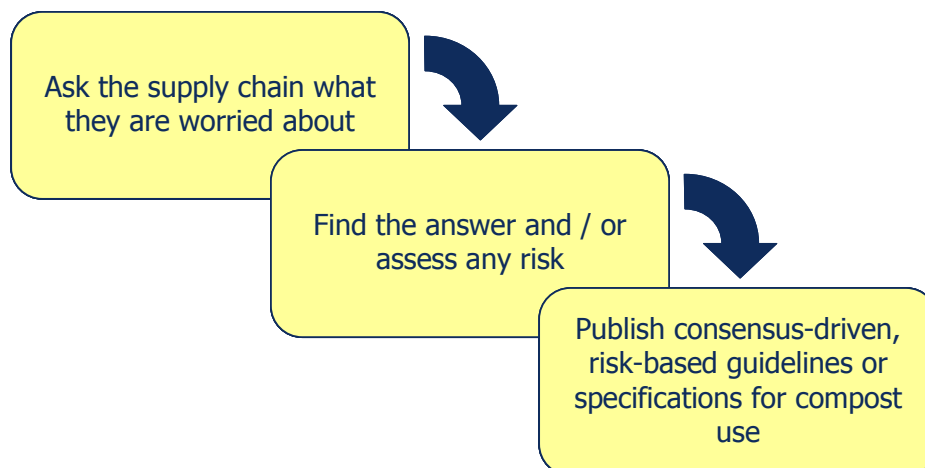


# Update: Confidence in Compost Programme

19<sup>th</sup> August 2009

## Background

The core objective of the Confidence in Compost Programme is to understand any risks that may result from hazards associated with composts, and to develop compost-use guidelines that manage these risks in a satisfactory way. In essence:



Starting in Spring 2008, three different programmes of risk assessment were procured by WRAP to help build the technical case for compost quality. These are all due to complete by August 2009, and are backed-up by a series of related projects. Full details and progress reports on this programme are provided in this update. Please click on the links to be taken directly to the article of interest.

- [Use of Green Composts in the Scottish Livestock Sector](#)
- [Revisit of the 2002 Defra Animal By-Products Risk Assessment](#)
- [All composts in all agricultural sectors](#)
- [Follow-up work](#)
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1. *Use of Green Composts in the Scottish Livestock Sector*

Contractor: Macaulay Land Use Research Institute

The draft final report of this project has now been reviewed by the Technical Advisory Group (TAG). TAG membership comprised: WRAP; Association for Organics Recycling; SEPA; Scottish Government; Scottish Agricultural College; Quality Meat Scotland; National Farmers' Union Scotland; Keenan Recycling; ADAS; Rothamsted Research; Cranfield University; Food Standards Agency.

The research undertook a review of scientific literature to collate a comprehensive list of hazards reported as having been found in source-segregated green composts. Hazards were grouped into the following categories:

- Plant-derived toxic compounds
- Potentially toxic elements
- Organic Pollutants
- Pathogens
- Invasive weeds
- Physical contaminants
- Other environmental hazards

This approach necessarily relies upon hazards being reported in the literature. Where full data suites are not available (for example, for dioxins) then it may not be possible to undertake full risk analysis. Such data gaps will be highlighted in the final report.

497 different hazards were considered and filtered. Where possible, quantitative risk assessment was undertaken for the filtered hazards within the following compost-use scenarios:

- Grazing land
- Land used to grow grain crops for animal consumption
- Land used to grow root crops for animal consumption
- Land used to grow leaf crops for animal consumption

Comparative risk assessment was also undertaken to contextualize the use of compost against other common agricultural soil amendments, including: livestock manures and slurries; paper mill sludges; sewage sludge.

To assess the risks from pathogens associated with green waste feedstocks and composts, a number of stages were followed to: identify microorganisms that could enter source-segregated green waste compost (SSGW); determine whether they would pose a significant health risk to humans and animals; determine whether they would survive the composting process; determine the longevity after application to soil/pasture of those likely to survive composting. A general lack of data for pathogenic loadings in SSGW feedstocks and composts meant that a number of inferences had to be made throughout this process, based on an understanding of microbial behaviour in other soil amendments (such as manures and sewage sludge). Classical risk assessment was therefore not possible for pathogens, so the authors' recommendations for risk management were based on a knowledge of risk management techniques adopted for materials such as manures and sewage sludge.

Overall, three potential risks to grazing livestock were identified for toxic plants: from the plants Yew, Hemlock and Rhododendron. A potential risk was also identified from a dioxin, however, the methodology applied also identified a higher potential risk from this dioxin from livestock manures.

One key risk to sensitive crop plants was identified for compost: from the selective herbicide clopyralid.

These findings need to be treated with some caution. That risks have been identified through risk assessment does not automatically mean that there is a risk in practice, it simply means that particular hazards have been reported as having been found at higher than acceptable levels on one or more occasions. Thus, the dioxin identified in compost was also identified in cattle farmyard manure, indeed, cattle farmyard manure was found to pose a greater risk than compost for this dioxin due to the reported concentrations. This does not mean that manures are unsafe.

The risks identified for plant toxins are as a result of lack of information on their degradation. WRAP-supported fieldwork undertaken by the Scottish Agricultural College (SAC) has shown that the compounds grayanotoxin I and grayanotoxin III in rhododendron leaves degrade after some 60 days in a commercial green-waste windrow. WRAP are currently investigating how to make this (MSc) research available to a wider audience. Following a competitive tendering process, SAC are now investigating the fates of the compounds coniine (from hemlock) and taxine (from yew) through a similar approach. This work is expected to be complete before March 2010. In the meantime, minimizing content of these plants in composting feedstocks (keeping them to less than 1% each of the total feedstock material) should reduce the risks to grazing livestock to an acceptable level, even when the composts are surface applied to grazing land and livestock have access to that land every day for throughout their productive lives. Ploughing-in composts before re-seeding of grassland also minimizes any risk.

Throughout the risk assessment programme it has become clear that good quality UK data for a number of potential contaminants is not available. The risk assessments have therefore had to rely on data from Europe or North America. To address this deficit and to build further confidence in the integrity of the risk assessments, WRAP are currently procuring work to quantify a very wide range of determinands in composts and anaerobic digestate. This will include (for example) an examination of dioxins, PCBs and PAHs.

It must be emphasized that the Macaulay research has yet to be peer-reviewed, and the summary given above reflects WRAP's interpretation of the current version of the final research report. Peer review of this, and the other risk assessments, is expected to take place during September 2009, for publication later in the year.

2. *Revisit of the 2002 Defra Animal By-Products Risk Assessment*  
Contractor: Paul Gale (Veterinary Laboratories Agency)

The 2002 risk assessment underpins the UK's statutory standards for processes that compost catering wastes. Any other kind of suitable (low risk) food waste must be processed to a different, EU standard. Questions raised around the robustness of a number of the (necessarily conservative) assumptions made by Paul Gale in 2002 have encouraged WRAP to procure a limited re-visit of his original work to replace key assumptions with

contemporary data, wherever possible. A new step-wise approach is intended to be much simpler to understand:

How much meat is in the domestic food waste stream?

What is the infectivity of particular pathogens in this meat?

Assume all infectivity is in domestic food waste stream

Assume all domestic food waste is composted

Calculate 'infectivity per tonne of compost'

Calculate whether there is any increased risk to grazing cattle and sheep from using this compost, based on:

Different application rates

Different application methods

Different grazing ban periods

The following outcomes are expected:

- Revised estimated livestock exposures for CSFV, ASFV, FMDV, SVDV, and BSE
- New estimated livestock exposure for Newcastle Disease
- Revised review of the evidence for regrowth of bacterial pathogens in compost or compost-amended soil, and the resulting risks to livestock grazing on treated land
- Re-assessment of the risks of *Toxoplasma gondii* in the light of any new available dose-response data or better information on the levels of *T. gondii* in meat or meat-waste composts
- Assessment of the importance of the grazing ban by calculating the risks with 0, 3 week and 8 week grazing ban periods
- Consideration of risks to livestock grazing on, and to humans eating vegetables grown on, land to which compost had been applied in a previous rotation
- Commentary on pig parvo and circo viruses, and MRSA

Little preliminary feedback is currently available, but the following example illustrates the conservative nature of the original risk assessment:

In 2002, it was estimated that 10,000 FMDV infected pigs (representing ~ 620,000kg infected meat) were illegally imported and composted. A 2004 VLA assessment of illegal imports determined that 565kg of FMDV infected meat might actually be imported, representing a reduction in infectivity within the human food chain of more than 1000-fold.

This project is now expected to complete at the end of August 2009, and will be peer-reviewed as a package with the WRAP-procured risk assessments. The contractor has recently been tasked with estimating the infectivity of classical and atypical scrapie in the food chain, and if possible a quantitative risk assessment for these agents in food-derived composts will be undertaken during October 2009.

### 3. *All composts in all agricultural sectors*

Contractors: Cranfield University, ADAS, Macaulay Land Use Research Institute

This project is being overseen by the WRAP Agricultural Technical Steering Group (TSG). TSG membership comprises: WRAP; Association for Organics Recycling; Defra; Environment Agency; Scottish Government; SEPA; National Farmers' Union; National Farmers' Union Scotland; Assured Food Standards; British Retail Consortium; Chilled Food Association; Quality Meat Scotland; Maltsters Association of Great Britain; ADAS; Association of Independent Crop Consultants; Horticultural Development Company; Food and Drink

Federation; Renewable Energy Association; Environmental Services Association; The TEG Group plc; Scottish Quality Crops; Scottish Food Quality Certification; Scotch Whisky Association; Animal Health; Food Standards Agency; Co-op; Sainsbury's; Royal Horticultural Society; Soil Association; British Pig Executive.

A comprehensive hazard matrix was collated by the TSG during summer 2008, in which seventeen different compost feedstock categories were compared with seven different agricultural and horticultural cropping categories. The lead contractor (Cranfield University) has now generated a semi-quantitative, ranked list of the resulting scenarios – a task that required computation of almost 40 million different feedstock / hazard / use combinations. Key scenarios have been quantitatively modelled by the Macaulay Institute, and data from these will allow the semi-quantitative list to be pegged to a fully quantified scaffold.

This project is now expected to complete at the end of August 2009, following which it will be peer-reviewed. This project will generate top-level, broad-brush guidance for the use of different composts in different agricultural sectors.

This project also begins to consider the use of anaerobic digestates in different agricultural sectors.

#### 4. *Follow-up work*

The WRAP risk assessment programme will generate draft guidance for the use of composts in different agricultural sectors. WRAP have now procured two follow-up projects to agree final guidance for the use of composts within the arable and potato sectors.

The arable project is led by ADAS, and involves discussions with: the Maltsters Association of Great Britain; the National Association of British and Irish Millers; Scottish Quality Crops; the Scotch Whisky Association; the Agricultural Industries Confederation; the Home Grown Cereals Authority; the National Farmers Union; the National Farmers Union of Scotland; Assured Combinable Crops, Assured Food Standards; Processors and Growers Research Organisation; British Sugar; British Edible Pulse Association. Final draft guidance will be discussed with FSA before release.

The potato project is led by Cambridge Eco, and involves discussions with: Potato Council; Assured Food Standards; National Farmers Union, National Farmers Union Scotland. Final draft guidance will be discussed with FSA before release.

Both sets of final guidance are expected to be available late in 2009.

If appropriate, the guidance for remaining agricultural sectors will form one WRAP workstream during 2010 / 11. WRAP consider it to be important that the arable land bank remains available for compost, even when that land is within rotations that might include livestock or ready to eat crops. Generating confidence in the integrity of composts under these circumstances will form another workstream during 2010 / 11. It seems unlikely that WRAP will seek to promote the use of food-derived composts either for direct application to grazing land or directly ahead of ready to eat crops – based entirely on perception issues around their microbiological safety, rather than any evidence of risk – but this position will remain under review as the programme develops.



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Other future projects will examine specific issues relating to the use of anaerobic digestates in agriculture, particularly focussing on the application of digestates to grassland.

5. Overview of Confidence in Compost programme

