

ADVISORY COMMITTEE ON THE MICROBIOLOGICAL SAFETY OF FOOD

RISK ASSESSMENT : USE OF COMPOSTING AND BIOGAS TREATMENT TO DISPOSE OF CATERING WASTE CONTAINING MEAT

Background

1. Under the Animal By-Products Order 1999 (as amended), all catering wastes containing, or having been in contact with, meat or other products of animal origin must be disposed of so that livestock and wild birds cannot access them. Most of this material currently goes into landfill or is incinerated.
2. An alternative disposal option being considered by Government is the use of composting and biogas plant to treat the materials, followed by land spreading of the compost/residues from the biogas process. Before this option can be approved, it requires the 1999 Order to be amended. This is the subject of a DEFRA consultation.

Risk assessment

3. Recognising that a proportion of meat will be discarded uncooked with catering waste, DEFRA commissioned a risk assessment to, amongst other things, determine the risks to humans utilising compost/biogas residues and either consuming crops grown in those fields to which this material has been applied or ingesting compost.
4. **The Food Standards Agency (FSA) has requested the opinion of the ACMSF on the potential human health risk.** In the first instance, the risk assessment has been considered by the *Ad Hoc* Group on Sewage Sludge. A copy of the Executive Summary is attached for ease of reference. The full report of the risk assessment is available on the DEFRA website. The address is <<http://www.defra.gov.uk/animalh/by-prods/publicat/reports.pdf>>
5. The risk to human health from exposure to *Campylobacter*, *E. coli* O157, *Salmonella* and *Clostridium botulinum* via the consumption of either soil, or crops grown on land to which compost has been applied, is assessed in the contractor's report to DEFRA as very low, specifically :-
 - for ***E. coli* O157** : the loading from composted catering waste is assessed as >5,000-fold lower than for manures and >40-fold lower than

for treated sewage sludge. The conclusion drawn is that, since the *E. coli* O157 is so much lower than for manures and treated sewage sludge, the application of composted catering wastes to land will have little impact. The risk to a gardener from ingesting 1 gram of compost is estimated to be 0.5×10^{-4} per person per gram of compost;

- for ***Campylobacter***, the risk from consuming unwashed and uncooked root crops is estimated to be very low (7.5×10^{-8} per person per year). The risk to a gardener from ingesting 1 gram of compost is assessed as 0.4×10^{-6} per person per gram of compost ingested;
- for ***Salmonella***, the risk to a gardener is put at 1.06×10^{-6} per person per gram of compost ingested. The risk to consumers of unwashed, uncooked root crops is assessed as $<10^{-6}$ per person per year;
- for ***Clostridium botulinum***, it is judged that there is no risk from toxin production. It is judged likely that the application of compost will have little effect on levels of *Cl. botulinum* spores already present in soils. The main public health risk is judged to be infant botulism from spores remaining in composted material. It is therefore recommended in the report of the risk assessment that compost produced from catering wastes containing meat should carry a warning label designed to ensure that infants are not exposed to it.

View of Ad Hoc Group on Sewage Sludge

6. The *Ad Hoc* Group regards as sound the approach adopted for the risk assessment. The Group also regards as acceptable the conclusion drawn that, if the conditions specified for composting and biogas treatment are complied with, then the risks to human health either from root crops grown on land to which compost or biogas product has been applied, or through the ingestion of compost by gardeners, are very low.
7. However, the *Ad Hoc* Group on Sewage Sludge has a number of detailed observations which it recommends should be drawn to the attention of DEFRA via the FSA, namely :-
 - no value is included for die off of pathogens after application of catering waste to agricultural land, although values are given for the decay of pathogens in sewage sludge-treated soil (section 4.3). This should be assessed;
 - there should be an event tree for each pathogen;
 - a two barrier composting system is recommended for the meat fraction for each composting barrier (section 25). It is proposed that the catering waste should reach a temperature of 60°C for 2 days during composting, with the composting process being continued for at least 14 days. The important factor is the microbial load at the end of composting and there should be no barrier to shorter holding times where these are seen to

achieve desired levels of pathogen reduction. A preferable approach might therefore be to state that other composting processes would be regarded as acceptable provided equivalent efficacy against the hazards detailed in the risk assessment could be demonstrated. This would provide opportunities for the development of alternative approaches and would be consistent with the approach adopted in the Safe Sludge Matrix and draft sewage sludge regulations;

- however, the heat treatment assumption used for the recommended composting process (60°C for 2 days) gives a worst case centre temperature in a particle of 40cm diameter of 56°C. This is said to be sufficient to give the appropriate destruction in respect of FMD-infected pig meat (ie. a bone-in leg of pork), and the assumption is made that 60°C for 2 days will also be sufficient to deactivate other pathogens present in meat tissue. It needs to be considered whether this holds true for, eg. parasites (which occur in pork tissue) or for invasive *Salmonella* strains. The same question arises in relation to the biogas assumption (5 cm sphere to reach 56°C in a biogas treatment plant held at 57°C for 5 hours);

- the risk assessment, while comprehensive, is restricted to conventional pathogens. Consideration needs to be given to possible new issues which might arise as a consequence of new disposal practices. For example, could application of composted animal tissue to agricultural land provide a human exposure pathway for an opportunistic pathogen or for other toxigenic microorganisms such as fungi, *Staphylococcus aureus* or *Clostridium perfringens*, all of which will occur on meat and some of which can produce heat-stable toxins;

- no assessment has been made for the risks from tapeworm (*Taenia*), an obvious hazard in relation to beef and pork;

- the risk assessment for *Clostridium botulinum* (section 22) appears to be based on bacon, but seems not to have been extrapolated to pork and other meats where the organism is likely to be equally prevalent. Indeed, the growth of the organism in bacon is likely to be inhibited by nitrite. This may not be the case for other meats which, in consequence, may present a greater risk and could substantially increase the calculated risk of infant botulism;

- no post-application restrictions, aimed at further reducing the risk of transmission through food chain exposure pathways, are applied to crops grown where catering waste has been spread. Post-application restrictions are an integral part of sewage sludge controls and, given several unknowns in the catering waste risk assessment, DEFRA should consider introducing this further level of protection. Consideration should, for example, be given to introducing a requirement for sub-surface injection/incorporation of the waste. In addition, DEFRA should consider, as a further safeguard, the option of precluding use of catering waste on ready-to-eat crops, or introducing a longer restriction between application and harvest.;

- the risk assessment covers catering and consumer raw meat waste but does not include raw meat waste from other sources (eg. raw meat waste from retail outlets such as butchers and supermarkets). This clearly needs to be covered if DEFRA intends to extend the regulations to allow raw meat from these additional sources to be recycled to agricultural land;
- the Animal By-Products Order includes, in the definition of “animal”, “fish, reptiles and crustacea”. “Fish” also features in the description of catering waste in the Order. However, fish and shellfish do not feature in the risk assessment. DEFRA should be asked to clarify its intentions regarding the disposal of catering waste comprising or containing such material.

Recommendation

8. ACMSF Members are invited to endorse these conclusions and to agree that the above comments should be drawn to the attention of the Food Standards Agency, with a view to their being forwarded to DEFRA.

**Secretariat
June 2003**

Risk Assessment : Use of Composting and Biogas Treatment to Dispose of Catering Waste Containing Meat. Final Report to the Department of Environment, Food and Rural Affairs. Available on DEFRA website at <<http://www.defra.gov.uk/animalh/by-prods/publicat/reports.pdf>>