Animal By-Products – Treatment Options

Factsheet FABRA-FS-009

INTRODUCTION

All aspects of animal by-products (ABPs) handling, including storage, collection, transport, processing and disposal, are subject to strict rules to ensure robust biosecurity. The options for treatment and / or disposal are laid down in the ABPs Regulations[1]. The Regulations are implemented in England, Wales, Scotland, and NI by individual Statutory Instruments.

Three categories of ABPs material (1-3) are defined, based on risk and materials of different categories must be kept separate and processed in dedicated plants - Refer to Factsheet *What are Animal By-Products?*[2]

TREATMENT OPTIONS

Category 3 material has the most treatment options available and can also be used as a raw material in pet food as a fresh or frozen product. Options for Category 1 and 2 materials are the most restricted to ensure that biosecurity is maintained and both public and animal health are protected. Commonly used treatment options are summarised in Table 1.

Table 1– Summary of Options

	Category 1 ABP	Category 2 ABP	Category 2 Manure and Gut	Category 3 ABP
Incineration and co-incineration	Yes	Yes	Yes	Yes
Landfill	No[a]			No[b]
Rendering	Yes	Yes	Yes	Yes
Land spread	No	No	Yes	Yes[c]
Compost/Biogas	No	No[d]	Yes	Yes
Pet food (fresh or frozen)	No	No	No	Yes

a) Following rendering of this material to Method 1 pressure sterilisation standards, the products can be landfilled.
b) Following rendering of Category 3 material the products can be landfilled.
c) Only milk, colostrum and clean eggshells.
d) Following rendering of this material to Method 1 pressure sterilisation standards, the products can be sent for composting or anaerobic digestion (biogas).

Heat treatment options involve pressure sterilisation (Method 1) or a reduction in size followed by heat treatment at defined temperature, pressure and time (Methods 2 -7). The exact parameters are set out in the ABP legislation[1]. The Regulations also allow for alternatives such as alkaline hydrolysis or gasification, but these are not commonly used.

When assigning a treatment method it is important to consider the end uses of treated material as this will define the economics of the process and help to evaluate efficiency. Although the rendering process for Category 1 and 2 materials is strictly controlled for biosecurity, it still allows for recycling of the material – with the meat and bonemeal (MBM) and tallow being used as fuels.

OTHER CONSIDERATIONS

The Fact Sheet *The Circular Economy and Animal By-products*[3] sets out the waste hierarchy (see Figure 1) for ABPs and provides more detail about the ways these materials can be recycled and reused.

Figure 1 – Waste hierarchy

COMPARISON OF METHODS

Processing of ABPs must take place in a processing plant that has been validated against an approved method. Some methods require validation to prove pathogen destruction, and routine testing of processed material is undertaken to check for pathogens[4].

The benefits of each treatment option take into consideration the end uses of the derived products and the resources expended to produce them[5].

Composting is more suitable for manure or digestive tract content rather than meat-based material due to the time taken for the latter to decompose and homogenise. At the other end of the scale, rendering produces a wide range of saleable products.

The pros and cons of the different treatment options are set out in Table 2

REGULATORY CONTROLS

ABPs sent for rendering are not classed as waste and are only covered by the ABPs Regulations[1]. Products from rendering that are combusted for energy recovery are covered by both ABPs and waste regulations unless subject to an approved end of waste determination by the regulator. Detailed environmental permits cover emissions to air, land and water.

Any ABPs sent for composting or anaerobic digestion (AD) come under the Waste Regulations as well as the Animal By-products Regulations. Both the transport and the composting/AD facility need to be in line with the legislative requirements. Environmental Permits are required for AD and composting installations. Refer to Factsheet *Animal By-Products – Regulatory Controls*[4]

Table 2 - Pros and cons of the different animal by-products treatment options

Treatment	Category 1	Category 2	Category 3	Pros	Cons
Rendering	✓	✓	✓	↑ Effective pathogen treatment ↑ A range of high value uses for derived products - including pet food, animal feed, fuel, oleochemicals ↑ Provides revenue stream for ABPs and minimises food waste ↑ Local and, flexible treatment solutions ↑ Highest in food waste hierarchy	↓ High energy consumption ↓ Potential for nuisance without good operational control ↓ Packaged waste processing limitations
Incineration/ combustion	✓	✓	✓	↑ Effective pathogen treatment ↑ Energy recovered as heat and power ↑ Reduced packaging waste handling issues	↓ High energy consumption ↓ Costs for disposal of ABPs as waste ↓ Significant emissions to air that must be controlled ↓ Limited product options - Ash may be used as a fertiliser with end of waste approval. ↓ Lowest in food waste hierarchy ↓ Potential for nuisance without good operational control
Anaerobic digestion		✓	✓	↑ Biogas product for power generation or grid - a source of renewable energy ↑ Digestate co-product for fertiliser/soil improver	↓ Unable to treat Category 1 ABPs ↓ Low conversion efficiency to derived product ↓ Category 2 ABPs must be pressure sterilised before anaerobic digestion ↓ Microbial population is sensitive to change of feedstock ↓ Limited range of derived products ↓ Digestate must be pasteurised before use as a fertiliser ↓ Middle of food waste hierarchy ↓ Potential for nuisance without good operational control
Composting		✓	✓	↑ Simple process ↑ Provides a source of fertiliser/soil improver	↓ Unable to treat Category 1 ABPs ↓ Effectiveness of treatment to achieve temperature requirement ↓ Not all ABP material is suitable as a raw material ↓ Limited application ↓ Limited range of derived products and low value ↓ Middle of food waste hierarchy ↓ Potential for nuisance without good operational control

REFERENCES

1. Commission Regulation (EU) No 142/2011 of 25 February 2011 implementing Regulation (EC) No 1069/2009
2. What are animal by-products, Factsheet FABRA-FS-001
3. The Circular Economy and Animal By-Products, Factsheet FABRA-FS-004
4. Animal By-Products – Regulatory Controls, Factsheet FABRA-FS-006.
5. Gooding, CH and Meeker, DL, 2016, Review: Comparison of 3 alternatives for large-scale processing of animal carcasses and meat by-products. In The Professional Animal Scientist 32(2016):259-270.

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