



EU guidelines have set strict rules for the processing of animal by-products. In-vessel composting is one option for the disposal of such waste. Here Steve Morris reveals the widely-used VCU and explains where it is best used



# Goodbye to animal by-products

**A**s the environmental sector develops, the need for robust and proven waste treatment technologies continues to grow to meet the increasingly stringent requirements.

Although the infrastructure of the waste industry and associated disposal costs in the western world vary from country to country, the option to landfill is becoming less viable. In some cases there is an outright ban on landfilling, and in others there is an increased cost via the introduction of taxes or, as in the UK, possible fines for exceeding allocated capacities. These factors are driving municipal authorities to look seriously at the options available for landfill diversion. In addition, many national waste policies include a waste hierarchy which classifies waste management strategies according to their desirability.

The analysis of municipal waste shows that the biodegradable fraction is typically 65%–75%, of which 40% is likely to be biowaste (comprising biodegradable green waste, food and kitchen waste).<sup>1</sup> The European Landfill Directive has set tough targets for the reduction of biodegradable municipal waste (BMW) for landfill: by 2010, it must be just 75% of that produced in 1995; by 2013 it must be 50% of the 1995 figure; and by 2020 biodegradable municipal waste landfilled must be just 35% of that produced in 1995.

To respond to this Directive, technology providers are continually required to improve their products both technically and commercially, and a large array of technologies now exist for the treatment of biowastes.

This article outlines one particular technology, an in-vessel composting (IVC) system, which has been utilized for over a decade to help divert biowastes away from landfill. It has evolved to meet the needs of this fast-changing industry.

## Animal by-products

Animal by-products (ABP) are a significant fraction of the biological waste stream, and there are stringent regulations governing the disposal of these wastes. ABP can be defined as animal carcasses, parts of carcasses or products of animal origin that are not intended for human consumption. The waste arises typically from food processing and manufacturing plants, distribution premises, wholesale and retail outlets, food markets and catering facilities (including household kitchens).

A number of technologies exist for the treatment of ABP, including rendering and incineration, as well as the composting and biogas treatment for certain categories of ABP.

In Europe, there is an increasing requirement for selecting solutions which demonstrate the best available technique for the treatment of ABP wastes. These can be easily defined as the most effective way of protecting of the environment using techniques developed on a scale which allows easy, economical implementation. It covers both the technology used and the way in which an installation is designed, built, managed, maintained and operated.

## EU animal by-product regulations

EU Legislation 1774/2002 sets out procedures for the collection, transport, storage, handling, processing, use and disposal of all animal by-products.

There are three categories of ABP based on their potential risk to animals, the public or the environment, and the regulations clearly state how each category may be disposed of. Category Three material is the lowest risk category. It includes raw meat, waste from food manufacturers and food retailers, eggs and certain other by-products which do not show signs of transmissible disease. Category Three material cannot be taken to landfill but can be



Magherafelt District Council, Northern Ireland, process co-mingled food and green waste in its VCU™ system



Typical mixed green and food waste  
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disposed of via treatment technologies such as in-vessel composting (IVC). This fits well with the waste hierarchy, as composting is the preferred treatment option after reduction and reuse.

ABPs treated by IVC need to meet the EU standard set out in the regulation – which is treatment at 70°C for one hour, with a maximum particle size of 12 mm. Some alternative treatment standards that differ from the current EU standards were introduced in 2007, these must demonstrate capability to meet a specified level of pathogen reduction.

### In-vessel composting

In-vessel composting is a well-proven treatment process and there are reported to be around 600 installations worldwide.<sup>2</sup>

As the technology has matured a number of different systems have emerged, each with their own benefits suited to various site-specific requirements – such as capacity and footprint. The latter is becoming increasingly important as many regions find that land is at a premium and they search for smaller decentralized treatment sites, often close to the source of the waste.

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One technology which has been applied successfully across three continents is the vertical composting unit (VCU™). As the name implies, the process is carried out in vertical chambers which have a small footprint. The system is modular, allowing for the addition of extra chambers as requirements change.

From its conception in the mid 1990s, the VCU™ has been installed on over 30 sites in seven countries and has helped to divert over 500,000 tonnes of waste from landfill. The VCU™ was the first system to be accredited in the UK under the Animal By-Products Regulations (ABPR 1774/2002) for the treatment of Category Three waste.

The VCU™ is an in-vessel, aerobic composting system, capable of processing most kinds of organic waste in a safe and cost-effective manner. The process occurs without emitting malodour or leachate. Waste is processed using varying cycle lengths (depending on the application) to produce a by-product that is odour-stabilized and free of pathogens. The system is modelled on the natural process of biodegradation, whilst structuring the active mass in such a way that efficiencies of time, space, energy and labour are also achieved.

### Variety of wastes

There is no 'one size fits all' solution when it comes to the treatment of ABP waste, and the specifics of the site will often dictate the best technology. The VCU™ system has been adopted to treat a variety of wastes, and provides a solution for capacities typically in the range of 5000–40,000 tonnes per annum. A key feature of any IVC system is robustness and flexibility, in particular the requirement to cope with changing



The VCU™ system at Keenan Recycling, Aberdeen, Scotland

feedstocks. Below are examples of the types of wastes being processed through the VCU™ system, and the reasoning behind the selection process.

### Co-mingled food and green waste

As the practice of separating wastes at the kerbside grows, the need for treating these source segregated wastes increases.

Magherafelt District Council, located north of Belfast, Northern Ireland, introduced a 'brown bin' collection for green and food waste in order to increase their recycling rates and meet their diversion targets. In 2004, the council conducted a

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Seafood waste can now be processed and turned into compost-like by-products

scoping study and tender process, and after evaluating a number of different technologies, opted for VCU Europa (suppliers of the VCU™) who had a proven track record of obtaining ABP compliance in the UK and who had successfully delivered similar projects. Other reasons for the technology choice were the small footprint required, low odour and leachate potential, and importantly, the flexibility to expand as demand increased. In 2007, the Council added a further two chambers to expand the plant capacity.

Another example of processing this type of waste is in Aberdeenshire, Scotland. For many years Keenan Recycling were windrow composting green waste as part of a contract with Aberdeen City Council. However, to meet targets for the diversion of biodegradable waste away from landfill, the council opted to introduce the collection of food waste in with the garden waste.

Having been awarded partial government funding, Keenan Recycling were obliged to complete a full due diligence evaluation of available technologies. The VCU™ was selected as a proven system which met site requirements. The system, which will process 25,000 tonnes of waste per annum, was installed in 2008.

### Seafood waste

The seafood industry has, for some time, recognized the need for effective waste treatment options, and one example of how a company has developed an outlet for this waste, is Grays Composting in Aberdeenshire, Scotland.

Gray Composting Services was established to provide disposal of locally produced waste. The company also recognised the benefits of applying the end by-product to land – consequently reducing the costs of artificial fertilizers. The company installed a VCU™ at its site at Portsoy in 2007. This has been recently expanded to double the processing capacity. The facility has been successfully processing shellfish, which continues to be its main waste stream, as well as taking scraps collected as part of a local trial to divert kitchen waste from landfill sites.

The VCU™ system is also operating and providing an outlet for seafood waste elsewhere in Europe. In 2004, Compost Reciclables s.l. (Sana) installed their first single-chamber VCU™ system at their site in Murcia, Spain. The plant has proven to be very successful for processing local squid waste and the facility remains the only ABP-compliant composting plant in the region.

As a result of the increasing need for more processing capacity for ABP waste in the region, Sana installed an additional three-chamber VCU™ system in 2008, enabling them to quadruple the amount of ABP waste they can treat, so allowing the further diversion of waste from landfill.

In some cases, producers have opted to treat waste on their own site. An example is Marine Harvest in Donegal, Ireland, who are one of the world's leading suppliers of seafood. Their organic and farmed salmon unit consists of hatcheries, farms and a processing plant. Originally the Category Three ABP waste was mixed with other wastes and sent for rendering, followed by shipment overseas for incineration. This was an unsustainable disposal option and the company decided to research the market for alternatives. The VCU™ was selected, and in 2004 the site became the first in Ireland dedicated to turning fish waste into high quality compost for horticultural use. It has significantly reduced Marine Harvests' transportation, treatment and waste disposal costs.

### Municipal solid waste

It is not only source segregated biological waste that is being treated using IVC. In County Meath, Ireland, AES were looking for a system that would both stabilize and give a mass reduction of the trolled organic fraction of municipal solid waste (MSW). The site was limited on space and consequently the company selected the VCU™ due to its vertical orientation, high throughput tonnage and modularity. AES are achieving mass reductions of up to 30% after processing and further maturation. The material is being used for landfill cover and the installation of the VCU™ has led to significant disposal cost savings which have justified the investment.

### Conclusions

As the need for landfill diversion increases, the need to recycle and compost waste has been identified as a preferred option after reduction and reuse of waste.

Animal by-products represent a significant part of the biowaste stream and disposal options are limited and highly regulated. In-vessel composting is permissible under EU regulations for Category Three ABP waste, and has shown to be a well-proven option. This has the added potential benefit of producing a safe and valuable compost for use as a soil conditioner and fertilizer whilst avoiding the need for landfill.

A wide choice of IVC technologies exist and selection is often made depending on site-specific conditions – such as capacity, footprint and adaptability. However, as the waste sector changes and grows, there is an increased need for IVC technologies with a proven track record that can demonstrate flexibility and meet the best available technique requirements.

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### References

- <sup>1</sup> National Strategy on Biodegradable Waste, Department of the Environment, Ireland
- <sup>2</sup> BioCycle May 2007, Vol 48, No 5, p21

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