

The solid residue from anaerobic digestion of organic matter is referred to as either digestate or biosolids. Biosolids is the residue from anaerobic treatment of municipal sewage, while digestate is the residue from anaerobic digestion (AD) of other organic matter. Both materials can be beneficially used as a soil fertiliser and conditioner, although stricter regulatory limits apply to the application of biosolids to land to minimise potential health risk for humans, livestock and the environment. Digestate which meets specified quality limits is suitable for safe use as a fertiliser on land and is called biofertiliser.

Processing of residual organic matter in an anaerobic digester produces biogas as well as the digestate or biosolids.

The residual organic matter processed as a feedstock in a digester is the remaining material from food processing; from agriculture crop residues; manures; or from municipal waste after the quantities of organic material have been reduced by minimisation, recycling or reuse. Organic residues can have a high reuse or recycling value and are only waste when we decide not to use the organic matter for a beneficial use.

Efficient and trouble-free anaerobic digestion requires effective source segregation of organic waste from other types of waste. Improved collection of organic waste with increased focus of businesses and communities on separation at source has internationally proven to increase the level of recycling and reuse of organic waste which would otherwise have gone to landfill, hence underpinning the goal of the waste hierarchy.



Internationally most food waste AD plants produce biogas for heat, electricity and use as a vehicle fuel, and biofertiliser from the digestate.

Anaerobic digestion or composting

Anaerobic digestion sits alongside composting as alternative processing technologies. Composting and AD processing of organic waste are both well proven, extensively used and often complimentary technologies used worldwide. The choice of processing pathway depends on the composition of the feedstock and the desired products produced in response to the local market demand and opportunities. In some applications with specific feedstock, composting will be the optimal processing path, while in other applications and feedstocks AD processing will be optimal. A benefit of AD processing compared to composting is that AD processing also produces valuable energy as well as a fertiliser¹.



¹ <https://www.biogas.org.nz/resource/tngb28-composting-and-anaerobic-digestion>

In general, high-energy feedstocks such as food waste are better suited for AD whereas high fibre feedstocks such as green waste are more suited to composting. Most importantly, they both keep waste out of landfills and hence substantially reduce greenhouse gas emissions and other environmental risks and impacts associated with that processing practice.

In general terms compost is an organic soil improver and AD biofertiliser is an organic fertiliser.

Application of biofertiliser to land

Digestate contains high levels of macro- and micro-nutrients and as such presents an environmentally sound alternative to mineral and synthetic fertilisers. Nevertheless, the use of digestate as biofertiliser has been limited by the perception of farmers, food wholesalers, food retailers, politicians, decision makers and the public as being un-safe due to its origin from waste materials and animal by-products. This is generally because all residues from anaerobic digestion of organic waste have been considered as being a biosolid and thus within the regulatory limitations on sewage biosolids use. Because the characteristics are different, separate consideration of the attributes of digestate and biosolids will assist in maximising the value of the products from anaerobic digestion of organic wastes.

*Technical Guide 8 - The production and use of digestate as fertiliser*² provides guidance on the production of high-quality, safe and healthy digestate for use as biofertiliser. The goal is to provide incentives for further investment in anaerobic digestion applications for processing of source-segregated organic waste in New Zealand, Australia and the South Pacific, by improving the awareness of the monetary, social and environmental benefits this technology offers for the treatment of organic waste.

Regulations applying to application of organics to land

Detailed discussion on the regulations covering the application of digestate to land is set out in Technical Guide 8.

The Technical Guide 8 does not cover the application of biosolids to land. These are covered extensively in the *Guidelines for Beneficial use of Organic Materials on land*³. Regulations covering the application of compost and other organic material is discussed in www.biogas.org.nz/biofertiliser

A scheme for classifying digestate as a biofertiliser and accrediting complying biofertiliser producers has been developed with assistance of funding from the Waste Minimisation Fund.

The aim of the Digestate Biofertiliser Scheme is to establish and publish guidelines based on current international knowledge and best practice that define the criteria for a digestate produced from segregated organic materials so it is safe to apply to land. Digestate which meets the Digestate Guidelines (*DBPAS 05 - The Guidelines for the Production of Digestate Biofertiliser for Application to Land*⁴) can be referred to as a biofertiliser. This provides confidence to customers that the digestate biofertiliser purchased meets the definition of being a fertiliser under the Agricultural Compounds and Veterinary Medicines Act 1997 and meets specific legislative standards.

² <https://www.biogas.org.nz/resource/tg08-production-and-use-digestate-biofertiliser>

³ https://www.waternz.org.nz/Attachment?Action=Download&Attachment_id=3291

⁴ https://www.biogas.org.nz/documents/admin/DBPAS-05_Digetate-Biofertiliser-Certification-Draft.pdf

Technical Guide 8 sets out the criteria and builds on the *UK PAS110 Specification for whole digestate, separated liquor and separated fibre derived from the anaerobic digestion of source-segregated biodegradable materials*⁵ which sets out the foundations for classification of digestate as fertiliser.

Bioenergy Association has established an accreditation scheme for producers of digestate. Guidance for producers seeking accreditation of digestate produced from their AD facilities is set out in *Digestate Biofertiliser Producer Accreditation Scheme*⁶. Accreditation is based on producers having a robust quality assurance framework for digestate from source segregated feedstock. The application form for accreditation is available from the scheme web page⁷.

Bioenergy Association is working with the Fertiliser Quality Council to establish procedures for certification of digestate biofertiliser under the Fertmark Scheme.

Digestate which does not meet the criteria as set out in the Digestate Guidelines is able to be applied to land only if it complies with the regulatory requirements of a biosolid specified by the Rules of the relevant local Regional Plan.

Accreditation of digestate biofertiliser producers

The Bioenergy Association scheme for Accreditation of Digestate Biofertiliser Producers⁸ is available to producers who produce and sell digestate biofertiliser which meets the criteria from the Digestate Guidelines.

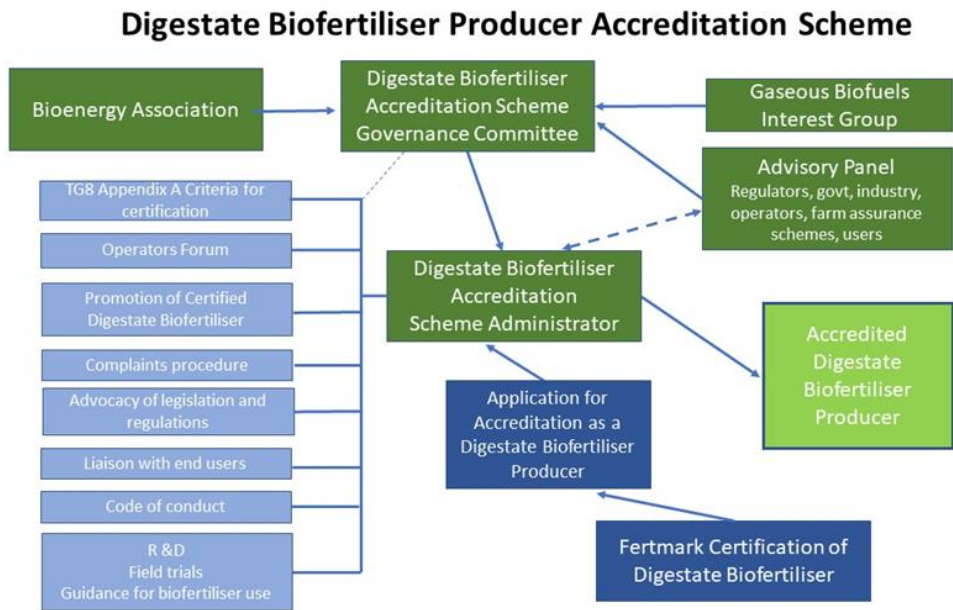


Figure 1: The components of the Digestate Biofertiliser Producer Accreditation Scheme

The Accreditation Scheme will be overseen by a Governance Committee of the Bioenergy Association.

⁵ <https://www.biogas.org.nz/resource/PAS110-digestate-standard>

⁶ <https://www.biogas.org.nz/resource/biofertiliser-certification-scheme>

⁷ <https://www.biogas.org.nz/biofertiliser>

⁸ <https://www.biogas.org.nz/biofertiliser>

The promotion, research and information sharing aspect of the Scheme will be managed by the **Operators Forum**⁹ made up of the accredited producers and associates (producers working to become accredited, regulators, and users). Membership of the Operators Forum is by application. Voting on decisions by the Operators Forum on the Scheme details will be limited to Accredited Producers.

The Operators Forum will identify and scope research on the application of biofertiliser to soils, disseminate information on the use of biofertiliser on different soils, provide collective support to producers on meeting regulatory requirements and publish material providing confidence to biofertiliser users on the efficacy of the digestate as a quality fertiliser.

Anaerobic digestion facility operators seeking accreditation can obtain Producer Accreditation documentation and application forms from the scheme web page¹⁰.

All details of the scheme and the on-going work programme are also available from the website.

The benefits of using digestate biofertiliser

A key aspect of interest to fertiliser users is that the product has known characteristics and is consistent in composition. The accreditation scheme will focus on the consistency of the anaerobic digestion process and the quality control on feedstocks, as both these affect the reliability and consistency of produced product.

With digestate classified as a biofertiliser and its characteristics identified, the biofertiliser is then ready for market distribution underpinned by the credibility of the accreditation scheme.

The benefits of using biofertiliser from accredited producers are:

- Provides a sustainable source of nutrients for agriculture. This is through the capture of nutrients by recycling organic material that would otherwise have gone to landfill
- Digestate biofertiliser use can lower greenhouse gas emissions by diverting material from landfill, reducing the reliance on conventional fertilisers, adds stable organic matter to the soil and is produced alongside biogas, a renewable energy source.
- Most of the nitrogen is present as ammonia and is highly accessible for plants. It also contains organic nitrogen which will be slowly released through mineralisation. This means it provides crops with nutrients available in the short and long term.
- Contains residual organic matter which will contribute to improved soil water holding properties and soil health.

A full review of the benefits of using compliant biofertiliser in a summary report *Characterisation of Food Waste Derived Biofertiliser*¹¹ and supporting documentation providing guidance on the application of biofertiliser to land is available from the Bioenergy Association's biofertiliser web pages¹².

⁹ Roles and responsibilities are set out in Section 6 of https://www.biogas.org.nz/documents/admin/DBPAS-01_Producer-Accreditation-Scheme.pdf

¹⁰ <https://www.biogas.org.nz/biofertiliser>

¹¹ [Link to beca document](#)

¹² <https://www.biogas.org.nz/biofertiliser>