GUIDELINES FOR THE PRODUCTION OF DIGESTATE BIOFERTILISER FOR APPLICATION TO LAND

DBPAS 05 Version 2
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Bioenergy Association

Contents

Legal Disclaimer:

This Guidelines for the Production of Digestate Biofertiliser for the Application to Land (the *Digestate Guidelines*) set out the feedstock and end product criteria and labelling requirements for digestate to be recognised as a biofertiliser.

The *Digestate Guidelines* are informative and not prescriptive. The Guidelines can assist AD producers to demonstrate compliance for the processing of biodegradable organic materials into quality digestate biofertiliser that is safe for application to land. Digestate which meets the criteria and standards set out in the *Digestate Guidelines* is referred to as a digestate biofertiliser. Please note that within this document the terminology 'digestate biofertiliser' and 'biofertiliser' are used interchangeably.

Furthermore, a producer may choose to be recognised as an accredited producer of biofertiliser through the membership of the Bioenergy Association Producer Accreditation Scheme (see Digestate Biofertiliser Producer Accreditation DBPAS 01).

In the absence of a regulatory framework the *Digestate Guidelines* and the Producer Accreditation Scheme provides structure and key quality standards to differentiate digestate biofertiliser from a waste product. Producers of digestate are not legally obliged to meet the criteria in the *Digestate Guidelines* and accreditation is voluntary.

While not a statutory requirement, consent authorities may choose to recognise the *Digestate Guidelines* and the Producer Accreditation Scheme as an acceptable path to demonstrating compliance of digestate as a biofertiliser.

Compliance with this publication cannot confer immunity from legal obligations.

When a biofertiliser is labelled with the Bioenergy Association Producers Accreditation mark this solely represents the producer's declaration regarding conformity. It is important to note that the accuracy of this claim is the sole responsibility of the person or organisation making it.

The purpose of this document is to assist biofertiliser producers demonstrate their facility meets industry best practice in the production of digestate biofertiliser. Best practice is when the digestate meets the criteria set out in this document (the Digestate Guidelines).

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application. In addition to the requirements of this, attention is drawn to the following statutory requirements:

Animal Products Act 1999

Animal Products Regulations 2021

Agricultural Compounds and Veterinary Medicines Act 1997

Biosecurity (Ruminant Protein) Regulations 1999

Resource Management Act 1991

Document Control

This is a controlled document.

This *Digestate Guidelines* is intended to be a "living document". It is based on current knowledge about the use of digestate in New Zealand and overseas and will be regularly reviewed in light of future research finding and management experiences. Selective updates based on the latest science may be issued without prior consultation.

Triggers for review could include new information from research including field trials, pollution incidents, a change in the market or a change in legislation or case law.

Updates to will only be made if approved by the Bioenergy Association. The process for suggesting an edit of a controlled document is set out on the Information Sheet 11[1].

Each version of the document will have a version number and a control sheet which will record its status and a brief comment about the changes that have been made to it.

The document and any associated papers will be published on www.biogas.org.nz

Version	Status	Bioenergy Association approval	Date	Significant changes from previous version
1	Consultation draft	Brian Cox	19/8/24	Initial establishment of the Digestate Guidelines and criteria for digestate application to land
2	publication draft	Brian Cox	14/5/25	Heavy Metals updated Final version after consultation of stakeholders

[1] https://www.bioenergy.org.nz/resource/is11-bioenergy-association-publications

1.0 Introduction

Compliance with the digestate biofertiliser requirements outlined in this document enables the production and supply of biofertilisers in a way that minimises risks to land, food safety, and animal welfare. Producers who meet these requirements may obtain Accreditation from the Bioenergy Association of New Zealand (BANZ), which formally recognises their digestate as a compliant biofertiliser.

How does a producer obtain accreditation?

To become an accredited supplier of digestate biofertiliser, producers must demonstrate that their product meets the minimum quality criteria detailed in Sections 4.0 and 5.0 of this document. This is achieved by implementing a comprehensive Risk Management Programme at their facility, ensuring consistent production of compliant digestate.

The Risk Management Programme must include the following components:

1. A **Quality Management System**
2. A **Hazard Analysis Critical Control Point (HACCP) Plan**
3. A **Facility Management Plan**

Accreditation is granted by the Bioenergy Association of New Zealand (BANZ) following submission of an application and presentation of audited evidence demonstrating compliance with these requirements. The accreditation process provides assurance that:

- The biofertiliser meets defined performance and quality standards
- The production facility manages biodegradable organic materials safely and in accordance with current regulatory requirements, including
    - Animal Products Acts 1999 and Animal Products Regulations 2021
    - Agricultural Compounds and Veterinary Medicines Act 1997
    - Biosecurity (Ruminant Protein) Regulations 1999

The Bioenergy Association supports accreditation with a formal complaints process. Any concerns regarding the quality or safety of an accredited biofertiliser may be directed to the Digestate Biofertiliser Scheme Administrator (Scheme Administrator).

2.0 Scope

These Digestate Guidelines apply to whole digestate, separated liquor and separated fibre fractions resulting from the anaerobic digestion of biodegradable organic materials. Producers should be aware that the inclusion of materials or wastes not listed in Table 2 will result in the digestate falling outside the scope of this guidance.

This document provides guidance on:

1. Characterisation of digestates suitable for accreditation
2. Producer systems and documentation required to achieve accreditation
3. Labelling requirements for accredited digestate biofertilisers

Terms with specific definitions are highlighted in **bold** upon their first use and are defined in **Section 11.0 Terms and Definitions**. Additional guidance, including templates and examples of required documentation, is available on the Bioenergy Association's website[2].

Producers are strongly encouraged to familiarise themselves with the Bioenergy Association's *Technical Guidance 8 (TG8): The Production and Use as Biofertiliser of Digestate Derived from Source Segregated Organic Waste.* TG8 outlines current best practices for anaerobic digestion and can also be accessed via the Bioenergy Association's website[3]

3.0 Does your Digestate meet the Criteria?

The first essential step towards accreditation is verifying that your digestate meets the defined biofertiliser quality requirements. Only digestate that complies with these standards is eligible to be recognised as a biofertiliser.

To qualify, your digestate must meet the following criteria:

1. Input materials must originate from sources listed in Tables 1 and 2
2. The digestate must meet the minimum nutrient, physical, biological and chemical characteristics specified in Tables 4-8 (see Section 5.0)
3. Digestate meets the labelling requirements in section 10.

Once the producer is confident that their digestate complies with both the input and output requirements and has documented a comprehensive Risk Management Programme, they may apply for accreditation through the BANZ Digestate Biofertiliser Producer Accreditation Scheme.

Becoming an accredited producer demonstrates a commitment to product quality, environmental responsibility and alignment with industry best practices.

4.0 Feedstock Materials

Table 1: Input materials able to be feedstocks for digestate biofertiliser

Industry	Approved Materials
Agriculture and Primary Processing Residues	Fruit and vegetable waste from paddocks or fields, including: • Produce that did not meet quality control criteria, poorly presented produce, residual plant material such as stems and stalks.
	Plant parts (e.g., leaves or tops) that are free from clopyralid and aminopyralid herbicides
	Purpose-grown agricultural break crops, also free from clopyralid and aminopyralid herbicides
	Abattoir and butchery by-products from healthy animals, which: • Are free from disease, are not suitable for sale as higher-value products, must comply with Conditions 1 and 2 in Table 2. These by-products may include:

[2] www.biogas.org.nz/resource/biofertiliser-accreditation-scheme

[3] www.biogas.org.nz/resource/tg08-production-and-use-digestate-biofertiliser

	• paunch grass, carcasses and body parts, hides, skins, hooves and horns, feathers, wool and hair, hatchery by-products including eggs, eggshells and unhatched poultry in shell, aquatic animals, and invertebrates.
	Shellfish shells containing soft tissue.
Animal Manures	From healthy animals, showing no signs of disease or sickness
Domestic and Commercial Garden waste	Organic materials typically found in domestic gardens or commercial green spaces, including: • tree branches and pruning, hedge trimmings, weeds, lawn clippings, plants, shrubs, leaves and cut flowers. These must comply with Condition 3 in Table 2.
Food and drink processing residues	Residues and by-products from the manufacture of food products containing meat, fish, or dairy. These must comply with Condition 4 in Table 2. Animal-origin materials deemed fit for human consumption at abattoirs or butcheries but unsuitable for sale due to commercial reasons or minor defects such as: • packaging damage, manufacturing faults, being past the use-by date, soiling. These products must pose no risk to public or animal health.
	Residue materials from the manufacture of drinks and other beverages.
	Rejected fruit and vegetables from commercial packhouses.
	Brewers' grain and chaff and grape marc (including skins, pulp, stems, and seeds after grape pressing).
Fats, oils, grease trap	Uncontaminated materials from: • primary food and drink processing, domestic and commercial food waste only (only where contaminated).
Domestic and commercial food waste - Must comply with Condition 4 in Table 2	Domestic food waste collected from household kitchens e.g., kerbside food scrap collections.
	Retail premises, restaurants, cafes, hotels and catering facilities, commercial kitchens.
	Food markets, supermarkets, butchers, and bakers.
	Schools and workplaces

Table 2: Specific Conditions for Feedstock Inputs

Condition 1	Abattoir by-products may be used if they have been passed as fit for human consumption but are not intended for - either because they consist of animal parts not typically eaten (e.g., hides, bones), or for commercial reasons.
Condition 2	Only meat from processing facilities approved for export to the UK and Europe will be accepted. These facilities must demonstrate compliance with requirements for the removal of spine cord and brain matter prior to further processing. Such facilities operate with Specific Risk Material (SRM) removal systems that meet international market standards. All SRM material is classified as high risk, separated at the source, and sent to rendering alongside condemned material.
Condition 3	Lawn clippings present a known risk of contamination with the herbicide clopyralid. Ideally, this feedstock should be confirmed as clopyralid-free. If clopyralid is detected, the end markets for the resulting biofertiliser must exclude high-risk crops known to be sensitive to this compound.
Condition 4	Meat and meat products that were once suitable for human consumption are exempt from the SRM certification requirement. This exemption applies to materials originating from:

	• butchers, supermarkets, restaurants, food processing facilities, kerbside food scrap collections. This includes, but is not limited to, meat that is past its use-by date, damaged or soiled stock and cooked or prepared food leftovers.
Condition 5	Anaerobic Digestion (AD) producers must carefully assess potential chemical residues in all input feedstocks. This is critical to ensure that crops or animal products receiving biofertiliser applications do not exceed limits set under the New Zealand Maximum Residue Levels (MRL) Notice.

Conditions 1, 2 and 4 in Table 2 are included in the input criteria to manage the risk of exotic diseases, such as bovine spongiform encephalopathy (BSE). Additional requirements for biofertilisers that contain, or may contain, ruminant protein are outlined in Section 10 - Labelling and End User Information, to ensure these products are not fed to ruminant animals.

The *Digestate Guidelines* adopt a risk-based approach to the wide range of biodegradable organic materials suitable for anaerobic digestion. To support this, the feedstock categories in Table 3 group materials based on their origin and risk characteristics. These categories are adapted from EU legislation, which classifies animal by-products according to their potential to spread disease.

Feedstocks are divided into two groups:

- Group A - requires pasteurisation at the anaerobic digestion (AD) facility
- Group B – does not requirement pasteurisation.

Table 3: Feedstock Pasteurisation Requirements

Biodegradable Organic Material	
Group A (requires pasteurisation)	**Group B (does not require pasteurisation)**
Kerbside food waste collections including FOGO	Agricultural break crops
Food manufacturing that is not solely plant based	Fruit, orchard and packhouse waste
Primary processing, i.e. approved abattoirs	Vegetable, paddock waste including stems, roots
Post consumer foodstuffs • Food approved for human consumption, i.e. spoiled • Restaurant, café, catering waste (including milk, milk product, egg products)	Forage, grass, pasture Food manufacturing that is solely plant based Brewery waste Vineyard – grape marc
Fats, oils, grease, grease trap	Animal manure (biofertiliser must be used on same farm from which the manure is sourced)
Paunch grass	
DAF ex abattoir, dairy farm or factory	
Animal manure (biofertiliser can be used on farms from which the manure is not sourced)	

Notes

1. **Group A Feedstocks** – These descriptors are adapted from EU Category 2 (permitted materials only) and Category 3. Group A materials **must undergo pasteurisation** at 70°C for 1 hour with a maximum particle size of 12 mm. In particular, any biofertiliser containing manure must be pasteurised before it can be applied to land other than where it originated.

2. **Group B Feedstocks** – These materials may be processed in an anaerobic digestion (AD) facility **without pasteurisation**. Scientific evidence supports that mesophilic and thermophilic conditions during digestion - combined with adequate retention time, pH, volatile fatty acids, ammonium and hydrogen sulphide - are effective in eliminating fungal plant pathogens and weed seeds[4]. If manure is sourced and used within the same farm or a co-operative, pasteurisation is not required.

The *Digestate Guidelines* acknowledge that materials such as paunch, manure, milk and milk by-products may be applied to land without prior processing, in line with EU regulations and common New Zealand farming practices. The EU regulations also extend this provision to eggs and egg by-products.

However, when such unprocessed materials are applied to land, a grazing restriction applies:

- 8 weeks for pigs and 3 weeks for all other livestock[5].

For clarity, under New Zealand Ruminant Protein Regulations, the following are not defined as ruminant protein and are exempt from those restrictions:

- Dairy and dairy products
- Eggs and poultry products
- Tallow (if insoluble impurities do not exceed 0.15% by weight)
- Paunch grass
- Manure

It nearly all cases, the application of manure and similar materials occurs within farm boundaries or across co-operatively managed farms, as part of routine farming practice.

However, when digestate biofertiliser is intended for use beyond the originating farm or co-operative, the *Digestate Guidelines* require pasteurisation of manure and paunch grass to manage potential biosecurity risks.

For further details on feedstock classifications, refer to Technical Note DBPAS 12 - Categories of Digestate Biofertiliser[6].

5.0 Digestate Minimum Quality Criteria

Quality testing for nutrient content and chemical, biological and physical characteristics of digestate must be conducted using accredited test methodologies. These tests must be performed in laboratories accredited to NZS ISO/IEC 17025 and/or recognised by IANZ (International Accreditation New Zealand, formerly TELARC). Additional tests must follow the methodologies prescribed in NZS 4454:2005 or other accredited test methods conducted in appropriately accredited laboratories. Sampling procedures must comply with the protocols outlined in Section 9.6.4 Sampling Procedures, in the *Water New Zealand Guidelines for the Beneficial Use of Biosolids on Land (2025)*[7].

[4] IEA Task 37 Digestate as a Biofertiliser https://www.ieabioenergy.com/wp-content/uploads/2010/06/Digestate_Brochure_Revised_12-2010.pdf

[5] Regulation 1069/2009, Option to allow Category 2 and Category 3 materials to be applied to land without processing: Article 13 (f) and Article 14 (l).

[6] www.biogas.org.nz/resource/tn-dbpas12-categories-of-digestate-biofertiliser

[7] https://www.waternz.org.nz/Article?Action=View&Article_id=1212

Table 4: Digestate Nutrient Characteristics (minimum nutrient limits for Biofertiliser)

Parameter	Standard	Authorised Analysis Methodology
Nitrogen Phosphorus Potassium Magnesium Calcium Sulphur	Aggregate of all parameters > or equal to 3.0% dry weight	N, P, K, Mg and Ca APHA Nitric Acid Digestion

[Source: BANZ]

Note: Calculated using the 6-month rolling average of sampling data. Tolerance limits for these nutrient concentrations is +/-20% on a dry weight basis once production facility reaches steady state (digestion and input feedstocks)

Table 5: Digestate Chemical Characteristics (heavy metal limits for Biofertiliser)

Parameter	Concentration Limit mg/kg dry weight	Authorised Analysis Methodology
Arsenic	30	NZS ISO 17025 (or IANZ) accredited laboratory using accredited test methodologies
Cadmium	6.5	
Chromium	1500	
Copper	750	
Lead	300	
Mercury	7.5	
Nickel	135	
Zinc	1250	

[Source: Guideline for Beneficial Use of Biosolids on Land 2025 and NZS 4454:2005 Composts, Soil Conditioners and Mulches]

Table 6: Digestate Biological Characteristics (pathogen limits for Biofertiliser)

Parameter	Standard	Authorised Analysis Methodology
E coli	Less than 100 MPN/g	Part 9221 F (modified) Standard Methods for the Examination of Water and Wastewater (APHA, 23rd ed. 2017)
Campylobacter	Less than 1/25g	Enumeration of Thermotolerant Campylobacter in Biosolids (A. Donnison, AgResearch Limited) Appendix 1 Biosolids Guidelines
Salmonella	Less than 2 MPN/g	Salmonella sp bacteria: Part 9260 D, Standard Methods for Examination of Water and Wastewater, (APHA, 1988), or Detection and enumeration of salmonella and Pseudomonas aeruginosa (Kenner and Clark, 1974)

[Source: PAS 110:2014 Specification for whole digestate, separated liquor and separated fibre derived from the anaerobic digestion of source-segregated biodegradable materials]

Table 7: Digestate Physical Characteristics (allowable physical contaminant limits for Biofertiliser)

Total N of Biofertiliser	Kg /t	<1	1-1.9	2-2.9	3-3.9	4-4.9	5-5.9	6-6.9	7-7.9	8-8.9	9 or more
Total Contaminants >2mm	**Kg /t**	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03
Total Stones >5mm	**Kg /t**	3.2	6.4	9.6	12.8	16	19.2	22.4	25.6	28.8	32
Authorised Analysis Methodology NRM method JAS-497/001 declared on a fresh weight basis or Accredited methodology at accredited laboratory (NZS ISO/IEC 17025 and/or recognised by IANZ)											

[Source: PAS 110:2014 Specification for whole digestate, separated liquor and separated fibre derived from the anaerobic digestion of source-segregated biodegradable materials]

Table 8: Digestate Stability Characteristics (allowable stability limits for Biofertiliser)

Parameter	Standard	Authorised Analysis Methodology
Stability of whole digestate, separated liquor or separated fibre		
Volatile Fatty Acids	0.774g COD / g VS	Gas Chromatography

[Source: BANZ]

Note: Alternative methods (excluding the alkalinity method) for determining stability as set out in Table 7 may be used, where those alternatives demonstrate an equivalent limit to that set in the table.

6.0 Facility Risk Management Programme

To ensure the reliability and consistency of digestate production, producers must implement a comprehensive Risk Management Programme. Figure 1 below illustrates how the facility's plans and systems integrate to form this programme.

Figure 1: Risk Management Plan requirements

In the table below it shows the components that make the Risk Management Programme.

Table 9: Components of your Risk Management Programme

Quality Management System	HACCP Plan	Facility Management Plan
1. Management engagement and leadership 2. Adequate resourcing, staff training, and contingency planning 3. Clear roles and responsibilities 4. Quality commitment 5. Effective communication 6. Regular reviews 7. Reporting 8. Document control	1. **Hazard analysis** 2. **Critical control points** (CCPs) 3. **Critical limits** 4. **Monitor**ing systems to control the CCPs 5. Corrective actions when monitoring systems indicate a CCP is not under control 6. Verification procedures 7. Documenting procedures and records	1. Facility details 2. Process safety management, feedstock separation and storage 3. Process equipment 4. Process monitoring 5. Sampling of digestate 6. Actions in the event of test failure 7. Distribution & Storage

7.0 The Quality Management System (QMS)

To demonstrate compliance, all producers must establish and maintain a Quality Management System (QMS). The QMS must include the following components:

1. Management engagement and leadership
2. Adequate resourcing, staff training
3. Clear roles and responsibilities including contractor training and control
4. Quality commitment
5. Effective communication
6. Regular reviews
7. Reporting
8. Document control

The requirements of each section are explained in detail below.

7.1 Management Engagement and Leadership

Senior management must appoint a member of the organisation's management team who, regardless of other duties, is responsible for:

a. Ensuring that QMS processes are established, implemented and maintained
b. Reporting to senior management on QMS performance and any need for improvement
c. Promoting awareness of customer requirements throughout the organisation

7.2 Adequate Resourcing:

Senior management must ensure that sufficient resources are provided for the establishment, implementation, maintenance and continual improvement of the QMS.

7.3 Clear Roles and Responsibilities

Senior management must:

a. Define and communicate roles and responsibilities, at a minimum using an organisational chart (organogram).
b. Determine required competencies for personnel affecting digestate quality.
c. Ensure such personnel are trained, instructed and supervised to maintain competency.
d. Provide training in QMS and HACCP principles to those responsible for managing the QMS
e. Ensure that trainers for QMS and HACCP are appropriately qualified and experienced
f. Ensure that contractors receive adequate training on site safety, equipment operation and are subject to access control procedures.

7.4 Quality Commitment

The producer must:

a. Establish a quality policy for digestate produced under the QMS
b. Ensure the quality policy includes:
    - Identification of the digestion equipment's location, process type(s) and digestate output type(s)
    - Commitment to meeting the minimum quality standards specified in TG8 for each output
    - Commitment to meeting customer requirements related to fitness for purpose and any additional quality specifications.

7.5 Effective Communication

Senior management must:

a. Communicate the requirement that all digestate produced under the QMS must be fit for purpose.
b. Establish internal communication processes to discuss QMS effectiveness
c. Ensure the quality policy and relevant QMS sections are communicated to personnel involved in digestate production
d. Ensure personnel understand the importance and relevance of their activities in meeting quality objectives.

7.6 Regular Reviews

The producer must:

a. Conduct and document internal audits at planned intervals (at least annually) to assess QMS conformity and effectiveness.
b. Establish procedures defining responsibilities, audit planning, recordkeeping and reporting.
c. Review the QMS, Hazard Analysis Critical Control Point (HACCP) Plan and Facility Management Plan (FMP) for continued effectiveness.

d. Promptly implement corrective actions for any detected nonconformities and their root causes.
e. Include verification and documentation of follow-up actions.

In the event of significant or non-temporary changes in input materials, production management, or digestate quality must:

a. Revalidate the production process
b. Assess and record the significance of the change and provide justification for classification.
c. Sample and test affected digestate output(s) to evaluate the impact.

Audit Programme requirements. The audit programme must:

a. Be planned and systematic
b. Consider process importance and previous audit results
c. Define audit criteria, scope, frequency and methods
d. Ensure objectivity and impartiality in auditor selection and audit conduct
e. Prevent auditors from auditing their own work

The audit must cover:

a. QMS procedures and processes
b. Digestate production operations
c. Relevant operating procedures
d. Digestate quality
e. Resource allocation, training, communication, customer-related processes, data handling and QMS improvements

Producers must complete regular reviews that include:

a. Internal and external audit findings
b. Anaerobic Digestion (AD) process performance
c. Digestate quality and conformance to the quality policy (including fitness for purpose)
d. Preventative and corrective actions
e. Follow-on on prior management review actions
f. Continued suitability of QMS, HACCP, CCPs, CLs, FMP and operating procedures
g. Complaints or concerns from stakeholders (including personnel, customers, clients and regulatory authorities) and their outcomes
h. Management decisions on:
    - QMS improvements
    - Digestate quality improvement
    - Resource requirements

Note: Significant change is subject to interpretation and may include changes in feedstocks, processes, or quality requirements that impact digestate quality.

7.7 Reporting

Records must be kept for each person, including those with QMS oversight, covering:

a) Training topics
b) Training date or duration
c) Trainee's name and role
d) Trainer's name and organisation (including the producer, if application); and
e) Certificates or qualifications obtained

The producer must record:

a) All accidents and incidents at the facility, the cause and the corrective actions taken.
b) All complaints or concerns regarding digestate quality or usability, including separated fibre or liquor fractions
c) Contact details of the person who raised the complaint
d) Specific nature of the complaint or concern
e) Date, time and recipient of the complaint
f) Details of responses, checks and responsible personnel
g) Dates and nature of communications back to the complainant
h) Name of the person who provided the response

7.8 Documents and Document Control

Producers must:

a) Develop documentation appropriate to the QMS scope
b) Implement document control procedures
c) Incorporate existing records into the QMS if they meet certification standards
d) Identify and control externally sourced documents
e) Promptly remove obsolete documents and replace them with approved versions
f) Clearly mark any retained obsolete documents as such
g) Maintain records demonstrating effective control of input materials and digestate production
h) Ensure records are identifiable, legible, authentic, organised, retrievable and preserved for at least two years.

Each internal document must:

a) Be the current version approved as adequate by the person with responsibility for document control.
b) Be legible and available at its relevant place(s) for use
c) Include a title, version number, date of issues and the name of the person who issued it

Note: Records generated by a weighbridge systems with non-edible software are exempt from the above document control requirements, provided each record is assigned a unique identifier.

8.0 Hazard Analysis and Critical Control Point Plan

To demonstrate compliance, producers must establish and maintain a Hazard Analysis Critical Control Point (HACCP) Plan specific to their facility's digestion process, feedstocks, and resulting outputs, including

whole digestate, separated liquors and fibre fractions. The HACCP Plan must include the following components:

1. Hazard analysis
2. Identification of critical control points (CCPs)
3. Determination of critical limits (CLs)
4. Monitoring systems for each CCP
5. Corrective actions for loss of control at any CCP
6. Verification procedures
7. Documentation procedures and records

Each requirement is detailed below.

8.1 Hazard Analysis

Producers must:

a) Identify all steps in the production process and conduct a hazard analysis to determine where significant hazards are likely to occur – specifically those that can be prevented, eliminated or controlled by the Hazard Analysis Critical Control Point (HACCP) Plan.

b) Include assessment of human, animal and plant (vegetation) health hazards associated with the intended use of each digestate output type for which certification is held or sort

c) Justify the inclusion or exclusion of each identified hazard and the control measures considered.

The hazards assessed must include, at minimum:

a) Pathogens and toxins harmful to human and animal health

b) Odours offensive to nearby residents or workers in close proximity to the biofertiliser

c) Inert materials (e.g., stones, plastics and any man-made particiles) that could damage equipment for handling, mixing or applying digestate or blended materials

d) **Sharps** that pose risk to human or animal health

8.2 Critical Control Points

For each of the hazards identified above, producers must:

a. Identify one CCP in the digestate production process

b. Establish the CCLs of the control measure(s) at the CCP

c. Ensure the same requirement are applied to each further hazard specified above and any other hazards identified by the producer

d. Ensure all whole digestate undergoes the CCP(s) for each hazard applicable to whole digestate

Please note:

i) A critical control point (CCP) is a point, step or procedure at which control can be applied and a safety hazard can be prevented, eliminated or reduced to ‘’acceptable’’ levels.

ii) Acceptable level is equivalent to the minimum digestate quality required in this document.

iii) The number of CCP's needed depends on the processing steps and the control needed to assure product safety.

iv) All steps of the digestate production process from input material receipt to digestate dispatch should be considered when identifying the CCP for a specific hazard.

v) This does not mean that every step in the production process is a CCP.

vi) More than one control measure might be required to control a specific hazard.

vii) The requirements relating to complaints and their review are specified with the QMS section of this document.

viii) At each CCP, operating conditions must be monitored and maintained within the CCP's CLs.

ix) Establish procedures for verification that the HACCP plan and its implemented CCPs and CLs are under control and that the HACCP system is working effectively.

x) Ensure the HACCP plan and related procedures are documented and reviewed as part of the QMS review as instructed earlier.

8.3 Critical Limits

Producers must:

Establish the Critical Limits for each CCP within the process

Please note:

A critical limit (CL) is the maximum and/or minimum value to which a biological, chemical, or physical parameter must be controlled at a CCP to prevent, eliminate, or reduce to an acceptable level the occurrence of a product or safety hazard.

8.4 Monitoring systems to control the CCPs

Producers must:

a. Establish monitoring procedures for the measurement of the critical limit at each critical control point.
b. Ensure monitoring procedures describe how the measurement will be taken, when the measurement is taken, who is responsible for the measurement and how frequently the measurement is taken during operation.

8.5 Corrective actions when monitoring systems indicate a CCP is not under control

Producers must:

a. Establish a **Corrective Actions** process
b. Ensure that procedures are followed when a **deviation** in a critical limit occurs to prevent potentially non-compliant digestate from being produced
c. Ensure that the steps needed to correct the process are taken

Please note:

This usually includes identification of the problems and the steps taken to assure that the problem will not occur again.

8.6 Verification procedures

Producers must:

a. Maintain monitoring procedures for each CCP to ensure that the facility is operating as designed and that end product is compliant with product limits
b. Establish verification procedures to ensure that the monitored results are accurate
c. Ensure the timing of verification testing is set out in the HACCP plan

d. Ensure that the verification procedures cover activities, other than monitoring that determine the validity of the HACCP plan and that the system is operating according to the plan

Please note:

Verification activities can include auditing of CCP's, record review, instrument calibration and product testing as part of the verification activities.

8.7 Documenting procedures and records

Producers must:

a. Establish record-keeping procedures in order to secure information that can be used to prove that the digestate was produced safely.
b. Ensure the records include information about the HACCP plan, product description, **flow diagrams**, the hazard analysis, the CCP's identified, Critical Limits, monitoring system, corrective actions, record keeping procedures, and verification procedures

9.0 Facility Management Plan

To demonstrate compliance producers must establish and maintain a Facility Management Plan (FMP) that is specific to their facility/ digestion process and the resultant whole digestate and any separated liquors and fibre. A FMP must consist of the following sections:

1. Facility details
2. Input controls
3. Process management, separation and storage
4. Process equipment
5. Process monitoring
6. Sampling of digestate
7. Actions in the event of test failure
8. Storage: Storage and use of whole digestate, separated liquor and separated fibre

The requirements of each section are explained in detail below.

9.1 Facility Details

Producers must:

a. Ensure the following information is recorded within their FMP:
    i) Producer name
    ii) Facility address
    iii) Name of business (if different to Producer)
    iv) Business description

9.2 Input Controls

Producers must:

a. Ensure all biodegradable organic material **feedstocks** are source separated or sourced from a single origin
b. Ensure a written **Supply Agreement** for feedstock materials is agreed between the Biofertiliser producer and the feedstock supplier
c. Work with the supply chain to eliminate or minimise plastic entering the feedstock (public education, visual inspections, de-packing technology)

d. Ensure feedstock does not contain any non-biodegradable materials or residues of any toxic substances, e.g. veneer, paint, laminate and wood preservatives
e. Ensure each feedstock load is visually inspected for quality prior to storage or processing
f. Ensure for every load of feedstock delivered to the AD facility, they record:
    i) Weight of each load
    ii) Type of material
    iii) Supplier
    iv) Date delivered
    v) Acceptance/ rejection
    vi) Delivery location on site/where it was sent if rejected
g. Ensure rejected materials are stored away from the processing AD facility and removed as soon as practicable
h. Ensure the volume/ weight of the rejected material is recorded

Producers must ensure Feedstock Supply Agreements include:

a. Type and source location of all material delivered
b. Product descriptions (odour and colour)
c. Product contaminants (physical, chemical and biological)
d. Amount (volume and weight)
e. Collection, pretreatment and handling practices
f. Handling and storage instructions
g. Date delivered
h. Any additional arrangements associated with actions taken to remove or reduce physical contamination or other unsuitable content prior to digestion
i. Criteria for delivery acceptance (inspections)
j. Criteria that trigger feedstock material rejection and procedure to be followed
k. Declaration that each feedstock material is fit for purpose and is free from any contaminants specified by the AD operator
l. Condition that supplier must notify the Biofertiliser producer of any significant change in the quality of feedstock material

Please note:

A written feedstock supply agreement is not required where a farm or co-operative produces biofertiliser from material sourced within its own premises.

Where physically and economically viable, feedstock can be pumped to the AD facility using individual pipework.

9.3 Process management, separation and storage

Producers must ensure each **batch or portion of production of digestate**, separated liquor or fibre is:

a. assigned a unique product identifier code for quality management purposes
b. the quantity produced in each batch or portion of production is recorded
c. treatment process and analysis results are recorded for each batch or portion of production

Producers must ensure they have procedures that cover:

a. Tracing and recall of out of spec product
b. Conducting a simulation recall event
c. When and how to recall product
d. Notification of BANZ if Producer Accredited and customers

Producers must ensure that:

a. The site has an **Incident Management Plan** in place to manage pollution incidents and emergencies
b. The Incident Management Plan is tested annually
c. Staff are fully conversant in the IMP
d. Odours are controlled and do not cause a nuisance to adjacent properties
e. Pests are controlled and do not cause a nuisance to adjacent properties
f. Any other nuisances are controlled and do not cause a nuisance to adjacent properties
g. Complaints are registered and appropriate actions are taken to address these

Producers must ensure:

a. Digestate handling and storage facilities are ''clean areas'' where no contact with the raw feedstock material or equipment can occur
b. Anything used in the storage and handling of digestate that has the potential to been in contact with raw feedstock material is disinfected prior to use (clothing, equipment)
c. Cross contamination between customers is prevented by using dedicated trucks and days/times of services
d. Trucks are washed down prior to use if it has been used for the transportation of other materials such as feedstocks
e. In the event of biosecurity concerns, truck wash down must also include sanitation

Producers must ensure all digestates produced by an AD process includes:

a. A pasteurisation step capable of heating all material to at least 70^{o}C for one hour; or
b. An equivalent alternative treatment validated for its efficacy at reducing a suitable plant pathogen indicator species
c. The process used is documented within the FMP
d. Staff are fully conversant in the pasteurisation process

Please note:
Some types of feedstocks are exempt from pasteurisation (detailed in Table 3).

9.4 Process equipment

Producers must:

a. List all process equipment
b. Provide a statement of annual feedstock material throughput quantity (estimate)
c. Provide a statement of annual digestate output quantity (estimate)
d. Prepare a process flow diagram illustrating the digestate production system (annotated)
e. Ensure each treatment and storage vessel/area are clearly labelled as described in the site's documents and flow diagram
f. Ensure material flows one way through the system
g. Ensure the site and digestate production system is designed and managed to prevent contamination between materials

9.5 Process monitoring

Producers must:

a. Control and monitor all processes within the facility within the acceptable operating levels specified for the critical performance parameters

b. Provide pasteurisation of feedstock or digestate product unless exempt
c. Provide and maintain equipment in good working order for the processes required
d. Specify how often equipment is checked, what checks will be carried out and contingency arrangements in the event of equipment failure
e. Avoid cross contamination of the final digestate product with untreated, partially treated, unwanted or rejected material
f. Justify and record and changes in the feedstock material, production process or required digestate quality
g. Understand any significant change in production that results in products not meeting the specification will trigger re-certification

9.5 Sampling of digestate

General requirements

Producers must ensure:

a. Sampling occurs after digestate has completed the full AD treatment cycle
b. Sampling occurs when the product is ready for use (after full separation, treatment or maturation if sampling separated liquors or fibre)
c. Samples are taken from storage tank before any new batch of digestate enters the storage vessel (if stored before dispatch from site)
d. Each sample is representative of the **batch** or **portion of production**
e. Samples are homogenous (storage tanks must be adequately mixed to ensure representative samples can be obtained)
f. Sampling and analysis follow the methods detailed in Tables 4-8
g. Stability testing occurs at the end of the anaerobic digestion process, prior to dispatch
h. For each batch or portion of production which is not sampled for testing, the quality management process is followed (QMS, HACCP, FMP)

Please note facilities that receive domestic and commercial garden residues feedstocks must test biofertilisers for the presence of the herbicides Clopyralid and aminopyralid at the frequencies specified in Tables 10 and 11 found on the following pages. A detection of Clopyralid and/or aminopyralid within the biofertiliser must be addressed according to section 7 of this Digestate *Guidelines* 'Actions in the event of Test Failure'. In the event that a retest or reprocessing still has clopyralid, this should be noted by the Producer, and they must have documented processes to ensure that the biofertiliser affected is not sold for application to sensitive crops

Sampling requirements

Producers must record for each sample taken:

a. Sampling date and time
b. Sample type (whole digestate, separated liquor, fibre)
c. Product identifier e.g. Batch code
d. Prior mixing time
e. Digestion facility name
f. Name of person who carried out the sampling

Sampling regime

Producers must ensure that initial product monitoring is completed:

a. Before applying for accreditation
b. When a new process is commissioned
c. When a change from non-animal product feedstocks to animal product feedstocks occurs
d. When changes are made to an existing process
e. When any of the routine samples do not meet the requirements set out in Tables 4-8

Table 10 below details the number of samples required to be taken during the initial product monitoring phase.

Table 10: Initial product monitoring frequency

Parameter	Facilities accepting feedstocks **with** animal product	Facilities accepting feedstocks **without** animal products
Nutrients	The 3 most **recent samples** meet the quality requirements in Tables 4 & 5	The 3 most recent samples meet the quality requirements in Tables 4 - 8
Chemicals Heavy Metals Clopyralid Aminopyralid		
Biological (Pathogens)	The 5 most recent samples are below the limits in Table 6	
Physical (Contaminants)	The 3 most recent samples meet the requirements in Tables 7 & 8	
Stability		

Please note:

1. Biofertiliser made from feedstock materials arising within a single or co-operative's premises used entirely within the same premises, biological (pathogen) tests are only required if any feedstock material contains or is at risk of containing human and/or animal pathogens.
2. For digestates made only from unprocessed crops, processed crops, crop residues and/or glycerol that arises within the producer's/co-operative's premises or holding no physical (contaminant) testing will be required. The digestate shall be used entirely within the same premises or holding.

After the initial verification testing has been completed, digestate must continue to meet the biofertiliser product quality limits. The routine test frequencies for each parameter are shown in Table 11 below. The digestate quality requirements remain the same as previously detailed (Tables 4-8).

Table 11: Routine product monitoring requirements

Parameter	Facilities accepting feedstocks **with** animal product	Facilities accepting feedstocks **without** animal products
Nutrients	1 sample per 5,000m^3 digestate produced or 1 sample per 3 months whichever is sooner	
Chemicals Heavy Metals Clopyralid Aminopyralid	1 sample per 5,000m^3 or 1 sample per 3 months whichever is sooner	

Biological (Pathogens)	5 samples per 12 months Samples must not be within 2 months of one another	1 sample per 5,000m^3 or 1 sample per 3 months whichever is soonest
Physical (Contaminants)	1 sample per 5,000m^3 or 1 sample per 3 months whichever is soonest	
Stability	2 samples per 12 months Samples must not be within 3 months of each other	

9.6 Actions in the event of test failure

Producers must ensure that corrective actions cover:

a. Restoring control and preventing recurrence of a loss of control
b. Identifying, managing and disposing of affected product
c. Managing unforeseen loss of control
d. Person(s) to manage incident(s)

If any batch or portion of production fails to meet any of the quality limits, the producer must ensure:

a. The batch is disposed of as non-complying digestate and not sold as a biofertiliser; or
b. The batch is re-processed
c. The reprocessed product is re-tested for the failed parameter/s
d. If they choose to re-process or take other corrective actions to a non-conforming liquid product (whole digestate, separated liquor) after implementing corrective actions, an additional digestate batch or portion of production can be mixed with the re-processed/ corrected batch provided the additional product has been tested and meets the complying criteria.
e. The new mixed batch is re-tested for compliance after thorough mixing
f. A re-processed/corrected batch or portion of production of separated fibre is re-tested prior to introduction of a new batch or portion of production

9.7 Storage: Storage of whole digestate, separated liquor and separated fibre

For the safe storage of biofertilisers, producers must ensure the site has:

a. Storage capacity for digestate produced outside the growing season
b. Storage facilities that minimise odour
c. Storage facilities that are gas sealed and vented through emission-destructing equipment

Please note biofertiliser labelling requirements and end user information is in section 10.

9.8 Controls and Management for Exotic Diseases

The systems and processes referred to in the previous sections contain the risk management approach for stopping the spread of exotic diseases in New Zealand. Exotic diseases can pose a risk to the freshwater and marine environments, forestry, horticulture industry and animal health. The most relevant diseases for biofertiliser derived from food waste are Bovine spongiform encephalopathy (BSE) and foot-and-mouth disease (FMD).

BSE can be spread by feeding protein from infected ruminants to other ruminants (e.g. cattle, sheep and goats). The regulations define ruminant protein as "protein derived from the tissue (including blood) of a ruminant". This includes meat, meat meal, bone meal, and blood meal.

To control BSE, ruminant protein must never be fed to ruminant animals which include cattle, buffaloes, sheep, goats and deer. (See Section 10 Labelling and End User information.) Ruminant protein is defined in the Biosecurity (Ruminant Protein) Regulations 1999[8] as "protein derived from the tissue (including blood) of a ruminant. Ruminant protein includes meat, meat meal, bone meal and blood meal. The regulations outline the obligations on operators and suppliers to ensure the safety of products, for example, the requirement to have a Ruminant Protein Control Programme, to use only dedicated equipment in the processing of ruminant protein and include specific details on the labelling of products.

Foot and mouth disease (FMD) is caused by a virus that only infects animals such as cows, pigs, sheep, goats. The foot and mouth virus usually enters the country through contaminated animal products (such as ham, salami or waste containing meat products), which are then fed to susceptible animals such as pigs. In New Zealand, it's illegal to feed pigs untreated meat or waste that might have contacted raw meat.

New Zealand doesn't accept animal products from countries with foot and mouth disease and there are strict controls for imported animal products.

Any contamination in biofertiliser from other diseases are primarily controlled by New Zealand's Biosecurity legislation, as well as strict screening and surveillance of material coming into the country. Any animal or plant pathogen of concern that has been identified in this country is subject to Biosecurity NZ response plans, monitoring of affected properties and long-term management programmes.

As well as the Biosecurity response, if pathogens are present in the biofertiliser, it has been shown that pasteurisation at 70^0C for 1 hour is most effective in controlling a range of human and plant pathogens. In addition, good communication and information about safe responsible use of the product is essential for end users. This includes the mandatory requirement about not feeding ruminant protein to ruminant animals and a 21-day withholding period.

The risks associated with the use of source segregated Digestate Biofertiliser on agricultural land are very low and at an acceptable level. This is supported by quantitative assessments of residual risks carried out by international scientific experts. See Technical Note DBPAS 08 Safety of Digestate Biofertiliser for Land Application[9] for more information.

<u>Controls for biofertiliser processing and distribution</u>

a. Only organic materials as per Table 1 and Table 2 are accepted as input feedstock for processing at AD facilities. This includes the condition that abattoir materials must have the spinal cord and brain matter removed using SRM removal systems. All inputs that contain meat must have been originally fit for human consumption.
b. All feedstock material is pasteurised at 70C for 1 hour.
c. There is mandatory labelling of the finished biofertiliser, including an information sheet for end users, farmers, landowners that states that the biofertiliser contains or may contain ruminant protein and must not be fed to ruminant animals. A further safeguard requires a 21-day

[8] Biosecurity (Ruminant Protein) Regulations 1999 (SR 1999/410) (as at 01 July 2013) – New Zealand Legislation

[9] https://www.biogas.org.nz/resource/tn-dbpas-08-safety-of-digestate-biofertiliser

withholding or 'lay off' period between application of biofertiliser to pasture and the introduction of grazing animals to the pasture land. See following Section 10 for more detail.

10.0 Biofertiliser Labelling & End User Information

Biofertiliser is classed as an exempt agricultural compound under the ACVM Notice Fertilisers, Plant Biostimulants and Soil Conditioners[10]. This section sets out in detail the conditions that producers of biofertilisers must meet to ensure their product can be classed as a fertiliser. Producers are advised to read the ACVM Notice in full, however the main requirements are described below.

10.1 Product is fit for intended purpose

a. Producer must identify any microbial compounds and chemical contaminants that may be present and cause harm
b. Put measures in place to manage those microbial compounds and chemical compounds
c. When applied to land Elemental selenium must not exceed 10g/Ha
d. Must have processes in place to review and ensure the above measures are maintained

10.2 Product is manufactured in accordance with a documented system

a. Producers must ensure Biofertiliser meets the requirements of this *Digestate Guidelines* and has been produced under control of a HACCP environment, with Facility Management Plan and Quality Management System.
b. Any stated claim relating to a plant nutrient is in line with the tolerance outlined in Table 12 below. Digestate biofertiliser is a 'Minimally processed organic matter compound'.

Table 12: Tolerance Limits for Fertilisers (source ACVM)

Stated Concentration (%)	Relative Tolerance (% of stated plant nutrient concentration)	
	Minimally processed organic matter	All other products
25 and above	5	5
10 and above, below 25	10	7
1 and above, below 10	20	10
Below 1	30	30

10.3 For safe labelling of biofertiliser products, producers must ensure:

a. They identify and control risks associated with false and misleading labelling
b. Products are labelled correctly
c. Customers purchasing biofertilisers in bulk are given a **Product Information Document** that contains the same information that would appear on the label of a packaged product
d. Provide the Product Information Document at the time of collection/delivery
e. Ensure transport/storage vessels are adequately marked to minimise the effects of accidents during transportation and storage

[10] Fertilisers, Plant Biostimulants and Soil Conditioners (mpi.govt.nz)

f. Where appropriate labels should be printed and fixed to containers and remain legible and permanently attached under all climatic, transport and other conditions likely to be experienced
g. Complete a **Dispatch Record** for every biofertiliser sale
h. Store Dispatch Records in line with the Scheme requirements

10.4 Dispatch Records must include:

a. Customer name and contact details
b. Delivery address
c. Product identifier e.g. batch number
d. Date of production
e. Quantity dispatched by weight or volume
f. Date of dispatch

10.5 The Product Information Document/ label information must include

a. Trade name
b. Name and address of producer
c. Product description (statement of whether whole digestate, separated liquor or separated fibre)
d. Product Identifier Batch number
e. Order number or date of delivery
f. Directions for use
    i) application rate;
    ii) timing of application(s);
    iii) what it is to be applied to;
    iv) any precautions necessary to avoid damage to the target crop, or harm to livestock,
    v) a withholding period (if necessary).
    vi) expected variance in nutrient values due to variance in organic raw materials used
g. Use-by or expiry date
h. Nutrient Content (concentrations of N, P, K)
    i) Where a fertiliser's purpose is to provide N, P, K or S, the concentration must be stated directly below the product name. The values must be stated as a percentage (%), with no more than one decimal place. This must describe the elemental content for each element, as a percentage on a weight per weight (w/w) basis for solid products or weight per volume (w/v) basis for liquid products.
    ii) Other nutrients, including micronutrients, must be stated in the elemental form as a percentage on a weight per weight (w/w) basis for solid products or weight per volume (w/v) basis for liquid products.
    iii) Where a nutrient which is an active ingredient is present at a concentration of 0.05% or greater, the form in which the nutrient is present must be stated (e.g. K as potassium sulphate, Ca as calcium chloride).
    iv) Where a nutrient which is an active ingredient is present at a concentration of less than 0.05%, the term 'trace' can be used.
i. Particle size range, pH, loss on ignition (volatile solids)
j. Information on the product's origins (e.g. if it includes animal products such as ruminant protein)
k. Storage and handling information (toxicity, first aid, methods of handling spills)

a. When stored on farm, biofertiliser must be stored in such a way to prevent livestock from accessing it, before it is applied to land.

l. As supplied product analysis information

m. the 'Precautions for Use' Declaration detailed below for Biofertiliser from Group A Feedstock

10.5.1 Labelling Requirements from Ruminant Protein Legislation

Producers, retailers, and distributors must make sure feed and fertiliser that contains (or may contain) ruminant protein has this wording on the label:

"Notice: Do not feed to sheep, cattle, deer, goats, buffaloes, or other ruminant animals. This product contains or may contain ruminant protein."

Place the label permanently on the:

- front of a feed or fertiliser package (just below the top), or
- container (not on the top or bottom), or
- invoice, waybill, or document if you're selling bulk feed or fertiliser.

Labels must be obvious, easy to read, and must last the lifetime of the product.

The label must:

- have text at least 20mm high, or
- occupy at least 2.5% of the total area of the:
    - outside of a flattened package
    - container (excluding the top and bottom), or
    - printed side of an invoice, waybill, or document.

Group A Category Feedstock

This group is made from food waste which may contain ruminant protein. It is essential that labelling of the biofertiliser include a warning that this should not be fed to ruminant animals.

Precautions for Use Declaration

This biofertiliser product may contain a variety of living micro-organisms, some of which on rare occasions can cause illness in humans. Serious infection is rare but can happened for older people and those with reduced immunity. Please take the following precautions:

- *Avoid handling biofertiliser in enclosed areas*
- *Avoid inhaling the emissions to air from the biofertiliser*
- *Always wear gloves and wash hands after use*
- *See your doctor if you develop a high fever, chill, breathlessness or cough*

Notice:
Do not feed to sheep, cattle, deer, goats, buffaloes, or other ruminant animals.

This product contains or may contain ruminant protein.

Advisory Note:

Whilst not a mandatory requirement by the Ruminant Protein regulations in New Zealand, these *Guidelines* recommend AD producers include a stand down period that states withholding periods before animals can be grazed if the biofertiliser has been applied to pasture[11]. This is in alignment with global best practice.

An example of a stand down statement is below;

There must be 21 days between application to land and the grazing of the land by animals. This shall be extended to 60 days in the case of pigs.

Group B Category Feedstock

This category of feedstock does not contain any ruminant protein.

Precautions for Use Declaration

This biofertiliser product may contain a variety of living micro-organisms, some of which on rare occasions can cause illness in humans. Serious infection is rare but can happened for older people and those with reduced immunity. Please take the following precautions:

- *Avoid handling biofertiliser in enclosed areas*
- *Avoid inhaling the emissions to air from the biofertiliser*
- *Always wear gloves and wash hands after use*
- *See your doctor if you develop a high fever, chill, breathlessness or cough*

[11] UK Animal By Products Regulations

11.0 Terms and Definitions

The following terms and definitions apply to this Digestate Guidelines

Anaerobic digestion (AD)	Process of controlled decomposition of biodegradable materials under managed conditions where free oxygen is absent, at temperature suitable for naturally occurring **mesophilic** or **thermophilic** anaerobic and facultative bacteria species, that convert inputs into biogas and whole digestate
Batch/ production portion	Unit of whole digestate, separated liquor or separated fibre produced by a single AD production process, using uniform critical control points and critical limits or a number of such units, when stored together, and that can be identified for the purposes of retreatment or disposal, should monitoring checks or sample tests require such actions. Size of batch or portion of production is set by producer rather than the BCS due to variability between individual AD systems. Please refer to Table 9 of this publication for guidance on batch/production portion quantity requirements
Biodegradable	Capable of undergoing biologically mediated decomposition
Biodegradable Organic Materials	A source separated or single sourced material of food origin which includes all food production and processing residues as well as post-consumer former foodstuffs. It also covers agricultural and horticulture growing and processing residues and supplementary feedstock crops
Biofertiliser	Digestate derived from organic matter which is produced by anaerobic digestion facilities that are designed and operated with the Digestate Guidelines for the Production of Digestate Biofertiliser for Application to Land and Technical Guidance 8. Note in general terms Biofertiliser are a material of biological origin that contains sufficient levels of plant nutrients in forms that are either directly absorbed by plants or are sufficiently quickly decomposed to available forms, to cause an increase in plant growth and/or quality
Biosolid	Sewage or sewage sludge derived from a sewage treatment plant that has been treated and/or stabilised to the extent that it is able to be safely and beneficially applied to land. Biosolids is a Biowaste Product that contains waste material of human origin.
Biowaste	Waste of an animal or plant origin that can be decomposed by microorganisms, other larger soil borne organisms or enzymes. For the purposes of this Digestate Guidelines, biowaste much be source-segregated
Catering Waste	All waste food, including waste cooking oil, from restaurants, catering facilities and kitchens including central kitchens and household kitchens
Chemical oxygen demand	Indirect measure of the amount of organic compounds in a substance, in which a sample of the substance is incubated with a strong chemical oxidant under specific temperature conditions and for a particular period of time.
Control	noun**:** State wherein correct procedures are being followed and criteria are being met verb: Take all necessary actions to ensure and maintain compliance with criteria established in the HACCP Plan
Control measure	Action or activity that can be used to prevent or eliminate a digestate safety hazard or reduce it to an acceptable level
Co-operative	Natural or legal persons who forma a group under a written agreement who exercises only agricultural, horticultural or forestry activities who as a group carry out one AD process at one location within the co-operative's holdings.

Corrective action		Action to be taken when the results of monitoring at the critical control point indicate a loss of control
Critical control point		Last step at which control can be applied and is essential to prevent or eliminate a hazard or reduce it to an acceptable level of risk
Critical limit		Criterion which separates acceptability from unacceptability
Deviation		Failure to meet a critical limit
Digestate		Whole digestate resulting from an AD process and any subsequently separated fibre or liquid fractions. NOTE Includes any separated fibre that undergoes a subsequent aerobic **maturation** step, without addition of further materials
Digester		Closed vessel system in which biodegradable materials decompose under anaerobic conditions
Dirty water		Dilute washings from dairy and milking parlours and run-off from yard areas lightly contaminated by slurry, manure or used animal bedding
Feedstock		Import materials/ waste that enter the anaerobic digestion process
Fertiliser		A substance or biological compound or plant material, or a mix of substances or biological compounds or plant material, that is described as, or held out to be suitable for, sustaining or increasing growth, productivity, or quality of plants through the delivery to plants or soil of plant nutrients; and includes any –
	i)	Non-nutrient attributes of the material used in fertiliser; and
	ii)	Animal nutrients used in fertiliser
	iii)	Does not include a substance of biological compound or plant material, or a mix of substance or biological compounds or plant material that is intended for use as a plant growth regulator that modifies the physiological functions of plants.
Fit for Purpose		Material that does not have properties or characteristics that prevent it from being suitable for its intended use. A compound that is Fit for Purpose means it must not - spread harmful organisms; - reduce the efficacy of medications on humans and animals; - result in residues that exceed limits; - be toxic to animals; transmit disease to animals; - transmit pests or unwanted organisms and; - otherwise create of likely create risks.
Flow Diagram		Systematic representation of the sequence of steps or operations used in the process for the production of whole digestate and any subsequently separated liquor or separated fibre.
Forestry		Art and science of controlling the establishment, growth, composition, health and quality of forests used for cultivating trees, timber and woody biomass crops.
Growing medium		Material, other than soil in situ, in which plants are grown.
Harm		Physical injury to, or damage to, the health of people, or damage to property, or to the environment. NOTE In the context of this Digestate Guidelines, ''harm'' also includes injury or damage to the health of animals and plants. Harm can be caused by one or more unwanted biological, chemical or physical agents in, or by misuse of, whole digestate, separated liquor or separated fibre
Hazard		Potential source of harm

Hazard analysis	Process of collecting and evaluating information on hazards and conditions leading to their presence, to decide which are significant in relation to the production of digestates that can be used without harm. NOTE This should be addressed in the HACCP Plan.
Hazard analysis & critical control point	System used for the identification, evaluation and control of hazards that are significant in relation to the production of digestate in relation es that can be used without harm.
HACCP Plan	Document prepared in accordance with HACCP principles, to ensure control of hazards that are significant in relation to the production, storage, supply and use of digestate that can be used without harm.
Holding	All the land units managed by a farmer/ land manager in New Zealand
Hydraulic retention time	Average time that material stays in the digester vessel, determined by the loading rate and operational digester capacity. NOTE Hydraulic retention time can be calculated by dividing the digester working volume by the rate of flow of input materials into the digester, i.e. HRT (days) = digester volume (m^3) / influent flow rate (m^3 per day).
Input material	Biodegradable material intended for feeding, or fed, into an AD process. In the context of this Technical Digestate Guidelines, Input material is source-segregated organic material, fit for anaerobic digestion.
Manure	Slurries and solid manures, including farmyard manures and dirty water
Maceration	To make biodegradable input materials into a more consistent and readily flowing and pumpable mixture by means of shredding, chopping, crushing or mincing the input materials and/or soaking them in a liquid.
Maturation	Optional period of treatment or storage of separated fibre under predominantly aerobic conditions
Mesophilic	Organisms for which optimum growth temperatures are within the temperature range 30^{o}C to 43 ^{o}C
Method of test	Procedure for testing a sample of digestate. NOTE Where available for any one or more parameters, this Digestate Guidelines specified recognised international standards
Monitor	Act of conducting a planned sequence of observations or measurements of control **parameters to access whether a CCP is under control**
Most Recent Samples	Samples taken a minimum of 1 week apart but not more than 2 weeks apart
Operating procedures	Carried out and documented procedures for producing digestates
Organic loading rate (OLR)	Weight of organic matter fed to a unit volume of the digester per unit time NOTE OLR = kg COD m-3 day-1 or kg VS m-3 day-1 , where COD is chemical oxygen demand and VS is volatile solids. A similar way to describe OLR is weight of organic dry matter added per day (kg VS d-1) divided by digester volume (m3)
Pasteurisation	Process step during which the numbers of pathogenic bacteria, viruses and other harmful organisms in material undergoing AD are significantly reduced or eliminated by heating the material to a critical temperature for a minimum specified period of time. NOTE 1 Pasteurisation could occur either as part of the AD process or as a separate step. Pasteurisation does not aim to achieve sterilisation, which destroys all life forms. NOTE 2 Pasteurised material might contain beneficial and other, non-harmful, microorganisms.
Personal Protective Equipment (PPE)	Any garments of clothing or equipment that is used to guard you and your employees against hazards in the workplace. For details of required PPE refer to the adequate H&S legislative documentation

Producer	Business enterprise, organisation, community initiative or person(s) responsible for the production of digestates
Product Information Sheet	Documentation that contains producer details, product details and storage and handling requirements that must be provided to biofertiliser hauliers and customers
Putrescible	Material that has the capacity to become putrid. NOTE In this context, those fractions of organic waste or biodegradable material with relatively high proportions of readily biodegradable carbon-based molecules and moisture.
Ruminant	Includes cattle, buffaloes, sheep, goats and deer. (Derived from Biosecurity (Ruminant Protein) Regulations 1999)
Ruminant Protein	Protein derived from tissue (including blood) of a ruminant. Ruminant protein includes meat, meat meal, bone meal and blood meal. (Derived from Biosecurity (Ruminant Protein) Regulations 1999)
Quality Control	Part of quality management focused on fulfilling quality requirements
Quality Management System (QMS)	Management system to direct and control an organisation with regard to quality. [SOURCE: ISO 9000:2005] NOTE In the context of AD, it is a system for planning, achieving and demonstrating effective control of all operations and associated quality management activities necessary to achieve digestates that are fit for purpose. Where specific controls are applied, they should be monitored and recorded, and their efficacy evaluated both during and after process validation. Corrective actions should be defined.
Quality Protocol (QP)	Set of criteria for the production, placement on the market, storage and use of products derived from suitable types and sources of waste, such that any risks to the environment and to human and animal health are acceptably low when any such product might under certain circumstance, be used without waste regulatory controls, in those countries in which the protocol applies. NOTE A Quality Protocol also sets out how compliance with its criteria should be demonstrated. Products should be used in accordance with good practice, and appropriate guidance is referred to where available and suitable for use of those products in end markets allowed by that specific QP.
Risk	Combination of the probability of occurrence of hard and the severity of that harm [derived from ISO/IEC Digestate Guidelines 51] NOTE It can mean the potential realization of unwanted, adverse consequences to human life and health, property or the environment associated with a hazard.
Senior Management	Individuals or team or individuals, at the highest level of organisational management, who have the day-to-day responsibilities of managing an organisation, and who holds specific executive powers conferred onto him/her/them with, and by authority of, the organisation's board of directors and/or its shareholders
Separated Fibre (SF)	Fraction of material derived by separating the coarse fibres from whole digestate. NOTE At least 15% of its mass should be dry matter in order that the sample is suitable for laboratory tests as a "solid" material. It should contain sufficient dry matter to be capable of being stacked in a heap if it undergoes an aerobic maturation step; a mass fraction of 23% dry matter is a Digestate Guidelines figure.
Separated Liquor (SL)	Liquid fraction of material remaining after separating coarse fibres from whole digestate. NOTE It is normally the fraction remaining following the use of a separator or centrifuge to remove coarse fibres. Less than 15% of its mass should be dry matter in order that the sample is suitable for laboratory tests as a "liquid" material. It should contain sufficient moisture to be pumpable; a suitable mass fraction percentage of dry matter content should be determined in practice and the dry matter result declared for any tested portion of production. If the user desires that no significant solids residue remains on

	crop leaves after applying separated liquor, it should contain no more than a mass fraction of 4% dry matter.
Sharps	Man-made contaminants that are greater than 2mm in any dimension that might cause physical injury to a person who handles digestate without protective gloves or to a person or animal who comes into contact with these materials
Site Management Plan	Documentation that demonstrates how risks associated with the processing, handling and production of digestate biofertiliser at a facility are controlled to ensure the production of compliant biofertiliser
Specified digestate or biofertiliser	A digestate or biofertiliser where the physical and fertiliser characteristics are known and identified. NOTE Organic components such as twigs and woody fragments can puncture skin but this risk is considered acceptably low and so has been omitted from this "sharps" definition. Omitted also are rock-derived "mineral" particles and aggregated particles of all sizes, including, for example, gravel and stones
Soil improver/ conditioner	Material added to soil in situ primarily to maintain or improve its physical properties, and which many improve its chemical and/or biological properties or activities
Source segregated	Materials or wastes that are stored, collected and not subsequently combined with any non-biodegradable wastes, or any potentially polluting or toxic materials or products, during treatment or storage (whether storage is before or after treatment). NOTE Source-segregated materials can include collection of a mixture of biowaste/biodegradable material types, from more than one source. Such materials do not include sewage sludges and their derivatives. It is acknowledged that low levels of physical contamination might occur, which might trigger rejection of an input material load or physical contaminant removal prior to loading the biowaste/biodegradable material into the working digester.
Stability	Quality of being stable
Stable	Point at which the rate of biological activity has slowed to an acceptably low and consistent level and will not significantly increase under favourable, altered conditions. NOTE Stable digestate should not be attractive to vermin or wild animals and should not be so odorous that its storage or use causes nuisance to humans. In a stable but immature state, it might still contain insufficiently biodegraded natural or man-made substances that exert phytotoxic effects in some applications; this should be taken into account in Digestate Guidelines for digestate use.
Stabilisation	Biological and chemical processes that, together with conditions in the material being treated, aim to achieve stable, treated material. NOTE after stabilization, biodegradation will continue to occur, albeit at a slower rate.
Step	Point, procedure, operation or in the digestate chain including raw materials, from primary production to final use of digestates and the consumption of food or fodder grown on land that has received such material
Supply agreements	Agreement between an AD facility operator and a supplier of digestible input materials that specifies suitable material types, quality, options and actions to be taken in the event of contamination, and other criteria that facilitate input material control
Thermophilic	Organism for which optimum growth temperatures are within the temperature range 45^{o}C to 80^{o}C
Total Solids (TS)	Those solids in a sample of material that remain after the drying of the sample at 105^{o}C, to the point such that they lose no more moisture. NOTE also referred to as 'dry solids', or 'dry matter (DM)'

User	Individual or organisation that obtains digestates from a producer or third party with the intention of using them
Validation, validate	Obtaining and evaluating evidence that the elements of the HACCP plan are effective. NOTE 1 In the context of this Scheme, this includes obtaining and evaluating evidence that the QMS is effective for producing digestates of the quality to which the producer has committed in the quality policy.
Verification, verify	Application of methods procedures, tests and other evaluations, in addition to monitoring, to determine compliance with the HACCP plan
Volatile fatty acids (VFAs)	Fatty acids, or organic acids with a carbon chain of six carbons or fewer
Volatile solids (VS)	Those solids in a sample of material that are lost on ignition of the dry solids at 550^{o}C. NOTE 1 Volatile solids are also referred to as “loss on ignition (LOI)”, which is a measure of organic matter (OM).
Whole digestate (WD)	Material resulting from a digestion process and that has not undergone a post-digestion separation step to derive separated liquor and separated fibre