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WORKING DOCUMENT

BIOLOGICAL TREATMENT OF BIOWASTE

2nd draft

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http://europa.eu.int/comm/environment/waste/facts_en.htm

WORKING DOCUMENT
BIOLOGICAL TREATMENT OF BIOWASTE

An EU-initiative to improve the present situation for biodegradable waste (biowaste) management and help meeting the targets of the Landfill Directive 1999/31/EC could be based on Articles 95 and 175 EC Treaty and should include the following elements:

Objectives

- To promote the biological treatment of biowaste by harmonising the national measures concerning its management in order to prevent or reduce any negative impact thereof on the environment, thus providing a high level of environmental protection.
- To protect the soil and ensure that the use of treated and untreated biowaste results in benefit to agriculture or ecological improvement.
- To ensure that human as well as animal and plant health is not affected by the use of treated or untreated biowaste.
- To ensure the functioning of the internal market and to avoid obstacles to trade and distortion and restriction of competition within the Community.

Scope

The collection and treatment of the biowastes listed in Annex I as well as the production, trade and shipment of treated biowaste.

Definitions

The following definitions are proposed:

- (1) 'waste' means any substance or object in the meaning of Article 1 (a) of Directive 75/442/EEC as amended;
- (2) 'biowaste (biodegradable waste)' means any waste that is capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste, and paper and paperboard;
- (3) 'green and wood waste' means vegetable waste from gardens and parks, tree cuttings, branches, grass, leaves (with the exception of street sweepings), sawdust, wood chips and other wood waste not treated with heavy metals or organic compounds;
- (4) 'municipal waste' means waste from households, as well as other waste which, because of its nature or composition, is similar to waste from households;
- (5) 'compost' means the stable, sanitised and humus-like material rich in organic matter and free from offensive odours resulting from the composting process of separately collected biowaste, which complies with the environmental quality classes of Annex III;

- (6) 'digestate' means the material resulting from the anaerobic digestion of separately collected biowaste, which complies with the environmental quality classes of Annex III;
- (7) 'biogas' means the mixture of carbon dioxide, methane and trace gases resulting from the controlled anaerobic digestion of biowaste;
- (8) 'stabilised biowaste' means the waste resulting from the mechanical/ biological treatment of unsorted waste or residual municipal waste as well as any other treated biowaste which does not comply with the environmental quality classes 1 or 2 of Annex III;
- (9) 'composting' means the autothermic and thermophilic biological decomposition of separately collected biowaste in the presence of oxygen and under controlled conditions by the action of micro- and macro-organisms in order to produce compost;
- (10) 'windrow composting' means the composting of biowaste placed in elongated heaps which are periodically turned by mechanical means in order to increase the porosity of the heap and increase the homogeneity of the waste;
- (11) 'in-vessel composting' means the composting of biowaste in a closed reactor where the composting process is accelerated by an optimised air exchange, water content and temperature control;
- (12) 'home composting' means the composting of the biowaste as well as the use of the compost in a garden belonging to a private household;
- (13) 'on-site composting' means the composting of the biowaste where it is generated;
- (14) 'community composting' means the composting of biowaste by a group of people in a locality with the aim at composting their own and other people's biowaste in order to manage the supplied biowaste as close as possible to the point at which it was produced;
- (15) 'anaerobic digestion' means the biological decomposition of biowaste in the absence of oxygen and under controlled conditions by the action of micro-organisms (including methanogenic bacteria) in order to produce biogas and digestate;
- (16) 'mechanical/biological treatment' means the treatment of residual municipal waste, unsorted waste or any other biowaste unfit for composting or anaerobic digestion in order to stabilise and reduce the volume of the waste;
- (17) 'treatment' means composting, anaerobic digestion, mechanical/ biological treatment or any other process for sanitising biowaste;
- (18) 'plant' means any technical unit and equipment dedicated to the treatment of biowaste via composting, anaerobic digestion or mechanical/biological stabilisation as well as any equipment dedicated to the treatment of air emissions and wastewater;
- (19) 'separate collection' means the collection of biowaste separately from other kinds of waste in such a way as to avoid the different waste fractions or waste components from being mixed, combined or contaminated with other potentially polluting wastes, products or materials;

- (20) 'residual municipal waste' means the fraction of municipal waste remaining after the source separation of municipal waste fractions, such as food and garden waste, packaging, paper and paperboard, metals, glass, and unsuitable for the production of compost because it is mixed, combined or contaminated with potentially polluting products or materials;
- (21) 'producer' means the person legally responsible for carrying out composting, anaerobic digestion or the mechanical/biological treatment of biowaste;
- (22) 'sanitation' means the treatment of biowaste, in accordance with Annex II, during the production of compost and digestate that aims at killing organisms pathogenic to crops, animals and man, to a level that the risk of carrying disease in connection with further treatment, trade and use is minimised;
- (23) 'stabilisation' means the reduction of the decomposition properties of biowaste to such an extent that offensive odours are minimised and that either the Respiration Activity after four days (AT₄) is below 10 mg O₂/g dm or the Dynamic Respiration Index is below 1,000 mg O₂/kg VS/h^(*);
- (24) 'impurities' means the presence of fragments of plastic, glass, metals or similar non-biodegradable materials, with the exclusion of sand, gravel and small stones;
- (25) 'agricultural benefit' means the improvement of soil conditions for crop growth whilst ensuring the protection of the environmental quality in the broadest sense as required by Article 4 of Directive 75/442/EEC as amended when treated or untreated biowaste is applied to land,
- (26) 'ecological improvement' means the maintenance of habitats and their biodiversity where these would otherwise deteriorate, the provision of new habitats for wild life and the development or restoration of existing habitats to give greater biodiversity and sustainability whilst ensuring the protection of the environmental quality in the broadest sense as required by Article 4 of Directive 75/442/EEC as amended when treated or untreated biowaste is applied to land.

General principles

An improved management of biowaste in the Community should encourage, in this order:

- (1) the prevention or reduction of biowaste production (e.g. sewage sludge) and its contamination by pollutants,
- (2) the reuse of biowaste (e.g. cardboard),

(*)For definitions and a discussion of positive and negative aspects, see T. Scheelhaase, W. Bidlingmaier (1997), Effects of mechanical-biological pre-treatment on residual waste and landfilling, *Proceedings Sardinia 97*, pp. 475-483; E. Binner *et al.* (1997), Laboratory test methods characterizing the biological reactivity of wastes, *ibidem*, pp. 485-494; E. Binner, A. Zach (1999), Laboratory tests describing the biological reactivity of pretreated residual wastes, *Proceedings ORBIT 99*, vol. I, pp. 255-261; T. Scheelhaase, W. Bidlingmaier (1999), Characterisation of solid waste and determination of the emission potential, *ibidem*, pp. 249-254; F. Adani (2000), Biostabilization of mechanically separated municipal solid waste fraction, *Waste Management & Research*, **18**, 471-477; B. Scaglia *et al.* (2000), Respiration Index determination: dynamic and static approaches, *Compost Science & Utilization*, **8** (2), 90-98.

- (3) the recycling of separately collected biowaste into the original material (e.g. paper and cardboard) whenever environmentally justified,
- (4) the composting or anaerobic digestion of separately collected biowaste, that is not recycled into the original material, with the utilisation of compost or digestate for agricultural benefit or ecological improvement,
- (5) the mechanical/biological treatment of biowaste,
- (6) the use of biowaste as a source for generating energy.

Home composting

Member States shall encourage home composting whenever there are viable outlets for the resulting compost such as private gardens.

Member States shall ensure that an appropriate information campaign is carried out in order to inform the general public on how to make compost and to illustrate the benefits for the environment from recycling biowaste.

On-site composting and anaerobic digestion

Member States shall encourage on-site composting or anaerobic digestion whenever there are viable outlets for the resulting compost or digestate such as farmland.

Local authorities shall be encouraged to compost on site their own green and wood waste, for example from cemeteries and public parks.

The competent authority shall be satisfied that an on-site composting or anaerobic digestion plant fulfils the requirements of Article 4 of Directive 75/442/EEC as amended.

Community composting

Member States shall take appropriate measures to encourage the setting up of community composting schemes as a way of involving the general public in the management of their own waste, reducing transport of waste and increasing awareness of waste recycling practices.

The competent authority shall be satisfied that a community composting plant fulfils the requirements of Article 4 of Directive 75/442/EEC as amended.

Separate collection

Member States shall set up, where they are not already in place, separate collection schemes with the aim of collecting biowaste separately from other kinds of waste in order to prevent the contamination of biowaste with other polluting wastes, materials and substances.

In particular, the following biowastes – if it can be reasonably expected that their biological treatment will not significantly worsen the quality of the resulting compost or digestate – shall be separately collected, unless they are home composted or community composted:

- (a) food waste from private households;
- (b) food waste from restaurants, canteens, schools and public buildings;

- (c) biowaste from markets;
- (d) biowaste from shops, small businesses and service undertakings;
- (e) biowaste from commercial, industrial and institutional sources unless used on site;
- (f) green and wood wastes from private as well as public parks, gardens and cemeteries.

Paper and cardboard waste are biodegradable and quite easily composted. However, when practicable, these wastes should be recycled.

The separate collection schemes shall be organised in such a way that any nuisance – caused in particular by odours, insects, rodents, dust and noise – is minimised during collection, transport and treatment.

These separate collection schemes shall at least cover:

- (a) urban agglomerations of more than 100 000 inhabitants within three years;
- (b) urban agglomerations of more than 2 000 inhabitants within five years.

Member States may waive the obligation of separate collection of biowaste:

- in inner cities where the logistic of separate collection may make it difficult to achieve a low level of contamination of biowaste with other polluting wastes, materials and substances;
- in rural or scarcely populated areas with a density of less than 10 inhabitants per square kilometre in which the setting up of separate collection schemes would not be environmentally justified. In these areas special campaigns to particularly promote home, on-site and community composting shall take place.

In order to avoid an unjustified increase in the quantity of sewage sludge, it should be prohibited to dispose of shredded biowaste to the sewer.

Residual municipal waste

The amount and contamination of residual municipal waste should be reduced to the minimum extent possible via the separate collection of municipal waste fractions such as biowaste, packaging, paper and cardboard, glass, metals and hazardous waste.

If residual municipal waste undergoes a mechanical/biological treatment prior to landfilling, the achievement of either a Respiration Activity after four days (AT_4) below 10 mg O_2/g dm or a Dynamic Respiration Index below 1,000 mg O_2/kg VS/h shall deem that the treated residual municipal waste is not any more biodegradable waste in the meaning of Article 2 (m) of Directive 1999/31/EC.

If residual municipal waste is incinerated prior to landfilling, the achievement of a Total Organic Carbon value of less than 5% shall deem that the incinerated residual municipal waste is not any more biodegradable waste in the meaning of Article 2 (m) of Directive 1999/31/EC.

Mixing rule

The mixing of different materials solely for the purpose of diluting pollutants shall be prohibited.

Any mixing of compost or digestate with other suitable materials (such as mineral fertilisers, peat or biowastes suitable for being spread on land without treatment) in order to obtain high-quality plant nutrients and soil improvers shall be regarded as compost or digestate respectively for the purposes of this working document.

Composting

The composting process of biowaste shall have the purpose of transforming this waste into compost fulfilling the environmental quality classes of Annex III and suitable for agricultural improvement or ecological benefit.

It shall be carried out in such a way as to minimise the negative impact on the environment of air emissions and leaching to surface or groundwater as well as to minimise the health impact on the workers at the plant.

The requirements that have to be complied with in order to ensure a sufficient level of sanitation of the final compost are in Annex II.

Compost shall be produced, imported, traded and marketed in the Community according to one of the environmental quality classes set out in Annex III.

Anaerobic digestion

The anaerobic digestion treatment of biowaste shall have the purpose of reducing the fermentability of this waste, maximise the production of biogas, and ensuring that the digestate can be used for agricultural benefit or ecological improvement.

It shall be carried out in such a way as to minimise the impact on the environment of air emissions and leaching to surface or groundwater as well as to minimise the health impact on the workers at the plant.

If released into surface water, the liquid digestate from an anaerobic digestion plant shall be suitably treated to comply with the relevant requirements of Directive 91/271/EEC.

The requirements that have to be complied with in order to ensure a sufficient level of sanitation of the digestate are in Annex II.

The management of biogas from anaerobic digestion plant shall be carried out according to the requirements in Annex VI.

Digestate shall be produced, imported, traded and marketed in the Community according to one of the environmental quality classes set out in Annex III.

Mechanical/biological treatment

The mechanical/biological treatment of biowaste shall have the purpose of stabilising and reducing the volume of the biowaste in order to ensure that the stabilised biowaste can either

be used for ecological improvement or has reduced negative environmental impacts when landfilled.

It shall be carried out in such a way as to minimise the impact on the environment of air emissions and leaching to surface or groundwater as well as to minimise the health impact on the workers at the plant.

Use on land

Only treated biowaste shall be allowed to be spread on land, except for those untreated biowastes specifically mentioned in Annex I and for vegetable plant waste generated and remaining on agricultural or forest land.

Member States shall ensure that the use on land of treated and untreated biowaste shall result in agricultural benefit or ecological improvement.

Where conditions so demand, Member States may restrict the land use of treated or untreated biowaste and take more stringent measures than those provided for in this section.

Whenever justified for ensuring a higher level of environmental protection or for improving the quality and characteristics of the soil, the competent authority shall decide, on a case-by-case basis, on lower or higher maximum allowable quantities than those provided for in this section.

- Compost or digestate of class 1 shall be used according to best agronomic practice without any specific restriction. Compost or digestate of class 2 shall be used in a quantity not exceeding 30 tonnes dry matter per hectare on a three-year average.
- Member States may authorise the use of stabilised biowaste fulfilling the requirements of Annex III as a component in artificial soils or in those land applications that are not destined to food and fodder crop production [such as final landfill cover with a view to restoring the landscape, landscape restoration in old and disused quarries and mines, anti-noise barriers, road construction, golf courses, ski slopes, football pitches and the likes].

For spreading on land or in areas likely to be in direct contact with the general public, stabilised biowaste shall also fulfil the sanitation requirements laid down in Annex II.

The use of stabilised biowaste shall be allowed on condition of not being repeated on the same areas for at least 10 years and for a total quantity not exceeding 200 tonnes of dry matter per hectare.

The spreading on land of stabilised biowaste shall take place under control of the competent authority and shall at least be subject – *mutatis mutandis* – to the provisions of Articles 5 (1) [heavy metal limits in soil], 9 [soil analysis & analytical methods] and 10 [record keeping] of Directive 86/278/EEC.

Permit requirements

The provisions set out in Article 9 of Directive 75/442/EEC shall be specified and supplemented, so as to ensure that no biological treatment plant operates without a permit, without prejudice to the following paragraph.

For composting or anaerobic digestion plants producing less than 500 tonnes of compost or digestate, the following exemptions shall apply (registration in the sense of Article 11 (2) of Directive 75/442/EEC as amended):

Annual production (only green and wood waste) (fresh weight)	Permit requirement	Provisions of working document
Less than 10 tonnes	<i>de minimis</i>	
Between 10 and 100 tonnes	Registration with the competent authority prior to any composting activities	None
Between 100 and 500 tonnes	Registration with the competent authority prior to any composting activities	<u>Sampling</u> : agronomic parameters, heavy metals → once a year <u>Labelling</u> : organic matter, pH, nitrogen, phosphorus and potassium
More than 500 tonnes	Yes	All

Annual production (including food waste or animal manure) (fresh weight)	Permit requirement	Provisions of working document
Less than 10 tonnes	<i>de minimis</i>	
Between 10 and 50 tonnes	Registration with the competent authority prior to any composting activities	None
Between 50 and 250 tonnes	Registration with the competent authority prior to any composting activities	<u>Sampling</u> : agronomic parameters, heavy metals → once a year <u>Labelling</u> : organic matter, pH, nitrogen, phosphorus and potassium
More than 250 tonnes	Yes	All

The permit should take into account the presence of neighbouring buildings, sport facilities, groundwater and surface water and set minimum distances accordingly.

The application for a permit to the competent authority shall include a description of the measures which are envisaged to guarantee that the requirements of Annex V are complied with.

The permit granted by the competent authority to a plant shall explicitly list the biowastes in Annex I which may be treated.

Producer responsibility

The producer of compost or digestate shall be responsible for the quality of the compost or digestate produced and shall ensure that compost or digestate is as little contaminated as possible by pathogens, weed seeds and other substances or materials that could present problems for soils, crops, animals or man.

The producer shall guarantee that compost or digestate complies with the relevant limit values set in Annexes II and III and has been analysed according to the frequencies and procedures set in Annex IV.

Producers of more than 10,000 tonnes per year of compost or digestate shall implement a quality assurance system for the treatment process. Such a quality assurance system shall be independently audited by auditors certified by the competent authority.

Labelling and shipment requirements

Compost and digestate that is imported, produced or marketed within the Community shall carry a label bearing the following information:

- (a) the words “EC Compost Class ‘X’ produced according to the requirements of Directive .../.../EC” or “EC Digestate Class ‘X’ produced according to the requirements of Directive .../.../EC” where ‘X’ is either 1 or 2 according to Annex III;
- (b) the indication “Allowed in organic farming”, if it complies with the relevant requirements of Council Regulation (EEC) No 2092/91 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs as amended;
- (c) the name or trade name or trademark and the address of the person responsible for marketing, established within the Community;
- (d) the name and address of the site of production;
- (e) the feedstock for all components;
- (f) detailed information on the parameters listed in Annex IV;
- (g) information for a correct application and use with special regard to the maximum quantities that can be spread on land;
- (h) if relevant, specific information to the professional end user according to European product schedules developed/ to be developed by CEN.

The shipment of stabilised biowaste within, into and out the Community shall be subject to the relevant provisions of Council Regulation (ECC) No 259/93.

Public procurement

Public authorities and the public sector shall use compost as a substitute for peat and other raw materials extracted from the environment whenever possible, in particular as a component in soil improvers, growing media, mulches, potting soil and in soil dressing for landscaping purposes.

Appropriate measures to encourage the use of compost in public procurement contracts shall be established.

ANNEX I

Biowastes suitable for biological treatment

The 6-digit code refers to the correspondent entry in the European Waste Catalogue (EWC) adopted with Commission Decision 2001/.../EC (in force but not yet published on the OJ).

The biowastes listed below are in principle suitable for biological treatment and/or spreading on the soil.

In case of production of compost or digestate, the producer shall put in place the necessary controls on the incoming biowastes to ensure that there is no intentional dilution of polluting substances.

Waste code	Waste description	Additional comments and use restrictions
02 00 00	Waste from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing	
02 01	Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing	
02 01 01	Sludges from washing and cleaning	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture and without prejudice to Directive 90/670/EEC on animal waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000]
02 01 02	Animal-tissue waste	Only for animal tissues deemed to be fit for human consumption and as a left-over of food preparations. Without prejudice to Directive 90/670/EEC on animal waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000]
02 01 03	Plant-tissue waste	
02 01 06	Animal faeces, urine and manure (including spoiled straw), effluent, collected separately and treated off-site	Without prejudice to Directive 90/670/EEC on animal waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000]
02 01 07	Wastes from forestry	Bark left in a natural state and wood waste left in a natural state may be spread on land untreated.
02 02	Waste from the preparation and processing of meat, fish and other foods of animal origin	
02 02 01	Sludges from washing and cleaning	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture and without prejudice to Directive 90/670/EEC on animal waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000]
02 02 02	Animal-tissue waste	Only for animal tissues deemed to be fit for human consumption and as a left-over of food preparations. Without prejudice to Directive 90/670/EEC on animal

Waste code	Waste description	Additional comments and use restrictions
		waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000]
02 02 03	Materials unsuitable for consumption or processing	Without prejudice to Directive 90/670/EEC on animal waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000]
02 02 04	Sludges from on-site effluent treatment	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture and without prejudice to Directive 90/670/EEC on animal waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000]
02 02 99	Waste not otherwise specified	Without prejudice to Directive 90/670/EEC on animal waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000]
02 03	Wastes from the fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve production; yeast and yeast extract production, molasses preparation and fermentation	
02 03 01	Sludges from washing, cleaning, peeling, centrifuging and separation	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
02 03 04	Materials unsuitable for consumption or processing	
02 03 05	Sludges from on-site effluent treatment	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
02 03 99	Waste not otherwise specified	
02 04	Wastes from sugar processing	
02 04 02	Off-specification calcium carbonate	
02 04 03	Sludges from on-site effluent treatment	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
02 05	Wastes from the dairy products industry	
02 05 01	Materials unsuitable for consumption or processing	Without prejudice to Directive 90/670/EEC on animal waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000]
02 05 02	Sludges from on-site effluent treatment	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture and without prejudice to Directive 90/670/EEC on animal waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000]
02 05 99	Waste not otherwise specified	Without prejudice to Directive 90/670/EEC on animal waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000]

Waste code	Waste description	Additional comments and use restrictions
02 06	Wastes from the baking and confectionery industry	
02 06 01	Materials unsuitable for consumption or processing	
02 06 03	Sludges from on-site effluent treatment	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
02 07	Wastes from the production of alcoholic and non-alcohol beverages (except coffee, tea and cocoa)	
02 07 01	Wastes from washing, cleaning and mechanical reduction of raw materials	
02 07 02	Wastes from spirits distillation	
02 07 04	Materials unsuitable for consumption or processing	
02 07 05	Sludges from on-site effluent treatment	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
02 07 99	Waste not otherwise specified	
03 00 00	Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard	
03 01	Wastes from wood processing and the production of panels and furniture	
03 01 01	Waste bark and cork	Bark and cork left in a natural state (except from trees and bushes from roadside) may be spread on land untreated. Bark and cork from trees and bushes from roadside may only be spread on land if they comply with at least Class 3 compost requirements.
03 01 05	Sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04	Sawdust and sawmill waste of untreated wood kept in its natural state from the area of wood processing may be spread on land untreated.
03 03	Wastes from pulp, paper and cardboard production and processing	
03 03 01	Waste bark and wood	Bark left in a natural state (except from trees and bushes from roadside) may be spread on land untreated. Bark trees and bushes from roadside may only be spread on land if it complies with at least Class 3 compost requirements.
03 03 02	Green liquor sludge (from recovery of cooking liquor)	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
03 03 05	De-inking sludges from paper recycling	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
03 03 07	Mechanically separated rejects from pulp of waste paper and cardboard	
03 03 08	Wastes from sorting of paper and cardboard destined for recycling	
03 03 09	Lime mud waste	
03 03 10	Fibre rejects, fibre-, filler- and coating sludges from mechanical separation	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
03 03 11	Sludges from on-site effluent treatment other than those mentioned in 03 03 10	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
04 00 00	Waste from the leather, fur and textile industries	
04 01	Wastes from the leather and fur industry	
04 01 06	Sludges, in particular from on-site effluent treatment containing chromium	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture
04 01 07	Sludge, in particular from on-site effluent treatment free of chromium	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.

Waste code	Waste description	Additional comments and use restrictions
04 02	Wastes from the textile industry	
04 02 20	Sludges from on-site effluent treatment other than those mentioned in 04 02 19	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
04 02 21	Wastes from unprocessed textile fibres	Without prejudice to Directive 90/670/EEC on animal waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000].
04 02 22	Wastes from unprocessed textile fibres	Without prejudice to Directive 90/670/EEC on animal waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000].
15 00 00	Waste packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified	
15 01	Packaging (including separately collected municipal packaging waste)	
15 01 01	Paper and cardboard packaging	
15 01 03	Wooden packaging	
19 00 00	Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use	
19 06	Wastes from anaerobic treatment of waste	
19 06 04	Digestate from anaerobic treatment of municipal waste	
19 06 06	Digestate from anaerobic treatment of municipal waste	Without prejudice to Directive 90/670/EEC on animal waste [see Proposal for a Regulation laying down the health rules concerning animal by-products not intended for human consumption, COM(2000) 574 final of 19.10.2000]
19 08	Wastes from waste water treatment plants not otherwise specified	
19 08 05	Sludges from treatment of urban waste water	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
19 08 12	Sludges from biological treatment of industrial waste water other than those mentioned in 19 08 11	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
19 08 14	Sludges from other treatment of industrial waste water other than those mentioned in 19 08 13	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
19 09	Wastes from the preparation of water intended for human consumption or water for industrial use	
19 09 01	Solid waste from primary filtration and screenings	
19 09 02	Sludges from water clarification	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.
19 09 03	Sludges from decarbonation	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.

Waste code	Waste description	Additional comments and use restrictions
20 00 00	Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions	
20 01	Separately collected fractions (except 15 01)	
20 01 01	Paper and cardboard	The addition of high-gloss paper and waste wallpaper is not permitted.
20 01 08	Biodegradable kitchen and canteen waste	
20 01 25	Edible oil and fat	Only for anaerobic digestion.
20 01 38	Wood other than that mentioned in 20 01 37	
20 02	Garden and park wastes (including cemetery waste)	
20 02 01	Biodegradable waste	Except grass and bush cuttings from roadside.
20 03	Other municipal wastes	
20 03 01	Mixed municipal waste	Only for mechanical/ biological treatment.
20 03 02	Waste from markets	Only if the biowaste is separately collected, otherwise only for mechanical/ biological treatment.
20 03 04	Septic tank sludge	Only if it fulfils the requirements of Directive 86/278/EEC for the use of sludge in agriculture.

ANNEX II

Sanitation requirements

[this Annex would have to be brought in line with the updated Sewage Sludge Directive]

1. PROCESS VALIDATION TEST

This section only applies to biological treatment plants producing more than 500 tonnes of treated green and wood waste per year or 250 tonnes of treated biowaste per year.

An indicator organism shall be used in order to determine the effectiveness of the treatment in sanitising biowaste. This test shall be carried out for each treatment plant within 12 month of its starting up phase.

The test shall be repeated if the composition of the biowaste significantly changes or if major modifications to the process treatment are made.

The indicator organisms shall be *Salmonella senftenberg* W775 (H₂S negative) [under review].

2. PROCESS MANAGEMENT

2.1. Composting

The composting process shall be carried out in such a way that a thermophilic temperature range, a high level of biological activity under favourable conditions with regard to humidity and nutrients as well as an optimum structure and optimum air conduction are guaranteed over a period of several weeks.

In the course of the composting process the entire quantity of the biowaste shall be mixed and exposed to an appropriate temperature as in the following table:

	Temperature	Treatment time	Turnings
Windrow composting	≥55°C	2 weeks	5
Windrow composting	≥65°C	1 week	2
In-vessel composting	≥60°C	1 week	N/A

2.2. Anaerobic digestion

The anaerobic digestion process shall be carried out in such a way that a minimum temperature of 55 °C is maintained over a period of 24 hours without interruption and that the hydraulic dwell time in the reactor is at least 20 days.

In case of lower operating temperature or shorter period of exposure:

- the biowaste shall be pre-treated at 70 °C for 1 hour, or

- the digestate shall be post-treated at 70 °C for 1 hour, or
- the digestate shall be composted.

2.3. Mechanical/biological treatment

Sanitation to be obtained as in section 2.2 in case of aerobic treatment or section 2.3 in case of anaerobic treatment.

3. MONITORING

This section only applies to biological treatment plants producing more than 100 tonnes of treated green and wood waste per year or 50 tonnes of treated biowaste per year.

The relevant parameters of the biological treatment (temperature, moisture, turning frequency for composting and temperature as well as hydraulic dwell time for anaerobic digestion) shall be recorded each day during the sanitation phase referred to in the section on process management. These records shall be kept for five years and made available to the competent authorities upon request.

In order to allow a proper monitoring and the process validation procedure, the biological treatment plants shall have appropriate openings to allow for the insertion and extraction of samples and the recording of the relevant parameters of the process.

4. END-PRODUCT REQUIREMENTS

- Compost/digestate is deemed to be sanitised if it complies with the following:
 - *Salmonella spp* absent in 50 g of compost/digestate [under review]
 - *Clostridium perfringens* absent in 1 g of compost/digestate [under review]
- Compost/digestate shall have less than three germinating weed seeds per litre.

Community standards for the process validation test, the end-product requirements and for sampling should be developed. Until these standards are approved, Member States may apply national standards and procedures.

ANNEX III

Environmental quality classes for compost and stabilised biowaste

Parameter	Compost/digestate (*)		Stabilised biowaste (*)
	Class 1	Class 2	
Cd (mg/kg dm)	0.7	1.5	5
Cr (mg/kg dm)	100	150	600
Cu (mg/kg dm)	100	150	600
Hg (mg/kg dm)	0.5	1	5
Ni (mg/kg dm)	50	75	150
Pb (mg/kg dm)	100	150	500
Zn (mg/kg dm)	200	400	1 500
PCBs (mg/kg dm) (**)	-	-	0.4
PAHs (mg/kg dm) (**)	-	-	3
Impurities >2 mm	<0.5%	<0.5%	<3%
Gravel and stones > 5 mm	<5%	<5%	-

(*): Normalised to an organic matter content of 30%.

(**): Threshold values for these organic pollutants to be set in consistence with the Sewage Sludge Directive.

Compost, digestate and stabilised biowaste shall be assumed to belong to a specified class or type if, for each relevant parameter considered individually, samples show that compost, digestate and stabilised biowaste comply with the relevant parameter as in the following table:

Series of samples taken in any twelve-month period	Maximum permitted number of samples which fail to conform to any given parameter	Allowed deviation from statutory limit of samples which fail to conform to any given parameter
2	1	20%
4	1	20%
12	3	20%

The limits apply to the compost just after the composting phase and prior to any mixing with other materials.

ANNEX IV

Sampling frequency and methods for analysis and sampling **[this Annex would have to be brought in line with the updated Sewage Sludge Directive]**

- (1) In order to inform the end user about the characteristics of compost and stabilised biowaste, the following parameters shall be analysed:

	Parameter	Unit	Reference method (*)	
X	Dry matter	% fresh weight	EN 13039	Soil improvers and growing media – determination of organic matter and ash
X	Organic matter	% dm	EN 13039	Soil improvers and growing media – determination of organic matter and ash
X	Bulk density	kg/l fresh weight	EN 12580	Soil improvers and growing media – Determination of a quantity
X	Electrical conductivity	mS/m	EN 13038	Soil improvers and growing media – determination of electrical conductivity
X	pH(H ₂ O)	pH-unit	EN 13037	Soil improvers and growing media – determination of pH
X	Nitrogen (as total N and NH ₄ -N)	mg/kg dm	prEN 13654 parts 1 and 2	Soil improvers and growing media – total N – modified Kjeldahl/Dumas
X	Phosphorus (as P ₂ O ₅)	mg/kg dm	prEN 13650	Soil improvers and growing media – extraction of <i>aqua regia</i> soluble elements
X	Potassium (as K ₂ O)	mg/kg dm	prEN 13650	Soil improvers and growing media – extraction of <i>aqua regia</i> soluble elements
X	Calcium (as CaO), magnesium (as MgO), boron (B), molybdenum (Mo)	mg/kg dm	prEN 13650	Soil improvers and growing media – extraction of <i>aqua regia</i> soluble elements
X	C/N	-		
	Total impurities	% dm		
	Dynamic Respiration Index	mg O ₂ /kg VS/h	[ASTM D 5975-96]	Standard test method for determining the stability of compost by measuring oxygen consumption
	Respiration Activity after four days (AT ₄)	mg O ₂ /g dm		
	<i>Salmonella spp</i>	number/50 g dm		
	<i>Clostridium perfringens</i>	number/1 g dm		
	Germinating weed seeds	number/l	[ÖNORM S 2023]	
	Heavy metals: cadmium (Cd), chromium (Cr), copper (Cu), nickel (Ni), lead (Pb), zinc (Zn)	mg/kg dm	prEN 13650	Soil improvers and growing media – extraction of <i>aqua regia</i> soluble elements
	Heavy metal: mercury (Hg)	mg/kg dm		
	PAHs	mg/kg dm	[ISO 13877]	
	PCBs	mg/kg dm	[CD 10382]	

(*) Latest available edition.

- (2) The analyses shall be carried out:

- (a) every six months for plants producing more than 500 and up to 1 000 tonnes of treated biowaste per year;

- (b) at intervals of at least every 1 000 tonnes of treated biowaste produced or every 3 months, whichever comes first, for plants producing more than 1 000 and up to 10 000 tonnes of treated biowaste per year;
 - (c) every month for plants producing more than 10 000 tonnes of treated biowaste per year.
- (3) The competent authority may decide on a case-by-case basis to allow a reduction of the frequency of the analysis of any of the parameters for heavy metals and micro-organisms, if in a two-year period it has been shown that each measured value of the parameter is consistently below 75% of the threshold limit.

The competent authority may decide on a case-by-case basis to allow a reduction of the frequency of the analysis of any of the agronomic parameters if in a two-year period it has been shown that each measured value of the parameter deviates for less than 20% from the average.

- (4) The competent authority may decide on a case-by-case basis and whenever justified on the analysis of parameters other than those listed above.
- (5) The analyses shall be carried out by an independently audited using accredited methods and certified by the competent authority. Sample collection, preservation and analysis must assure valid and representative results.
- (6) The results of the analyses for the parameters marked with 'X' in the table above shall be printed on the label or on the accompanying information sheet.

The results of the analyses for all parameters shall be kept by the producer for five years and shall be at the disposal of the competent authority for compliance control.

- (7) Other methods for compost, digestate and stabilised biowaste examination to be used are the following:

Parameter	Unit	Reference method (*)	
Sampling	-	EN 12579	Soil improvers and growing media – sampling
Odour	OU/m ³	[CEN/TC 264 /WG 2]	Odours - Odour concentration measurement by dynamic olfactometry
<i>Salmonella senftenberg</i>			

(*) Latest available edition.

- (8) Community standards for the parameters listed in this Annex shall be developed. Until these standards are approved, Member States may apply national standards and procedures.

ANNEX V

General requirements for biological treatment plants

1. Location

The location of a treatment plant must take into consideration requirements relating to:

- the feedstock waste and the treatment technology used,
- the distance from the boundary of the site to residential and recreation areas, waterways, water bodies and other agricultural and urban sites,
- the existence of surface water, groundwater, coastal water or nature protection zones in the area,
- the protection of the nature or cultural patrimony area.

2. Wastewater and leachate management

Appropriate measures shall be taken, with respect to the characteristics of the biowaste treated on the site and prevailing meteorological conditions, in order to collect the contaminated water and leachate from the site that, if released into surface water, shall be suitably treated to comply with the relevant requirements of Directive 91/271/EEC.

3. Control of odour

Measures shall be taken to control odour emissions from biological treatment plants located near dwellings and producing more than 500 tonnes of treated green and wood waste per year or 250 tonnes of treated biowaste per year.

The efficiency of the technical systems for the treatment of the odour shall be preferably assessed following the CEN proposed method of dynamic olfactometry [CEN/TC 264/ WG 2 “Odours”, “Odour concentration measurement by dynamic olfactometry”].

4. Nuisance and hazards

Measures shall be taken to minimise nuisances and hazards arising from the treatment plant through:

- emissions of dust,
- wind-blown materials,
- noise and traffic,
- birds, vermin and insects,
- formation of aerosols, and
- fires.

The treatment plant shall be equipped so that dirt originating from the site is not dispersed onto public roads and the surrounding land.

ANNEX VI

General requirements for biogas use

- (1) When biogas is used as a fuel in internal combustion engines, the following emission limits shall be complied with (normalised to 5% O₂ in the exhaust gases):

Parameter	Unit	Limit value
Dust	mg/m ³	50
NO _x	mg/m ³	500
SO ₂	mg/m ³	500
CO	mg/m ³	650
H ₂ S	mg/m ³	5
HCl	mg/m ³	30
HF	mg/m ³	5

- (2) The above-mentioned parameters shall be measured once a month in first three months of operation of the combustion engine and every year thereafter.
- (3) To prevent the formation of dioxins, the concentration in biogas of total halogenated hydrocarbons (AOX) shall be lower than 150 mg/m³.
- (4) Biogas that cannot be used on-site or upgraded to natural gas quality shall be flared.

When flaring biogas, the outlet temperature of the flue gas shall be at least 900°C and the residence time 0.3 seconds. The maximum concentration of sulphur compounds in biogas shall be 50 ppm or a removal efficiency of at least 98% shall be proven.

- (5) In case of upgrade of biogas to natural gas standards, the use of the upgraded biogas shall be subject to the Community provisions pertaining to natural gas transport and use.
- (6) Community standards for the parameters listed in this Annex should be developed. Until these standards are approved, Member States may apply national standards and procedures.