

# ECN-QAS – A European Quality Assurance Scheme in respect to End-of-Waste Criteria for Compost and Digestate

Stefanie Siebert

1.	Executive Summary .....	501
2.	Introduction.....	502
2.1.	Background.....	502
2.2.	Targets of the European concept.....	502
3.	Elements of the ECN-QAS.....	503
3.1.	Process requirements.....	504
3.2.	Product quality .....	504
3.3.	General requirements concerning the protection of the environment and the consumers .....	504
4.	Quality monitoring.....	505
5.	Certification .....	506
6.	Forecast.....	506
7.	Information.....	506
8.	References .....	506

## 1. Executive Summary

Quality assurance schemes for compost and digestion products have been established themselves in the last 20 years successfully in various European Member States as a key element for the sustainable recycling of organic residues. The market and demand for quality composts and digestate increased on account of the beneficial properties of organic fertilisers and soil improvers, the need for organic matter and continuously increasing prices for mineral fertilisers. This development and also the intention by the European Commission to define an End-of-Waste standard for compost and digestate led to a demand for European uniform quality standards for composting/digestion plants and composted/anaerobic treated products. The European Compost Network ECN met this challenge and developed a concept for a European quality assurance scheme. This concept includes quality standards for recycled organic resources, especially for compost and digestate, to facilitate the free cross-border movement of goods in the EU.

Based on the criteria laid down in the European standard *General criteria for certification bodies operating product certification* (EN 45011) and the experiences of existing quality assurance organisations in the field of biological waste management the ECN-QAS specifies requirements for quality assurance organisations in respect to aerobic and anaerobic treatment of biowaste. Additional to these criteria specific requirements for the sustainable management of biowaste with the aim to produce high quality products are given.

Quality assurance leads to improve the confidence of consumer in recycled organic materials and to increase the markets for organic goods. The pre-condition for a reliable European quality assurance is to harmonise the parameter of the treatment process and the requirements for product quality and to check them regularly by an independent control. Therefore ECN has set up a comprehensive quality assurance scheme including a positive list for input materials, requirements for the treatment process and quality criteria for the end products with declaration for their specific use.

## 2. Introduction

Quality assurance schemes for compost and digestion products have been established themselves in the last 20 years successfully in various European Member States as a key element for the sustainable recycling of organic residues. The market and demand for quality composts increased on account of the beneficial properties of organic fertilisers and soil improvers, the need for organic matter and continuously increasing prices for mineral fertilisers. This development and also the intention by the European Commission to define an End-of-Waste standard for compost and digestate led to a demand for a European uniform quality standard for compost plants and composted products. The European Compost Network ECN met this challenge and developed a concept for a European quality assurance scheme within its working group *Standardisation and Quality Assurance*. This concept includes the characterisation of quality standards for recycled organic resources especially for compost and digestate with the aim to facilitate the free cross-border movement of goods in the EU.

### 2.1. Background

Accompanied by long-lasting discussions about an EU-wide legislation for biowaste which lately ended in a Communication of the EU Commission about biowaste [1] and the intention to regulate *the point when compost ceases to be waste* in the Waste Frame Directive [2] ECN started to work on Europe-wide quality assurance scheme for compost (ECN-QAS) based on the existing national quality assurance systems (QS) and experiences in the member organisations. The requirements for quality assurance organisations, for the process management and the quality of compost are laid down in the ECN-QAS Quality Manual, which was published in 2010. With the on-going discussion and the publication of the 2nd working document of the European Commission [3] to define End-of-waste criteria for biodegradable waste subject to biological treatment the European Compost Network has started to enlarge the ECN-QAS Quality Manual with a European quality assurance scheme for digestate.

### 2.2. Targets of the European concept

The target of the set-up of an EU-wide quality assurance scheme for organic resources is to define Europe-wide standards for quality management and quality products from recycling processes. The pre-condition for a consistent quality is to harmonise the parameter of the

treatment process and to check them regularly by an independent control. The target of ECN-QAS is to set a common basis for the existing quality schemes in Europe and to support Member States defining quality standards and developing a quality assurance scheme for composts and digestate.

### 3. Elements of the ECN-QAS

The ECN-QAS represents an independent quality assurance scheme and includes fundamental requirements for national quality assurance organisations (NQAQO) for organic resources and basic requirements for a European compost standard in the first instance, followed by a European digestate standard. Besides the positive list for suitable input materials and requirements for process quality the scheme also includes quality criteria for the final product and analysing methods.

The European quality assurance includes:

- The conformity assessment of quality assurance schemes in European countries including the awarding of the ECN-QAS Conformity Label.
- Regular assessment of the production in the plants by the national quality assurance organisation (NQAQO) by means of process requirements.
- Regular sample taking and analysis of the final product considering relevant quality parameters from independent, acknowledged labs and additionally the evaluation of the results by the national quality assurance organisation (NQAQO).
- Documentation by the national quality assurance organisation (NQAQO) with information about the quality properties of the product, legal requirements, the necessary compost declaration and information about use and application rates according to good practice.
- Awarding of the ECN-QAS Quality Label to composting or digestion plants by the national quality assurance organisations (NQAQO).

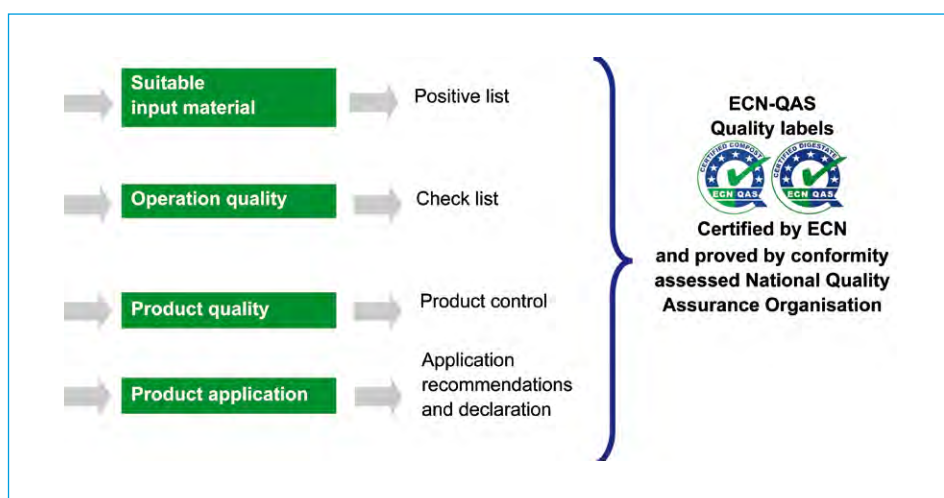


Figure 1: Concept of the European Quality Assurance (ECN-QAS) for compost and digestate

### 3.1. Process requirements

Process requirements for the production of composts are laid down in the ECN-QAS. These include the use of input materials defined in a positive list. The waste numbers and denominations of the European Waste Catalogue have been adopted and if necessary supplemented by explanations and specific requirements. As a basic principle only separately collected organic wastes are accepted.

Requirements on the process management and its documentation are defined too. This includes minimum guidelines about the adherence of process parameters to guarantee a sufficient sanitisation of the product. By means of a check list the operation quality of the plant is controlled and assessed through the NQAO at the plant inspection visit every two years.

### 3.2. Product quality

Quality products of organic resources have a widely homogenous composition based on defined input materials and are highly qualified humus products, which are placed on the market as soil improvers and organic fertilisers. They are used to preserve the content of organic matter in the soil and thus influence bio-diversity and soil fertility in a positive way. The fertilising efficiency of compost and digestate can be characterised via their nutrient content, whereby longer time periods, especially for compost, must be calculated (crop rotations) compared to mineral fertilisers. Further criteria, relevant for various applications, especially with the use as mixing components in growing media, are among others the plant compatibility and the salt content of the material.

Table 1: Quality criteria of the European Quality Assurance Scheme for the characterising of quality products

	Parameter	Assessment
Soil improvement	Organic matter	≥ 15 %, declaration
	Alcaline effective materials (CaO)	Declaration
Fertilisation	Nutrients (N; P, K, Mg)	Declaration
Material properties	Plant compatibility	Benchmark accord. to the test on germinable plants, declaration
	Water content	Benchmark for peak content, declaration
	Bulk density/volume weight	Declaration
	Grain size	Declaration
	pH-value	Declaration
	Electric conductivity	Declaration

### 3.3. General requirements concerning the protection of the environment and the consumers

Important parameters for the market of recycling products are the not desired ingredients which in quality assured organic resources can be reduced to a minimum through separate collection of bio-wastes together with an optimised process management which are harmless and environmentally safe for the individual application. Hereby to be named is the content of heavy metals and impurities like plastics, metals and glass, germinable seeds and plant parts.

In order to achieve the quality label limit values must be kept for these parameters. They are based on a research [4] which has been contracted by the Commission's DG Environment in the framework of the development of the European Soil Protection Strategy. The formation of these limit values was the result on the comparing assessment of the present compost qualities in Europe with the pre-condition that separate collection of bio-waste is established in the countries. In order to comply with the precautionary requirements of the environment and consumer protection the long-term accumulation of harmful matter in the soil has been considered when identifying the limit value levels.

In comparison to the proposed End-of-Waste criteria for compost and digestate [3] the precautionary threshold values of the ECN-QAS are more or less identically. For the end-user of waste-derived materials (liked compost and digestate from biowaste) the amount of impurities is determining. A stringent threshold value like 0.5 % in dry matter is reasonable for fulfilling the expectations of farmers and end-users like gardeners in high quality products.

Table 2: Precautionary requirements on the protection of environment and consumers

	Parameter	ECN Assessment [Amlinger]	EoW proposal [EU COM]
Hygienic aspects	Salmonellae	0 in 25 g DM	0 in 50 g DM
	E.coli	–	1.000 CFU/g FM
Undesired ingredients	Impurities (glass, metals, plastics)	≤ 0.5 % DM	≤ 0.5 % DM
	Germinable seeds and sprouting plant parts	≤ 2 per litre	≤ 2 per litre
Harmful matter	<b>Heavy metals</b>	<b>mg/kg DM</b>	<b>mg/kg DM</b>
	Lead (Pb)	130	120
	Cadmium (Cd)	1.3	1.5
	Chromium (Cr)	60	100
	Copper (Cu) <sup>1)</sup>	300 <sup>2)</sup>	100
	Nickel (Ni)	40	50
	Mercury (Hg)	0.45	1
	Zinc (Zn) <sup>1)</sup>	600 <sup>2)</sup>	400

<sup>1)</sup> Copper and zinc are classified as essential nutrients. Values over 110 mg Cu kg-1 DM and over 400 mg Zn kg-1 DM must be declared.

<sup>2)</sup> These values are classified as benchmarks.

Sources:

Amlinger, F. et al. 2004: Heavy metals and organic compounds in waste used as organic fertilisers.

EU COM (2011): Technical report for End-of-waste criteria on biodegradable waste subject to biological treatment. Second working document of the Institute for Prospective Technological Studies (IPTS) / Joint Research Centre (JRC) / European Commission. [http://susproc.jrc.ec.europa.eu/activities/waste/documents/20111012005713\\_IPTSEoWBiodegradablewaste2nd-workingdocument.pdf](http://susproc.jrc.ec.europa.eu/activities/waste/documents/20111012005713_IPTSEoWBiodegradablewaste2nd-workingdocument.pdf)

## 4. Quality monitoring

Quality monitoring of recycled products is realised through regular sample taking and analysing by independent labs which are recognised by the national quality assurance organisation. A pre-condition for such approval is a regular participation in ring tests.

The basis for the analysis of soil improvers and growing media are European Standards (EN). The analysing methods will be actualised correspondingly to the development in the European Standardisation of analysing methods. However, national analysing methods are also accepted in the ECN-QAS, so far as they are legally requested.

## 5. Certification

The national quality assurance organisation approved by the ECN-QAS is responsible for the monitoring of the operation and product quality of the plants treating biowaste materials. The conformity check of the NQAO is executed in regular terms by the ECN Quality Manager. The approval is given by the Quality Committee of the ECN. In case of a successful participation in the ECN-QAS the national quality assurance organisation will award the ECN-QAS conformity label.

Composting and digestion plants can be awarded with the ECN Quality Label by the national quality assurance organisation if they can proof the compliance with the ECN quality standards. The report of the analysis results will be sent to the Quality Committee of the ECN for monitoring and documentation.

This system doesn't replace the autonomy of national quality labels and certifications. However, it makes clear that a uniform product quality in the European context is given which simplifies com-post marketing over the country borders.

## 6. Forecast

The Commission has already been started to work on product standards for biodegradable waste subject to biological treatment under the Waste Framework Directive [1, 2]. The Member States are asked to actively participate in the process. In the report *End of Waste Criteria* [5] published by the European Commission in 2008 and as well in the current working document of the European Commission [3] a possible concept for end of waste criteria for composts and digestate – as proposed by ECN – was included and it was pointed out that the monitoring of a product standard for composts and digestate should be connected to a uniform, independent system of quality assurance. This would definitely contribute to legal security and deregulation of national control measures.

## 7. Information

The current edition of the ECN-QAS Quality Manual includes the requirements for compost and can be ordered by ECN. After the revision in 2012 the ECN-QAS Quality Manual will be completed with the requirements for digestate.

### Acknowledgements

The European Quality Assurance concept ECN-QAS and the ECN-QAS Quality Manual was worked out by the members of the ECN working groups *Quality Assurance* and *Anaerobic Digestion*. Thanks are given to all of them.

## 8. References

- [1] EU COM (2010): Communication from the Commission to the Council and the European Parliament on the future steps in bio-waste management in the European Union. COM (2010) 235 final; <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0235:FIN:EN:PDF>

- [2] 2008/98/EC: Directive 2008/98/EG of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives. L 312:3; <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0098:EN:NOT>
- [3] EU COM (2011): Technical report for End-of-waste criteria on biodegradable waste subject to biological treatment. Second working document of the Institute for Prospective Technological Studies (IPTS) / Joint Research Centre (JRC) / European Commission. [http://susproc.jrc.ec.europa.eu/activities/waste/documents/20111012005713\\_IPTSEoWBiodegradablewaste2ndworkingdocument.pdf](http://susproc.jrc.ec.europa.eu/activities/waste/documents/20111012005713_IPTSEoWBiodegradablewaste2ndworkingdocument.pdf)
- [4] Amlinger, F., Favoino, E., Pollak, M., Centemero M. and V. Caimi (2004): Heavy metals and organic compounds from wastes used as organic fertilisers. Study on behalf of the EU Commission DG ENV. A.2, <http://europa.eu.int/comm/environment/waste/compost/index.htm>
- [5] EU KOM (2008): End of Waste Criteria. Final Report of the Institute for Prospective Technological Studies (IPTS) / Joint Research Centre (JRC) / European Commission. <http://susproc.jrc.ec.europa.eu/documents/Endofwastecriteriafinal.pdf>



# Grundlagen der Bioabfallwirtschaft



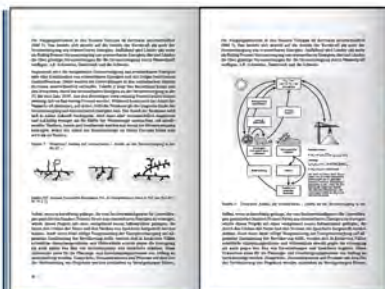
Autor:	Ulrike Stadtmüller
ISBN:	978-3-935317-12-2
Verlag:	TK Verlag Karl Thomé-Kozmiensky
Erscheinung:	2004
Gebund. Ausgabe:	141 Seiten
Preis:	25,00 EUR

In den letzten zwanzig Jahren sind biologische Verfahren im Aufwind. Dies startete mit der Einführung der getrennten Sammlung von Bioabfällen zu Beginn der zwanziger Jahre des zwanzigsten Jahrhunderts. Heute werden etwa sechzig Prozent der Küchen- und Gartenabfälle in Deutschland kompostiert - eine Erfolgsgeschichte. Derzeit stagniert diese Entwicklung zugunsten der Anaerobotechnologien, da diese auch solche Abfallarten erschließen, die aufgrund ihrer Konsistenz meist aerob nicht behandelt werden können sowie aufgrund der Situation auf dem Energiemarkt. Diese in Deutschland, den Niederlanden und Österreich vollzogene Entwicklung weitet sich derzeit europaweit aus, speziell auf den Süden.

Zu biologischen Prozessen in der Abfallwirtschaft gibt es unzählige Publikationen, eine Internetrecherche zeigt rund zwanzigtausend und dies ist sicher nur ein Teil. Doch eine Gesamtschau, ein Lehrbuch fehlt. Ansätze sind vorhanden: Golouke, de Bertoldi, Diaz, das Müllhandbuch, aber die Zeit ist darüber hingegangen, sie blieben alle lückenhaft, unvollendet eben - Tempus edax rerum.

Um so höher ist der Verdienst der Autorin des vorliegenden Werkes, Ulrike Stadtmüller, einzuschätzen, die diese Lücke gefüllt hat. Sie hat die Zeit angehalten, wenn sicher auch nur für eine Sekunde in der Weltzeit, um Kompostierung und Vergärung in ihrer Ganzheit darzustellen. Hier lässt sich aufbauen! Hier lässt sich erfahren, wo biologische Verfahren einzusetzen sind und wo nicht, damit zukünftig ihre gezielte, sinnvolle Anwendung ihnen zur weiteren Verbreitung verhilft.

*Professor Dr.-Ing. habil. Werner Bidlingmaier*



Bestellungen unter [www.vivis.de](http://www.vivis.de)  
oder

Dorfstraße 51  
D-16816 Nietwerder-Neuruppin  
Tel. +49.3391-45.45-0 • Fax +49.3391-45.45-10  
E-Mail: [tkverlag@vivis.de](mailto:tkverlag@vivis.de)

**vivis**  
TK Verlag Karl Thomé-Kozmiensky