ECN Position Paper on the Acceptance of Compostable Plastics

31 October 2019

1 ECN - Who we are

The European Compost Network (ECN) is a European non-profit membership organisation promoting sustainable recycling practices in composting, anaerobic digestion and other biological treatment processes of organic resources.

ECN's vision is a Europe in which all organic resources are recycled and recovered in a sustainable way. From this vision, ECN's primary goal is to support the implementation of EU waste policies and thereby contributing to the development of a recycling society, to sustainable agriculture and energy recovery, to improve human health and to create overall added value within the European market. To achieve this, we believe that effective recycling in all Member States should be built on appropriate collection systems for organic waste to promote high quality products derived from biological treatment. ECN supports this development through implementation programmes for Member States; the development of EU quality assurance systems for compost and digestate; and, guidelines for the monitoring of operational processes within compost and digestate facilities.

With the publication of the ECN Quality Manual 'ECN-QAS - European Quality Assurance Scheme for Compost and Digestate' in October 2014, the European Compost Network (ECN) laid down harmonised requirements for national certification bodies and quality criteria for recycled materials from organic resources. The aim is to facilitate the free cross-border movement of composts and digestate made out of recycled bio-wastes within the EU. The ECN-QAS is registered as trademark for certified quality assurance organisations, compost and digestate products at the European Register of Community Trade Marks ('OHIM 2012/210: TM No 011007168').

ECN supports the circular economy. The organisation and its members are committed to increase separate collection and recycling of bio-waste and are engaged in producing quality compost to be used in growing media, as organic fertiliser and soil improver.

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2 About this document

This document addresses the issues of acceptance and inclusion of specific types of compostable plastic items at composting[1] facilities for bio-waste. It is addressed to decision makers, local authorities engaged with MSW management and the recycling sector for bio-waste.

Plastics are described as "biodegradable and compostable" if they comply with the EU standards EN 13432 (reference date 2000-12) or with the standard EN 14995 (2007-3)[2]. The use of "bio-based" raw materials for the production of bioplastics is not addressed in this document. Even if paper is a well-known item that can be used to collect bio-waste and thus treated at biological recycling facilities, paper is not the focus of this document.

All statements refer to professional managed composting facilities only and where anaerobic digestion is addressed it is considered in relation to post-treatment of the digested material with an aerobic process. In this case, the two types of facilities are grouped as bio-waste recycling facilities. Home composting and specifically the behaviour of compostable plastics in home composting is not considered in this document.

According to ECN not all types of compostable items can be granted automatic and unconditioned access to bio-waste recycling facilities; thus, **ECN does not consider composting as the main option for the recycling of any packaging item**. Chapter 8 shows ECN position about the possible acceptance of different selected and specific types of compostable items at composting facilities.

The current document does not address marine littering, nor does it suggest compostable plastics to be a solution for this important threat to our environment; the solution to marine littering depends on a revolutionary change in consumers' education, waste collection capabilities, sorting capabilities and waste management systems in general.

[1] Composting means the aerobic treatment of organic waste under controlled conditions in industrial installations, using micro-organisms to decompose and break it down to carbon dioxide, water, new biomass and mineral salts.

[2] EN 14995 has been drafted by CEN TC dealing with Plastics, to address the compostability of those plastic articles that do not qualify as "packaging", which is instead the "domain" or "scope" of EN 13432.

3 Glossary

For the purpose of this document, following definitions are used:

Bioplastics = defined as biobased and biodegradable and compostable plastics. For the sake of the argument here, when addressing bioplastics, biodegradable and compostable plastics are referred to.

Biodegradable = refers to a material that maintains its mechanical strength during practical use but break down into low-weight compounds and non-toxic by-products after their use

Bio-waste = as defined in the Waste Framework Directive (COM(EU)2018/851)[3]. Bio-waste means biodegradable garden and park waste, food and kitchen waste from households, offices, restaurants, wholesale, canteens, caterers and retail premises and comparable waste from food processing plants. It does not include forestry or agricultural residues, manure, sewage sludge, or other biodegradable waste such as natural textiles, paper or processed wood. It also excludes those by-products of food production that never become waste.

Compostable = a product or item that complies with the European standards EN 13432 Packaging - Requirements for packaging recoverable through composting and biodegradation - Test scheme and evaluation criteria for the final acceptance of packaging; or EN 14995 Plastics - Evaluation of compostability - Test scheme and specifications.

Food-waste = in the EU context is defined in the WFD (EU)2018/851 with back reference to (EC) No 178/2002 and includes any waste deriving from food, and therefore any kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants.

MSW = Municipal Solid Waste and covers household waste and waste similar in nature and composition to household waste, according to WFD (EU)2018/851

Recycling of bio-waste = processes such as composting, anaerobic digestion or both treatments combined that are developed under controlled conditions.

[3] COM (EU) 2018/851: DIRECTIVE (EU) 2018/851 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 30 May 2018 amending Directive 2008/98/EC on waste

4 Introduction

The existing **EU strategy addressing the circular economy applied to bio-waste** acknowledges that „ “Composting and anaerobic digestion offer the most promising environmental and economic results for bio-waste that cannot be prevented. An important pre-condition is a good quality of the input to these processes. This would in the majority of cases be best achieved by separate collection.[4]”

The role that bio-waste management can play in the EU circular economy strategy can be summarised in a few key-data: recycling the 90-116 million tons of bio-waste into high-quality **compost** could help to improve the quality of 3% to 7% of depleted agricultural **soils in the EU** and to address the problem of degrading soil quality in Europe. Maximizing composting could also replace 10% of phosphate fertilisers, 9% of potassium fertilisers and 8% of lime fertilisers[5].

In some EU countries and districts the use of compostable bioplastic bags for bio-waste collection has a long track-record, such as in Italy since more than 20 years, but also in Norway, Spain (Cataluña), Austria, Switzerland, the UK, Belgium, Luxembourg and others. In other EU countries – like Germany or the Netherlands – the acceptance of compostable bioplastics by operators of biological recycling facilities is very low. Please refer to **Annex A** for a short overview about the acceptance of compostable plastics at composting facilities in selected EU countries.

It is therefore fundamental for ECN to correctly address the issue regarding if, how and when and where to include compostable products into the recycling chain of bio-waste. In any case an agreement with the plant operator of specific composting plants is decisive for the inclusion of compostable plastics into the bio-waste stream. The bio-waste recycling facilities can only accept input that does not disturb the whole recycling process of biowaste and that contributes to the production of a quality end product.

[4] EC, 2010a. Communication from the Commission to the Council and the European Parliament on future steps in biowaste management in the European Union. COM (2010) 235 final. Commission of the European Communities, Brussels.

[5] EC, 2010b. Commission Staff Working Document Accompanying the Communication from the Commission on future steps in bio-waste management in the European Union. SEC (2010) 577 final. Commission of the European Communities, Brussels.

5 What are compostable plastics

5.1 Definition of compostable plastic items

The term "Bioplastic" could be used to define different types of plastics: bio-based plastics, biodegradable plastics or bio-based and biodegradable plastics. Among these, the characteristic that is relevant for the bio-waste recycling processes is the biodegradability and compostability in professional composting facilities.

A compostable product or item has – for the purpose of this document - to comply to the **European standards EN 13432** (for packaging) or **EN 14995** (for items made of compostable plastics). These standards guarantee a **disintegration** and **biodegradability** of the product in a certain time under **professional composting conditions**. Further information about compliance to the EU standard are summarized in **Annex B**. Well known examples of bioplastic items are shopping bags, fruit & vegetable bags and liners used in separate collection schemes for bio-waste.

Generally speaking, compostable plastics do not or do not completely biodegrade in anaerobic conditions; absence of oxygen, short retention times and relatively low temperatures usually do not guarantee a complete biodegradation of compostable items. But when anaerobic digestion is followed by the composting of the digestate, the standards for compostability may also be applied.

The specific aspect dealing with the use of "**bio-based**" raw materials for the production of bioplastics is not addressed in this document since renewable raw materials that are currently present in whole or in part in the bioplastics business, do not determine the biodegradation characteristics; biodegradation is solely influenced by the kind of chemical composition (i.e. the kind of molecules and their links in the bioplastics), not by the origin of said that are present in chemical composition.

5.2 Labelling of compostable plastic items

Citizens (and many MSW managers) are challenged to correctly identify compostable bags and liners now both compostable and non-compostable items are available on the market. Hence labels, instructions, information and communication are needed for consumers to correctly sort compostable items into bio-waste collection.

The use of right and clear claims (i.e. "suitable for the collection of food waste/compostable in professional / home composting'") stresses the most appropriate end of life option suitable for the compostable items. The use of the claim „biodegradable" should be avoided because of the lack of a European standard and undefined time boundaries for the process. Moreover, some countries, such as Belgium have already banned the use of the claim "biodegradable" on packaging when related to bags made of compostable plastics.

The adoption of a European harmonized logo connected to the EN 13432 and EN 14995 standards could facilitate consumer's understanding regarding items/products complying with the compostability standard. A visual pattern could also allow for the identification of compostable items at first sight if it covers the entire product (e.g. a collection bag or liner for bio-waste) as already being done in Switzerland, Belgium, France, United Kingdom.

In conclusion, though wishing for a unique marking and claiming system, ECN recognizes that single countries or regions or even composting facilities might suggest and implement additional instructions/claims depending on their actual waste management set up to facilitate citizens in a correct waste separation practice and avoid negative issues in accepting compostable items in their bio-waste recycling plants.

6 Circular Economy and Bio-Waste

The recent updating in 2018 of the EU Waste Framework Directive[6] recognizes the importance of organic recycling and introduces the obligation to separate at source, collect and hence manage the organic fraction of MSW. Bio-waste is addressed by the following: "*Member States shall ensure that by 31 December 2023 and subject to Article 10(2) and (3), bio-waste is either separated and recycled at source, or is collected separately and is not mixed with other types of waste.*" **Food waste** represents a relevant fraction of the municipal bio-waste and of industrial waste and accounts **around 90 million of tons of matter**[7] that in a circular economy approach should be prevented, recirculated rather than disposed of through landfilling or incineration.

According to ECN, however, the management of food waste has to be seen from the hierarchy of treatment as settled at the European level. Therefore, before valorisation and recycling, **prevention and reuse strategies have to be implemented in order to produce less food waste**, according to the 30% reduction target for food waste by 2025 and 50% by 2030[8] established in the mentioned directives.

Cities and settlements are large producers of bio-waste (that statistically represents between 30% to 45% of all MSW produced) and especially in urban dwellings, most bio-waste consist of food residues and food scraps. According to ECN[9] less than 45% of all bio-waste is currently separately collected and recycled in the EU, thus there is a **huge potential to boost the recycling sector for composting** with or without biogas production. With the increasing effort to extend the collection of bio-waste also to larger urban areas in Europe, also an increase in the level of impurities is generally being experienced. This requires a larger investment in communication and outreach activities, but also the use of the most effective tools to make the collection process as easy and hygienic as possible for the citizens.

Door-to-door collection of food waste among households and commercial activities using compostable bags is already available in large cities in the EU such as Milan, Paris, Grenoble, Geneva, Copenhagen, Turin, Parma, Barcelona, etc. Large semi-urban areas are also applying this optimized model (e.g. Contarina and Sardinia in Italy, Libournais and Thann-Cernay in France, Berguedà in Catalonia) with excellent participation rates and good

[6] COM (EU) 2018/851: DIRECTIVE (EU) 2018/851 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 30 May 2018 amending Directive 2008/98/EC on waste

[7] Stenmarck A. et al. 2016: FUSIONS Reducing food waste through social innovation: Estimates of European food waste levels. Stockholm. https://www.eu-fusions.org/phocadownload/Publications/Estimates%20of%20European%20food%20waste%20levels.pdf

[8] COM (EU) 2018/851: DIRECTIVE (EU) 2018/851 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 30 May 2018 amending Directive 2008/98/EC on waste

[9] Jane Gilbert, Stefanie Siebert 2019: ECN Status Report 2019 – European Bio-Waste Management. Overview of bio-waste collection, treatment & markets across Europe. European Compost Network e.V. ISBN 978-3-9820825-0-9

quality of food waste (impurities due to non-compostable materials (metals, plastics, glass, etc.) are reported to be around 1-2% and below 5 mass % in larger cities like e.g. Milan).

A recent investigation performed in Germany (13 cities and municipalities where examined) by the Witzenhausen Institut[10] showed that kitchen-based bio-waste is mostly collected in bags, primarily in polyethylene bags (PE) and special collection bags made of biodegradable materials. Paper bags played a minor role. The widespread fear that the admission of compostable plastic bags leads to an increase in impurities could not be verified during the analyses. On the contrary, the admission of compostable plastic bags resulted in less impurities in bio-waste. The cities/municipalities with the recommendation to use compostable plastic bags resulted in 2,5% by weight impurities in the collected bio-waste against 3.8% by weight impurities in the collected bio-waste in the cities/municipalities where no compostable plastic bags were allowed.

[10] Michael Kern, Hans-Jörg Siepenkothen, Thomas Turk 2018: Collection and quality of kitchen-based biowaste - Evaluation of sorting analyses. Ausgabe 10/2018, Müll und Abfall, pp. 526-531

7 How to enhance separate collection of bio-waste

The updated Waste Framework Directive requires all Member States to meet a 65% recycling target in 2035; in order to accomplish this goal, an increase of the separate collection of bio-waste with low content of impurities and high-quality composting and anaerobic digestion are required. End-product quality standards in national regulations and in the European Quality Assurance Scheme for compost and digestate (ECN-QAS) include stringent limits on impurities (e.g. plastics, metals, glass). With the new EU Fertilising Product Regulation[11] specific limits for plastics are set on European level. By 16 July 2029, these will be re-assessed in order to take into account the progress made with regards to separate collection of bio-waste.

An **efficient and sustainable separate collection** is the result of the interaction of different factors (collection tools, frequency of collections, type of collection scheme) including communication and awareness activities promoted by local authorities[12]. Among these factors, **the collection scheme and the type of bags** used play a key role to achieve convenience for producers (i.e. households and commercial activities) and high-quality standards of the bio-waste collected. Bags and liners made of compostable plastics are transparent, light weight, watertight, breathable and represent a comfortable tool for households in sorting cooked food with a high moisture content.

An important tool for increasing the commitment to food waste separate collection is the combined use of **compostable bags and vented kitchen caddies**, in order to prevent the production of odours from organics fermentation. The "vented system" is commonly used[13] in Italy, UK, Catalonia, France, Norway, Denmark, Switzerland, Austria and proves to reduce moisture content by 7 to 10%.

The positive **effect of the use of compostable plastic bags** associated to correct awareness campaigns has been documented repetitively. In Italy, for instance, where almost 40 million people were connected in 2017 to a food waste collection scheme[14], compostable plastic bags have become the most popular collection tool with significant beneficial effects on the quality of the collected feedstock (less than 4,8% average national contamination in 2017). In Ireland, the provision of educational tools, compostable liners &

[11] COM (EU) 2019/1009: Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003

[12] Reference documents for further readings: FRANCE - http://www.compostplus.org/realisations/#guide-pratique; NORWAY- Mold development on food waste in BioBags, The centre for soil and environmental research, 2004; SPAIN - http://www.portaaporta.cat/documents/arxiu_portaaporta_142.pdf

[13] Caimi, Ricci-Jürgensen M. & E. Favoino 2006: Analisi delle performance di sacchi in carta riciclata, MaterBi e polietilene per il conferimento dell'umido domestic. Scuola Agraria del Parco di Monza

[14] CIC 2018: Annual Update about composting and biowaste recycling. www.compost.it

kitchen caddies to householders in Sligo City[15] doubled the participation and reduced the contamination levels from 18% to 1%; one year later the contamination level was still as low as 3%. A test in the city of Kassel (Germany) showed[16] that through the distribution of the compostable biobags to households the share of bio-waste could be increased by 23 % on average and the impurities dropped by 56%, which was mainly a result of substituting PE bags with compostable plastic bags.

So, if **local authorities** choose - in agreement with the composting-plant-operator - to set up a collection scheme for bio-waste with compostable bags and liners, then they should give access to valuable collection tools by a set of different means, among the ones listed here:

- providing starter kits of kitchen caddies and compostable bags to households;
- make compostable bags and liners available for free to households or by paying a reduced price at bags dispenser machines, distribution points such as recycling yards, city hall offices, schools and local administration offices, etc;
- promote the availability of compostable bags in the supermarket stores and local shops and arrange agreements with the distributors (i.e. Canton of Geneva);
- enhance proper identification of compostable bags and liners, by labelling all the communication and collection tools related to that collection and/or by communicating how to identify a compostable bag or liner.

In addition National initiatives banning or limiting the availability of single-use carrier bags made out of petrol-derived plastics can promote the use of reusable or compostable plastic carries, thus reducing the availability of single-use plastic bags and therefore the risk of households using petrol-derived plastics in separate collection of bio-waste[17]. Currently ban on plastic bags and/or carrier bags are applied in Italy[18], France[19] and Austria[20] and there are a number of different initiatives worldwide[21].

[15] Sligo County Council, Cré – Composting & Anaerobic Digestion of Ireland, Department of Communications, Climate Action and the Environment – Ireland, Novamont, 2019: Final Report - National Brown Bin Awareness
Pilot Scheme in Sligo City

[16] Gröll, K., Kern, M. Turk, T. & J. Werner 2015: Praxisversuch mit kompostierbaren Biobeuteln. Optimierung der Erfassung von Küchen- und Nahrungsabfällen in der Stadt Vellmar, Landkreis Kassel. Ausgabe 06/2015, Müll und Abfall.

[17] See EU Directive2015/720

[18] Since 2011 Italy has banned single-use shopping bags (under 100µm) and from 2018 also all single use ultra-light; compostable plastic bags, certified according to EN-13432 are exempted from the ban.

[19] Since 2016 there is a ban in France on oxodegradable bags and on all check-out single use bags; all the single use bags (under 50µ=light weight bag) other than check-out bags should be home-compostable

[20] Austrian Initiative *EN 13432-Pflicht für alle Einweg-Sackerl und Einweg-Tragtaschen*, 2018

8 Acceptance of compostable materials in composting facilities

The Waste Framework Directive (COM(EU)851/2018) allows for compostable items and products complying with the EU harmonized compostability standard EN 13432 or EN 14995 to be accepted in the organic waste treatment such as composting; article 22 states that *"Member States may allow waste with similar biodegradability and compostability properties which complies with relevant European standards, or any equivalent national standards, for packaging recoverable through composting and biodegradation to be collected together with bio-waste".*

According to ECN not all types of **compostable items** that are currently available on the EU market can be granted automatic and unconditioned access to bio-waste recycling facilities; thus, ECN does not consider composting as the main option for the recycling of any packaging item.

For items made of compostable plastics, according to ECN, it should be evaluated whether composting is the most suitable recycling option, and this decision should be taken considering each type of item individually. The main purpose of including compostable items into the industrial sector of composting is to increase the amount and quality of bio-waste as a feedstock for composting and to produce high-quality compost.

In order to determine the suitability of compostable items for bio-waste recycling facilities, ECN proposes to classify them[22] in the following main types of compostable plastic items complying to EN 13432 and EN 14995 standards:

Type 1: Tools that are functional to ease the users in the separate collection of bio-waste; these tools include **bags and liners** utilised for the separate collection of bio-waste, and could be treated in bio-waste recycling facilities by decision of the operator considering that:

- compostable liners have a long track-record[23] in increasing the amounts of bio-waste collected separately and in reducing the presence of impurities (non-compostable items), above all the traditional plastic liners;

[21] ISWA 2015: ISWA Key Issue Paper Biodegradable Plastics- An overview of the compostability of biodegradable plastics and its implications for the collection and treatment of organic wastes.https://www.iswa.org/index.php?eID=tx_iswaknowledgebase_download&documentUid=4561

[22] **Obviously, these criteria DO NOT REPRESENT the current legislation existing in single EU member states, that must in any case be applied by local composting facilities. In some EU countries the treatment at composting facilities may not be legally allowed for all three types of compostable items.**

[23] Sources: CIC, *Annual Report of the Italian Composting and Biogas Association*, 2017, Milan; Witzenhausen-Institut *Optimization of the collection of kitchen waste with compostable bioplastic liners*, 2014

- compostable plastics are widely promoted in selected countries by local authorities/districts and waste management companies, so that users (especially households) can clearly identify those tools as suitable for the separate collection of bio-waste.

Extensive technical research has demonstrated[24] that these tools do comply with standard process management of professional composting facilities accepting bio-waste collected separately. Even so some composting facilities may not be able to treat these compostable bags due to the specific material flow management.

Type 2: Compostable catering packaging used at public events or by a specific type of waste producers, may be delivered and recycled by bio-waste recycling facilities if the following criteria are met:

- the compostable catering waste is collected (together with bio-waste) in **close loop events** (festival, street fests, etc.) or by selected producers (canteens, fast foods, restaurants, etc.) whose staff has been previously trained on how to sort different waste items correctly. This approach prevents traditional catering-waste (made of conventional plastic) from being used and delivered by error to the separate collection of bio-waste;
- the bio-waste recycling facilities do previously agree to receive such types of deliveries in separate batches, in order to adopt - if necessary – specific treatment procedures;
- the bio-waste recycling facilities are able to biologically treat the compostable catering waste in order to maximise the amount of bio-waste recycled and reduce the production of rejects.

Nowadays, "traditional"-plastic catering packaging is "contaminated" with food residues at the end of its use; this it is normally disposed at incinerators or landfills, preventing the recycling of the amount of food-waste. In this case, compostable catering packaging could represent a more sustainable alternative as they will compost together with the food-waste residues they contain.

Type 3: Complex compostable packaging for food items both emptied or full (i.e. packed food items beyond the expiry date), which may also be delivered and recycled at bio-waste recycling facilities, if following criteria are met:

- waste is collected separately as a mono-stream from dedicated waste producers (supermarkets, food and beverages producers, etc.); the waste producers need to

[24] Sources: C.A.R.M.E.N. e. V, *How compatible are compostable bags with major industrial composting and digestion technologies*, C. Letalik, 2012; CIC, *Getrenntsammlung und Kunststoffe/Fremdstoffe in Bioabfall und die Kompostierung und Vergärung in Italien*, Ricci, Centemero, 2018.

be clearly informed about the types of compostable packaging that can be used and applied;

- the bio-waste recycling facilities do previously agree to receive such types of deliveries in separate batches, in order to adopt - if necessary – specific treatment procedures;
- the bio-waste recycling facilities are able to biologically treat the compostable packaging waste in order to maximise the amount of bio-waste recycled and reduce the production of rejects.

Currently most composting facilities are unlikely to accept these types of complex packaging items, due to the actual layout and the material flow management.

9 Conclusion

ECN is aware that in each EU Member State there will be significant different acceptances for compostable plastics. Acceptance will also depend on specific composting facilities according to the layout of each plant and the specific time-temperature profiles, treatment times material flow and management. Additionally, the legal framework in the single Member States has to be considered, if they allow to collect specific types of compostable materials within the bio-waste collection scheme.

Thus, it is likely that most modern, bio-waste recycling facilities may accept Type-1 items, provided that they are applying adequate temperature profiles and their process has a duration in line with the production of a medium to mature compost; but at facilities producing fresh compost the utilisation of compostable plastic bags may likely to be widely excluded. In addition, several facilities may need to adapt their infrastructure or process layout in order to include also the Type-2 and Type-3 items.

For details about the current acceptance in selected EU member states refer to Annex A.

Before taking any decision, that implies awareness initiatives and communication to households, ECN advises local authorities to liaise with National/Regional composting organisation[25], its MSW collection companies and the local composting facilities, so to verify if and how compostable plastic items can be included into the separate collection scheme for bio-waste and recycled at bio-waste recycling facilities. This approach will result into national or local, tailor-made solutions that - by taking into consideration the increasing availability of compostable plastic items - will fit to the layout and the technology of local bio-waste recycling facilities.

For further info please contact us at https://www.compostnetwork.info/

Worked out by ECN TG on Compostable Materials
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Approved by ECN Board 09/10/2019

[25] Such as ECN "bio-waste organisation" members.

Annexes:

Annex A: Acceptance of compostable plastics in selected EU member states

Annex B: European Standard EN 13432:2000 in short

Annex A – Acceptance of compostable plastics in selected EU member states

The following table is summarising the current likely acceptance of compostable plastics (according to EN 13432 or EN 14995) at composting facilities according to the information provided by Composting Organisation being ECN members; the overview is neither complete nor exhaustive at the EU-28 level.

Country (ECN composting organisation)	Current status of separate collection of bio-waste	General acceptance of compostable plastics at composting facilities	Type 1 Bags and Liners	Type 2 Catering Ware	Type 3 Complex compostable packaging
AT **(KBVÖ)** **www.kompost-biogas.info**	In Austria bio-waste collection is developed and implemented on national scale, including collection in small towns and decentralised areas. The national ordinance regarding the separate collection of bio-waste is since 1995 in force. Especially in urban areas impurities in the bio-waste pose an increasing problem. The prohibition of conventional plastic bags valid from 2020 may help to improve the situation. The only exception of the prohibition are plastic bags < 15 mikron that consist mainly of renewable raw materials and that are suitable for home composting. The second exception are reusable bags following certain criteria.	In Austria the main technique is open windrow composting with a sufficient rotting duration thus thin walled certified compostable plastic bags will not pose a problem in composting. Those can help to increase the amount and quality of collected bio-waste. Composting in general shall not be the recycling path for biodegradable products in general. Only EN 13432 certified, thin walled bags as collection aid for bio-waste are accepted.	thin-walled (<15 mikron) EN 13432 certified, labelled as home compost (TÜV Austria) bags only www.biosackerl.at	Yes, if bio-waste recycling facilities do previously agree to receive such types of deliveries, if legally permitted.	No, more valuable and meaningful is the material recycling of these precious polymers.
BE **(VLACO)** **www.vlaco.be)**	Every plant decides for themselves if they accept compostable plastics. The minimum requirement is the EN 13432 and EN 14995. Compostable collection bags are accepted by some plants. These bags are	Compostable bags can be accepted when they are conform with the EN 13432 and when it is useful for the separate collection. We prefer that the bags are distributed by the (group of) municipalities.	Only in combination with the distribution of the compostable bags, only these bags can be used	Sporadic	Sporadic

Country (ECN composting organisation)	Current status of separate collection of bio-waste	General acceptance of compostable plastics at composting facilities	Type 1 Bags and Liners	Type 2 Catering Ware	Type 3 Complex compostable packaging
	distributed by the (group of) municipalities. Only these bags are allowed. Type 2 compostable plastics can be accepted by some plants, but there will be a lot of communication and commitments between the provider (e.g. festival) and the plant.	Next to that there can be opportunities for type 2 and 3 when they are conform with the EN 13432 or EN 14995 and when the plant decide they can process it correctly. We also want to give attention to prevention and home composting.			
DE **(BGK)** **www.kompost.de;** **(VHE)** **www.vhe.de**	Considering the different procedures and treatment times in composting plants, the co-treatment of the collection bags can not necessarily be required for most systems. This would possibly lead to a significant deterioration of the quality of the product if the bags are not completely degraded. The plant operators in Germany favour paper (bags / newspaper) for the collection of biowaste. Type 2 and Type 3 items cannot be collected with bio-waste. Further info: www.kompost.de	In Germany – the acceptance of compostable bioplastics by operators of biological recycling facilities is very low. The disposal of these materials through the bio-waste bin is not permitted with the exception of collection bags for kitchen waste and is generally not desired by the plant operators. These statements are corroborated by a survey by the Bundesgütegemeinschaft Kompost e.V. (BGK) from 2018, according to which 88.6% of respondents reject the use of compostable plastic bags.	Low, to be verified with local District Authorities and Composting Facilities	No	No
FI **(Biolaitosyhdistys ry)** **www.biolaitosyhdistys.fi** **(www.sulapac.com)**	currently 30% of bio-waste is collected (2019). Target is to increase the amount to 60 %, by the end of 2023.	Compostable plastics are accepted in nearly all collection areas.	General acceptance	Yes, if agreed with local waste treatment plant	Yes, if agreed with local waste treatment plant
FR	Since July 2016 single use plastic bags under 50 microns distributed at cash point are banned. Since January 2017 single use plastic	See next rows	Widely accepted	Very rare on the market	Not available on the market

Country (ECN composting organisation)	Current status of separate collection of bio-waste	General acceptance of compostable plastics at composting facilities	Type 1 Bags and Liners	Type 2 Catering Ware	Type 3 Complex compostable packaging
	bags under 50 microns are banned. Exemption for home compostable plastic bags and made of >40% renewable raw material in 2019, >50% RRM starting with 2020, >60% RRM starting with 2025. Starting with 2020 all single use plates and cups are banned. Exemption for home compostable and biobased plastic plates and cups. Separation at source of biowaste mandatory starting with 2025. Separation at source of biowaste mandatory for all producers over 10 T of biowaste/year since 2018. Separate collection of biowaste, mainly food-waste, available for 4 M inhabitants.				
IE **(Cré)** **www.cre.ie**	Bio-waste is collected from commercial premises (food waste only) and households (food waste and garden waste) through the brown bin initiative. The two main pieces of legislation are: Waste Management (Food Waste) Regulations 2009, and the European Union (Household Food Waste and Bio-waste) Regulations 2015.	Allowed in food waste bins (in accordance with the Food Waste Regs) as long as they meet EN 13432.	Yes, once they meet the new Cre Compostable Certification Scheme.	Yes, once they meet the new Cre Compostable Certification Scheme.	Yes, once they meet the new Cre Compostable Certification Scheme.
IT **(CIC)** **www.compost.it**	Collection of bio-waste and specifically food waste is significantly developed in Italy, since the late ’90. Today separate collection of food-waste is adopted in a large portion of Italian Municipalities including collection in cities and metropolitan areas.	Compostable plastic bags are generally accepted at composting and AD+Composting facilities, collected together with bio-waste. Other certified compostable items for catering ware are often accepted at composting and AD facilities	General acceptance	Significantly developed	Low, to be verified with local District Authorities

Country (ECN composting organisation)	Current status of separate collection of bio-waste	General acceptance of compostable plastics at composting facilities	Type 1 Bags and Liners	Type 2 Catering Ware	Type 3 Complex compostable packaging
NL **(DMWA)** **www.wastematters.eu**	EN 13432 is no guarantee for acceptance. Factors such as generated co-benefit and consumers' understanding are of importance. Further info: Factsheet	Compostable plastic bags are generally accepted at composting and AD+Composting facilities but the DWMA (all plants) favour paper (bags for the collection of biowaste.	General acceptance	No	No
UK	Composting of green waste is an established process, mostly in open-air windrows. Approximately 20% of UK households have separate door-to-door food waste collections (100% coverage in Wales). Separate food waste legislation in Northern Ireland, Scotland & Wales. Anaerobic digestion is the preferred option for food waste treatment.	Allowed as part of the compost standard (PAS 100) and end-of-waste criteria (Compost Quality Protocol) as long as they are independently certified to EN 13432. Acceptance dependent upon the site, its environmental permit and waste contracts.	Dependent upon the site. Generally, not accepted at AD plants due to processing problems.	Sporadic Dependent upon the composting site.	Sporadic Dependent upon the composting site.

Annex B – European Standard EN13432:2000 in short

The definition of the "compostability" criteria is very important because materials not compatible with composting (traditional plastics, glass, materials contaminated with heavy metals, etc.) can decrease the final quality of compost and make it not suitable for agriculture and, therefore, commercially not acceptable. Additionally, the terms "*biodegradation*", "*biodegradable materials*", "*compostability*" etc. are very common but frequently misused and source of misunderstanding. The European standard EN 13432 resolves these problems by defining the characteristics a material/article must own in order to be claimed as "*compostable*" and, therefore, recycled through composting of organic solid waste.

The norm EN 13432 is a harmonised norm, i.e. it has been quoted in the Official Journal of the European Communities, it has been implemented in Europe by the national standardization bodies, and it provides presumption of conformity with the European Directive 94/62 EC on packaging and packaging waste.

According to the EN 13432, the characteristics that must be demonstrated for a compostable items and packaging are:

1. **Analysis on chemical composition**: to assess that heavy metal content and verify that are below specific threshold values;
2. **Biodegradability**: describes the capability of the compostable material to be converted into CO_2 and water (mineralization) under the action of micro-organisms in the presence of oxygen. This property is measured with a laboratory standard test method like the EN 14046 (also published as ISO 14855: biodegradability under controlled composting conditions). In order to show complete biodegradability, a biodegradation level of at least 90% must be reached in less than 6 months; this very high threshold level (90%) is considered as an indicator of total biodegradation and of no remaining chemical residues; the rest of organic matter is being immobilised as biomass.
3. **Disintegrability**: describes the property of a material to breakdown into fragments; the standard requests a minimum degradation up to a maximum treatment period of 12 weeks of industrial composting; this characteristic is measured in a composting test (for example EN 14045). The final compost is then screened with a 2 mm sieve. The mass of test material residues with dimensions > 2 mm shall be less than 10% of the original mass.
4. **Eco-toxicity**: is performed on the compost produced with bioplastics inside the input feedstock of the process; the test verifies the absence of negative effects on plant growth.

Currently there are **in Europe three main certification labels for compostable plastics**, that verify the compliance of single and specific items to the compostability criteria established in the harmonised standards EN-13432.

COMPOSTABILE CIC Verifica con il tuo Comune/Gestore Locale le modalità di conferimento e raccolta dei rifiuti	OK compost TÜV AUSTRIA INDUSTRIAL	DIN Geprüft
www.compostabile.com	**http://www.tuv-at.be/it/home/**	**https://www.dincertco.de**