

**FACT
SHEET**

APR 2015

HOME COMPOSTING



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1. DESCRIPTION OF TECHNOLOGY

1.1 __ Framework: types of composting and European legislation

Composting means the controlled decomposition of organic material such as yard trimmings, kitchen scraps, wood shavings, cardboard and paper. It is a means of recovery of organic matter into compost, which can be used for soil improvement or as a fertilizer. In general, two types of composting can be distinguished, industrial composting and home composting.

Industrial Composting can be defined as the controlled biological decomposition of organic waste under managed conditions that are predominantly aerobic (i.e. in the presence of oxygen) and that allow the development of thermophilic conditions as a result of biologically produced heat.¹ Thermophilic describes temperatures around 50-65 °C or higher.

When referring to “home” or “backyard” composting, a cooler aerobic breakdown of organic material or waste is meant, usually in small-scale composters and by ‘slow-stack’ treatment methods. Temperatures are in the psychrophilic (0-20 °C) to mesophilic (20-45 °C) ranges². The volumes treated in home composting are considerably smaller than in industrial composting and the compost is usually used in private gardens.

In some European countries, especially where industrial composting infrastructure is not or only partly established, home composting has been identified as an opportunity for managing a part of the domestic biodegradable waste stream. Minimising the amount of waste collected for landfill disposal contributes to achieving reductions in landfilling of biodegradable waste required by the EU Landfill Directive.³

1.2 __ Home composting: motivation, set up, technique

Maintaining a home composting pile makes most sense when a reasonable usage of the produced compost is ensured, i.e. when there is a demand for the resulting compost. Key factor here is the garden size. In order to avoid over-fertilisation and related possible threats to groundwater, usually about 20 to 50 square meters of garden area per person (excluding lawn) are necessary for the compost to be applied.⁴ In smaller gardens, the application of compost can be problematic, even more so when most of the area is lawn. Not only is it difficult to compost larger amounts of lawn clippings without enough bulking material, also does lawn usually need only small amounts of compost as a fertilizer compared to e.g. fruit and vegetable gardens.

In home composting, organic materials are piled up in order to form a compost heap, though simply constructed boxes can make a residential compost pile easier to set up and maintain. Alternatively, to save space and hasten decomposition, many home composters chose to contain the compost in a composting bin, with air openings on the side walls and a lid on top. These vessels are often referred to as “thermocomposters” because of the higher temperatures that can be reached by the decomposing organic matter.

Most home composting is undertaken in a “slow-stack” technique whereby the user gradually adds organic matter to the vessel and over time this will naturally decompose to form compost. As with industrial composting, it is important to maintain a carbon to nitrogen ratio in the range of 25-30 to 1. This is achieved by mixing carbon rich materials such as straw, leaves, hedge trimmings and cardboard with nitrogen rich materials such as grass cuttings, nettles, raw fruit and vegetables. Depending on local regulations, sometimes in closed vessels it is also possible to home compost meat, fish, dairy and cooked food scraps but this is usually not recommended in open heaps due to concerns about rodents and other pests.

Depending on weather conditions, the addition of water to the material may be necessary. Aerobic conditions are generally sustained, and decomposition is faster than would naturally occur if the yard trimmings or organic wastes were left on the ground. The complete stabilization and production of finished compost can take from four months to two years with longer times resulting from colder climates and little or no turning. Residents can produce compost at a higher rate by more frequently stirring the contents and moving the material through a series of containers.⁵

¹ BSI PAS100:2011 Specification for Composted Materials

² Mitaftsi O. and S. R. Smith (2006) Quantifying Household Waste Diversion from Landfill Disposal by Home Composting and Kerbside Collection. Imperial College London <http://www3.imperial.ac.uk/ewre> (1999/31/EC)

⁴ Kern, Michael (2013): Biotonne versus Eigenkompostierung – Stand und Perspektiven. Müll und Abfall 3/2013, pp. 120 - 125.

⁵ Decision Maker's Guide to Solid Waste Management, Volume II, Second Edition (EPA530-R-95-041, 1997).

2. CURRENT DISTRIBUTION OF HOME COMPOSTING

Due to a lack of EU-wide regulatory drivers to promote home composting, there is no accurate data measuring the prevalence of home composting

at EU level. However, a number of European countries do promote / report home composting to varying degrees, e.g.:

 Austria – according to the “Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft”, about 1,5 million tonnes of biowaste were treated by means of home and neighbourhood composting in 2009.⁶

 Belgium – Home composting is widely promoted with training courses and reduced waste fees as part of the pay as you throw waste strategy.

 Finland – Home composting is encouraged for houses with gardens and for garden waste. Home composting for kitchen waste is allowed in closed, insulated composting equipment.

 France – the “Grenelle 1” national law of 2008 seeks to develop organic recovery of municipal biowaste by means of industrial composting, anaerobic digestion and home composting.

 Germany – Depending on local administration, home composters get exemptions from compulsory biowaste collection services, contributions for the purchase of home composting bins and / or reductions of waste taxes.⁷

 Italy – Home composting is an expanding practice with particular reference to the northern part of the country.⁸

 Netherlands – About 5-10 % of the households are home composting. No promotional activities are in place.

 Spain – Promotion programmes for home composting exist.⁹ The Catalunan Waste Agency is providing financial support for the promotion of home composting.¹⁰

 Sweden – In 2012, almost 14% of the household waste treated biologically was home composted.¹¹

 Switzerland – The “Ordinance on Waste Treatment” under Art. 7 prescribes home composting to be encouraged by the cantonal authorities, especially through information and consulting.¹²

 UK – About 40% of households with a garden reported being active home composters, having access to a compost heap or bin.¹³ The ‘Recycle Now’ home composting programme has from 2004 until 2009 encouraged around 1.6 million households to start composting at home through offering subsidized compost bins and information campaigns.¹⁴

⁶ Bundes-Abfallwirtschaftsplan 2011, Band 1 - Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft Österreich.

⁷ Fricke K, Goedecke H, Einzmann U - Die Getrenntsammlung und Verwertung von Bioabfällen – Bestandsaufnahme 2003. In: Die Zukunft der Getrenntsammlung von Bioabfällen. Schriftenreihe des ANS. Nr.44 2003

⁸ www.isprambiente.gov.it - Rapporto Rifiuti 2007

⁹ Ministerio de Medio Ambiente y Medio Rural y Marino - Plan Nacional Integrado de Residuos 2007 - 2015

¹⁰ Agència de Residus de Catalunya - <http://www.arc-cat.net>

¹¹ Avfall Sverige – Rapport U2013:16: Hushållsavfall i siffror.

¹² Technische Verordnung vom 10. Dezember 1990 über Abfälle (TVA)

¹³ WRAP (2007) - Understanding Food Waste - ISBN: 1-84405-310-5

¹⁴ www.wrap.org.uk - home composting guidance and information

3. REGULATORY FRAMEWORK

On EU level, the above mentioned Landfill Directive requires member states to reduce the amount of biodegradable waste going to landfill to 35% of 1995 levels by 2016 (for some member states by 2020). A number of member states include the promotion of home composting in their national strategies as a mean to reach those quotas.¹⁵ The Waste Framework Directive (2008/98/EC) contains specific biowaste related elements, such as recycling targets for household waste, which can include bio-waste and a mechanism allowing setting quality criteria for compost (end-of-waste criteria).

In July 2014, the European Commission adopted a legislative proposal under the umbrella of the Circular Economy Package to review waste- and

recycling-related targets from several Directives.¹⁶ This proposal, however, was deleted together with the whole Circular Economy Package from the Commission's work programme 2015. A new and more comprehensive proposal – again including amendments regarding waste legislation – will be presented by the Commission presumably in 2015.

Biodegradable waste accounts for a large proportion of municipal waste in all European member states. In many documents such as national waste strategies and reports, home composting is generally regarded as an effective waste reduction tool. A number of Member States (e.g. Sweden¹⁷) have seen an increase in home composting take-up following the introduction of Pay By Weight schemes for residual wastes.

4. BIOPLASTICS AND HOME COMPOSTING

Bioplastics are biobased, biodegradable or both. The relevant group of biodegradable/compostable plastics comprise e.g. PLA, starch blends, or PBAT (blended with PLA or starch blends). The claim "compostable" for bioplastics should only be used if the conditions of the biodegradation pro-

cess (time frame, temperature, etc.) are clearly defined. Compostable plastics currently available in the market are foremost certified according to the harmonized European standard EN 13432 and thus industrially compostable.

4.1 Standards

On European level, the reference standards for compostable products are the harmonized European standard EN 13432 and EN 14995 (for non-packaging items). Both refer to compostability in "municipal or industrial biological waste treatment facilities", i.e. industrial composting. Specific research on the behaviour of EN 13432 certified bioplastics in home composting has been conducted in order to assess their degradation in this environment. It shows that home composting generally occurs at a slower pace compared to industrial composting. A significant study has been conducted by the Bauhaus-Universität Weimar, Germany during the Kassel Project in 2002. Different products made of different materials show significant distinctions in behaviour with some items degrading up to 97% and others showing no significant degradation in a time span of 12 months.¹⁸⁻¹⁹ In another series of trials, different groups of materials degraded from 5% to 90% in 180 days.²⁰ These results indicate that the materials exhibit a range of biodegradation proper-

ties and that conformity to the EN 13432 and to the EN 14995 does not simultaneously assure a good performance in home composting. A European standard for home compostability is currently lacking. However, the 2015 amendment to the Directive 94/62 EC on packaging and packaging waste foresees that the European Commission tasks the European Committee for Standardization (CEN) with the development of a separate standard for home-compostable packaging.²¹ When considering a possible European home compostability standard, it must be noted that due to different policies it is very difficult to define homogeneous criteria valid for the different EU member states. In addition, the process of home composting itself is difficult to standardize. For the development of such a standard, already existing standards or certification schemes for home compostability in a number of EU member states might be a helpful basis. Together with this standard, the basic principle and minimum requirements of home composting should be defined.

¹⁵ Report from the Commission [COM(2005)105 final]

¹⁶ Landfill Directive (1999/31/EC), Waste Framework Directive (2008/98/EC) and Packaging and Packaging Waste Directive (94/62/EC).

¹⁷ Dhalén L. (2008) Household Waste Collection: Factors and Variation. Doctoral Thesis <http://epubl.luth.se/1402-1544/2008/33/LTU-DT-0833-SE.pdf>

¹⁸ Klaus, M.; Bidlingmaier, W. (2003): Backyard or Home Composting of Biodegradable Polymer Packaging. Proc. of the 4th International Conference on Biological Processing of Organics: Advances for a Sustainable Society - ORBIT 2003 Perth, Australia. P. Pullammanappallil, A. McComb, L.F. Diaz, W. Bidlingmaier (Eds.), vol. 2, Perth, Australia, pp. 682-691.

¹⁹ Klaus, M. (2004): Degradation of Biologically Degradable Packaging Items in Home or Backyard Composting Systems With Special Focus on the Pilot Scale Field Test for Compostable Packing in Kassel, Germany. Rhombos Verlag Berlin.

²⁰ J.H. Song, R.J. Murphy, R. Narayan and G.B.H. Davies: Biodegradable and compostable alternatives to conventional bioplastics. *Phil. Trans. R. Soc. B* (2009) 364, 2127-2139.

²¹ Directive (EU) 2015/720 of the European Parliament and of the Council amending Directive 94/62/EC. April 2015.

4.2 __ Standards on EU Member State level

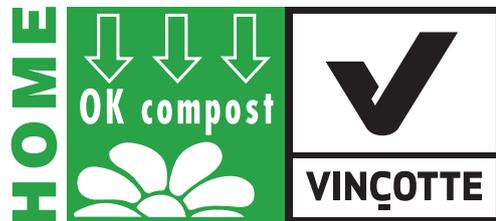
Italy - There is a national standard relating to the suitability of biodegradable plastics for composting at ambient temperature, the UNI 11183:2006²². This Standard specifies the biodegradability requirements of plastic materials which are utilized to make products disposable through home composting, i.e. through aerobic biodegradation at ambient temperature (between 21°C and 28°C).

Belgium - There is a private specification, the OK Compost Home programme²³. The OK Compost Home programme is broadly based on EN 13432:2000 but with longer test periods for biodegradation and disintegration and with the testing taking place at lower temperatures.

4.3 __ Certification and labelling

Currently there are two certification bodies which offer a specific “home compostability” certification programme: DIN CERTCO (Germany) and Vincotte (Belgium). Products that have passed all of the relevant criteria are permitted to display the appropriate logo and the certified company number. In the same way as for the certification for industrial composting, not only the raw materials but also the finished products manufactured with

these materials need to be tested and certified. The German certifier DIN CERTCO offers a certification programme for its “DIN Geprüft home compostable” certificate. This certificate is based on the Australian standard for home compostable plastics, AS 5810.



²² UNI 11183:2006 "Materie plastiche biodegradabili a temperatura ambiente. Requisiti e metodi di prova" - www.uniplast.info

²³ www.vincotte.com

5. BENEFITS AND CHALLENGES OF HOME COMPOSTING

5.1 __ Benefits

- ➔ The end-consumer takes care of the separation, treatment and ultimate end-use of the organic waste.
- ➔ Home produced compost reduces the need for soil conditioning and peat based products.
- ➔ Home composting of home compostable bioplastics will reduce the volumes of mixed plastics to be handled.
- ➔ It can provide municipalities with potential cost savings in terms of waste collection and disposal and thus also provide residents with potential cost savings in terms of reduced waste fees.
- ➔ Home composting satisfies the proximity principle.
- ➔ It reduces the amount of biodegradable waste going to landfill.

5.2 __ Challenges

- ➔ The process of home composting is difficult to define and thus to measure: It is for this reason that there is a lack of regulation in this area.
- ➔ If home composting is not properly managed it could contribute to GHG emissions (nitrous oxides and methane).
- ➔ Proper education on composting processes and compost application is necessary.
- ➔ To avoid difficulties in distinguishing between home and industrially compostable products, labelling and communication should be very clear.
- ➔ Not everyone has a garden or is willing to home compost.
- ➔ Proper use of the resulting compost has to be ensured.
- ➔ Meat based / cooked food scraps should not be composted in open heaps to eliminate pests and hygienic problems. The same applies to contaminated home compostable packaging.
- ➔ If home composting is not properly managed, products could fail to compost even if certified "home compostable".
- ➔ There can be risks of too much water (rain) running through the composting pile and releasing e.g. nitrogen and passing it as nitrate to the soil and groundwater.

6. CONCLUSION

Home composting is a means of organics recovery for private households. At best, it is an additional feature to separate (kerbside) collection and industrial composting, providing that the relevant infrastructure is in place. This ensures the proper treatment of all organic waste.

The development of a harmonized European standard for home compostability is a reasonable step, as it provides a counterpart to EN 13432 for industrial compostability and also helps to facilitate the appropriate communication.

7. ADDITIONAL INFORMATION

Recycle now by WRAP: <http://www.recyclenow.com/compost/>

Cornell University: <http://cwmi.css.cornell.edu/compostingathome.pdf>

USEPA: <http://www.epa.gov/epawaste/conservation/composting/index.htm>

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