

Position of European Bioplastics

FATE OF COMPOSTABLE PLASTICS IN POST-CONSUMER RECYCLING STREAMS

There is a widespread misconception about compostable plastics and their allegedly negative impact on mechanical recycling streams.

Currently, only a limited number of plastics are sorted for recycling, those are in general the plastics with the highest market shares, such as PET, PP, PE¹ and, in specific cases, also PS. Examining the input streams of sorting facilities, it is clear that several other types of polymers are entering the facilities, which – due to low volumes – will not be recycled and have to be sorted out. Hence, potential **cross-contamination of recycling streams is a general issue that involves all kinds of plastics and materials, not only compostable plastics specifically.**

Existing sorting technologies, such as density separation and NIR (near-infrared) sorting, can efficiently separate and sort different kinds of polymers, including compostable plastics. Compostable plastics are mainly polyesters that have very different densities compared to polyolefins and very distinctive NIR-spectra compared to polyolefins, PET and PS.² Numerous studies have proven that sorting of compostable

plastics is effective^{3, 4, 5, 6} and that after sorting, the contamination rate in an established recycling stream is usually very low (below 1%).^{7, 8} Italy, for example, which is the country with the highest number of compostable packaging on the market in the EU, reports misthrow rates of compostable plastic products in conventional packaging waste streams below 4% before sorting and a contamination rate of lower than 0.8% after sorting.⁹

To ensure a high quality of recyclates and to reach recycling rate targets, advancements in sorting technologies are currently taking place to improve accuracy and efficiency of sorting processes. NIR for the flexible plastic waste stream will further improve the purity of recycling streams and keep possible contamination with all kinds of polymers low. Innovative technologies like digital watermarks will be able to improve the purity of streams even more.

There is no negative impact of possibly remaining impurities of compostable plastics on existing recycling streams.

¹ For PE usually two separate streams exist, one for LDPE (low density PE) and one for HDPE (high density PE).

² See: Domestic Mixed Plastics Packaging Waste Options, Final Project Report, WRAP, June 2008.

³ CE Delft, PLA sorting for recycling (2021): https://cedelft.eu/wp-content/uploads/sites/2/2021/05/CE_Delft_190180_PLA_sorting_for_recycling_Def.pdf

⁴ Xiaozheng Chen, Nils Kroell, Ke Li, Alexander Feil, Thomas Pretz, Influences of bioplastic polylactic acid on near-infrared-based sorting of conventional plastic, RWTH Aachen University, Aachen, Germany (2021).

⁵ M. Moroni, A. Mei, Characterization and Separation of Traditional and Bio-Plastics by Hyperspectral Devices, DICEA-Sapienza University of Rome, CNR-Institute of Atmospheric Pollution Research (2020).

⁶ COTREP: Avis Général 58. Emballages souples compostables. July 2019.

⁷ C. A. Beretta, Monitoring of plastic packaging recycling at sorting facilities, COREPLA, Milan Oct 2017.

⁸ Separate recycling streams for mechanically or chemically recyclable bioplastic materials will become economically feasible with growing market volumes. A certain market share of a material is necessary to establish its own recycling stream. PLA is currently the most widely used biodegradable and compostable material for packaging, thus a separate sorting stream could make sense in the near future.

⁹ C. A. Beretta, Monitoring of plastic packaging recycling at sorting facilities, COREPLA, Milan Oct 2017.

Should compostable plastics, alongside other impurities, enter the recycling streams of PE or PET, no negative impacts are to be expected. This has been shown in a variety of studies: contamination rates of up to 10% - which are very unlikely to occur, even in the medium and long term - generally do not interfere with the quality and performance of the recyclate, neither for flexible films nor for rigid packaging applications.^{10, 11, 12, 13}

Compostable plastic applications are designed for organic recycling. Labelling is crucial to direct the product to the appropriate recycling stream.

Certified compostable products should be collected with biowaste and then treated in industrial composting and/or anaerobic digestion facilities.¹⁴ All compostable plastic products should display clear labelling to avoid misthrows and to ensure separate collection in the dedicated waste stream. Applicable standards and related certification marks are available for industrial and home compostability.^{15, 16}

The market share of biodegradable and compostable plastic packaging in Europe is currently still very low. Bioplastics represent around 1% of the more than 390 million tonnes of plastics produced globally every year. Around 52% of bio-

plastics on the market are biodegradable/compostable plastics, about half of which are used for packaging applications, with PLA being the most widely used material, followed by starch blends and PHA.¹⁷ Consequently, even if compostable plastics accidentally end up in other plastic waste streams, current and foreseeable market volumes are so low that after sorting, any remaining contamination will be negligible and the potential impact insignificant.

About European Bioplastics

European Bioplastics (EUBP) represents the interests of more than 80 member companies throughout the European Union. With members from the entire value chain, European Bioplastics serves as both a contact platform and catalyst for advancing the objectives of the growing bioplastics industry. For further information, please visit <http://european-bioplastics.org>.

¹⁰ H.-J. Endres, A.-A. de la Cruz, Influence of PLA/PBAT material (ecovio®) on the recycling of conventional LD PE, University of Applied Sciences, Hannover, 2013.

¹¹ M. Van den Oever, K. Molenveld, M. Van der Zee, H. Bos, Bio-based and biodegradable plastics - Facts and Figures, Wageningen University, 2017.

¹² C. Heß, Influence of BIOPLAST-material and conventional non-PE plastics on the mechanical properties of recycled PE-Film, BIOTEC, Presented at K Fair 2013.

¹³ Thoden van Velzen EU, Chu S, Molenveld K, Jašo V. Effect of poly lactic acid trays on the optical and thermal properties of recycled polyethyleneterephthalate. *Packaging Technology Science*. 2022;1-10.doi:10.1002/pts.263310.

¹⁴ If certified and labelled accordingly, some products may also be treated via home composting.

¹⁵ The standard for industrial compostability is EN 13432 (Packaging - Requirements for packaging recoverable through composting and biodegradation - Test scheme and evaluation criteria for the final acceptance of packaging), a harmonized home compostability standard is currently being finalized. Related certifications are offered by DIN CERTCO and TÜV AUSTRIA Belgium.

¹⁶ The acceptance of certain applications in the bio-waste or packaging bin may be regulated locally.

¹⁷ European Bioplastics market data 2022.