

LCA OF FOOD WASTE MANAGEMENT IN ITALY, WITH A SPECIAL FOCUS ON THE EFFECT OF THE BAGS USED FOR THE COLLECTION

Mario Grosso, Politecnico di Milano, Italy
mario.grosso@polimi.it
Giovanni Dolci, Politecnico di Milano, Italy
Lucia Rigamonti, Politecnico di Milano, Italy

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More than 7 million tonnes of organic fraction were separately collected in Italy in 2018, following a robust increasing trend. Its treatment is progressively shifting towards anaerobic digestion instead of composting, with about 3 million tonnes currently being processed in integrated anaerobic/aerobic treatment plants or in purely anaerobic ones.

The type of bag used for the organic waste collection is crucial in determining the overall performance of the system, since there is a mounting evidence that bioplastic bags, especially in the form of shoppers, might cause problems during the anaerobic treatment. On the other hand, paper bags allow for a smoother operation of the plant, since they don't need to be removed upstream.

This project aims to analyse the environmental performances of the full treatment chain of the organic waste processed with anaerobic digestion, starting from the assessment of the weight losses during the household storage, and considering the different behaviour of the bags at the treatment plant. In particular, the degradation potential and the corresponding biomethane production of the different typologies of bag were evaluated at the laboratory level, by means of BMP (Biochemical Methane Potential) tests carried out under different conditions.

To assess the performances of the overall organic waste treatment chain, a comparative Life Cycle Assessment for the different types of collection bag (paper bags, bioplastic bags dedicated to the food waste collection, bioplastic shopper bags that can be reused for the food waste collection) was carried out. The following stages were included: the production and supply of raw materials used for the manufacturing of the collection bags and their packaging, the bags production, their distribution, their use at the household, and the collection and treatment of the food waste. As regards the latter, an anaerobic digestion process followed by post-composting was considered, including the valorization of useful outputs and the management of residues.

For the recycling and recovery processes, two different modelling approaches were considered: the Circular Footprint Formula applied to Product Environmental Footprint (PEF) studies and the approach applied in the framework of the International Environmental Product Declaration (EPD) System.

The results revealed how the use of paper bags for the storage of food waste generally leads to improvements in the impact associated to its overall management, but this is strongly affected by the different approaches in modeling systems where recycling occurs. As regards the impact contributions, the most impacting phases in the overall system are the bag production (for bioplastic) and the food waste collection.

The analysis allowed also to state that shopper bags are less impacting than dedicated bioplastic bags because they are utilized, as the first purpose, for carrying the grocery shopping.