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# Improving food waste collection

How BASF solutions contribute to closing the nutrient loop towards a Circular Economy



## Improving food waste collection: How BASF solutions contribute to closing the nutrient loop towards a Circular Economy

Fruit and vegetable (F&V) bags made of ecovio® are more than simple carrier bags. The bags can be re-used to improve food waste collection and recovery. Additionally, they reduce food losses during transport and storage of fruit and vegetables due to breathability of the bags.

The European Union has renewed the Waste Framework Directive: Separate organic waste collection will be mandatory in Europe from the end of 2023. In France, for example, unsorted household waste still contains approx. one third organic fraction, mostly food waste. It amounts to 6.3 million tonnes per year\*. By now, only 36 % of the French population has access to the separate food waste collection system\*. It is estimated that 60 % of the food waste could be diverted from landfills and incineration to organic recycling. For this it would be necessary that most people have access to separate food waste collection and use compostable fruit and vegetable bags (Figure 1).

The European Union sets targets for reducing plastic bag consumption. Nevertheless, it also recognizes the benefits of compostable bags for organic waste diversion. Thus, it allows EU member states to exempt compostable bags from the reduction targets. Therefore, France has decided to exempt home-compostable biobased F&V bags from a ban of very lightweight plastic bags.

BASF offers bio-based and certified home-compostable polymers for the production of fruit and vegetable bags compatible with this new French law\*\*. Home-compostable bags made of ecovio® support consumers in safer, cleaner and easier separate food waste collection. Convenience is a driver for volume increase of collected food waste. As the use of bags made of ecovio® increases organic waste diversion rates, they contribute to closing the nutrient loop.

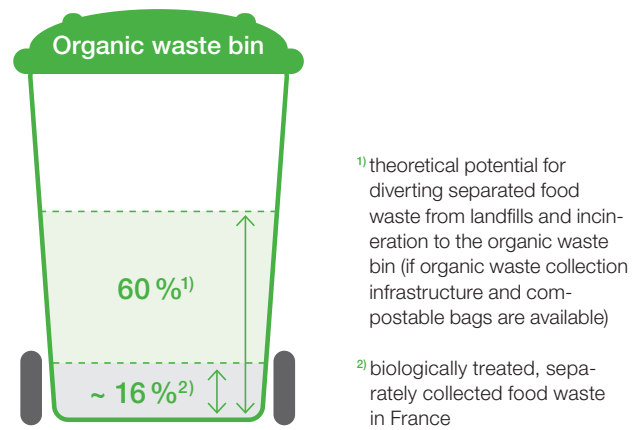


Figure 1: Theoretical potential for separate food waste collection in France – est. five million tons per year

## BASF Life Cycle Assessment for fruit and vegetable bags – key conclusions

BASF has conducted a Life Cycle Assessment of fruit and vegetable bags made of different materials available in supermarkets in France: polyethylene (PE), paper and certified home-compostable ecovio®. In a first step, they can be used to transport fresh fruit and vegetables (such as tomatoes). Afterwards, the bags serve as organic waste bags for food waste disposal (Figure 2).

The assessment was calculated by TÜV Rheinland on behalf of BASF. The results of the Life Cycle Assessment were challenged and confirmed by a review panel of independent institutes (consisting of Quantis, Elipso and CompostPlus).

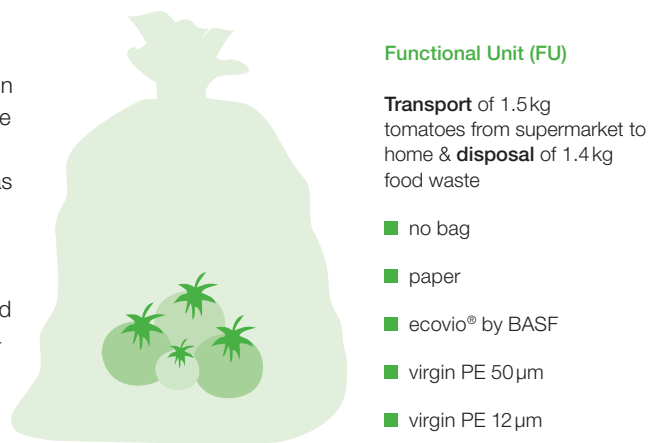


Figure 2: Scope of the Life Cycle Assessment for F&V bags

\* Deconinck, S., de Wilde, B., Velghe, F., Mortier, N., McDonnald, N. & Tillinger, R.: Future importance of AD and AD-able plastics on a worldwide scale, 2014.

\*\* Transition énergétique pour la croissance verte ; NF T51-800 on home-compostability of plastic (published 11/2015).

## Influence of consumer behavior: Food waste collection is the key to demonstrate advantages of compostable fruit and vegetable bags

The number of distributed home-compostable plastic F&V bags in France is estimated to be five billion per year (166 bags per household). However, the conservative assumption is that each household with organic waste bin uses only ten F&V bags per year for food waste collection. Taking this assumption into account, up to around 60% of the potential food waste per inhabitant could be recovered (Figure 1). The prerequisite is that people are connected to the organic waste collection system. The study shows: It would bring environmental benefits to enable people to improve their habits and collect more food waste in the organic waste bin.

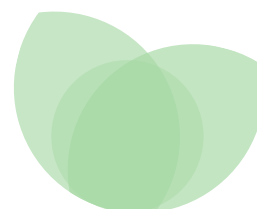
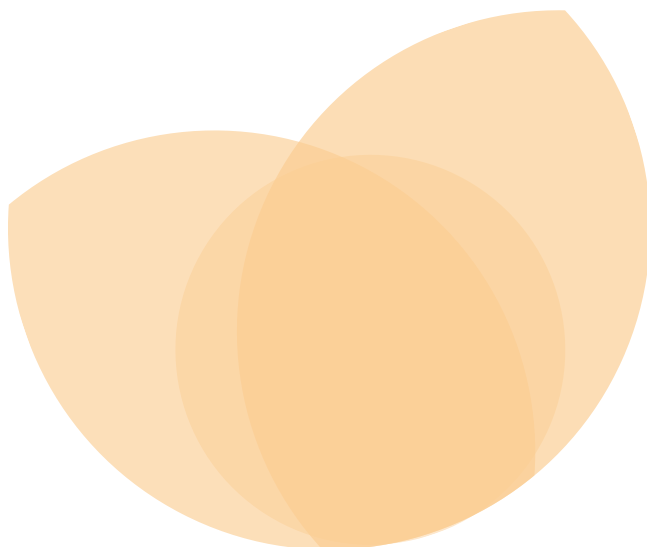
A compostable, dual-purpose bag is such an enabler. It allows the hygienic and convenient collection of a bigger amount of kitchen waste for organic recycling. In order to make the consumer behavior tangible and quantifiable, BASF drives various field projects. These demonstrate that consumers collect more food waste with compostable watertight plastic bags compared to no-bag availability. They also collect food waste which they do not usually collect, such as fatty, liquid food residues of higher calorific value.



## Additional benefit of fruit and vegetable bags made of ecovio®

The study also analyzed the benefit of ecovio® bags for extended food shelf life in an additional scenario. Films made of ecovio® offer high water vapor and oxygen transmission rates. With the right bag volume, optimal humidity and oxygen concentration for different fruit and vegetables in bags can be achieved. This contributes to shelf life extension.

A BOKU research report from 2015 finds the following: Tomatoes stored in ecovio® bags have an approximately four times longer shelf life compared to PE bags. Taking the food storage into account, the scenario showed the environmental benefits for ecovio® compared to all alternatives analyzed. This is due to the longer shelf life and a lower demand of fresh tomatoes.



## Environmental performance of biobased and certified compostable bags

The ecovio® bag displays a similar or better environmental performance compared to traditional paper or PE bags in most environmental impact categories (except for land use). The most relevant environmental impact categories are: climate change (Figure 3a), freshwater eutrophication (Figure 3b) and summer smog. The reasons for these results are:

- dual usage of bag: for transport of tomatoes and for organic waste collection
- improved food waste collection rates (less organic waste ends up in landfills and incineration plants)
- reduced need to wash the organic waste bin due to bag usage (for both paper and ecovio® bag)

The key benefits of ecovio® do not lie in material production but rather in material properties that enable the ecovio® bags to increase the separate food waste collection. Thus ecovio® bags help to promote the Circular Economy. The different shares of the respective End of Life (EoL) options for the disposal of organic waste (Figure 4) drive the differences in the environmental assessment between the alternatives considered.

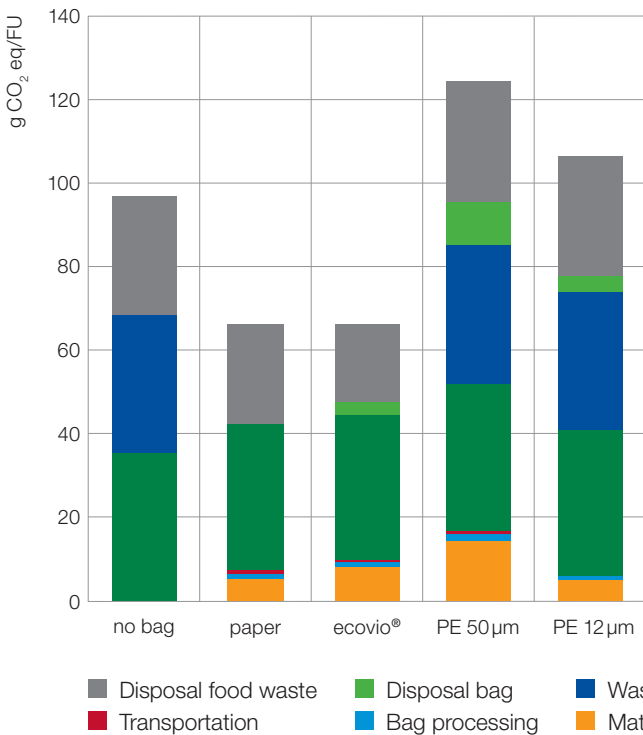


Figure 3a: Climate change

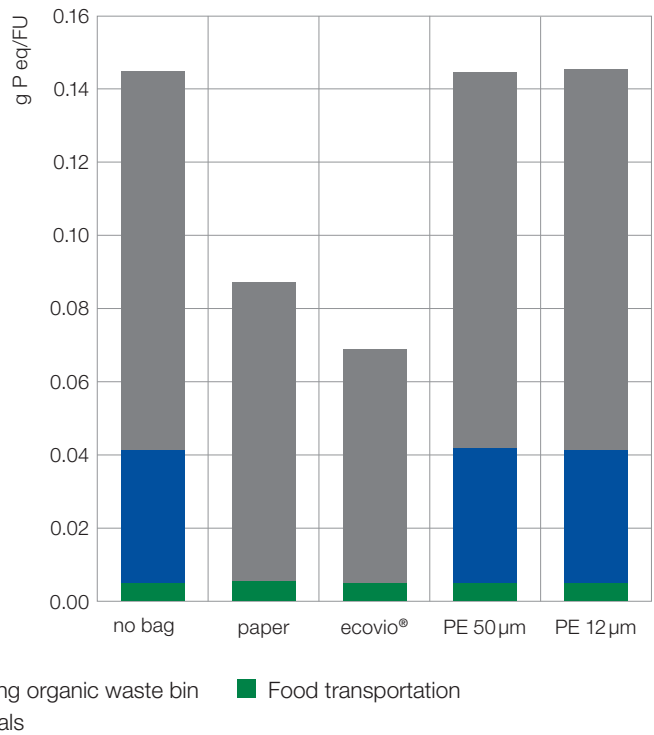
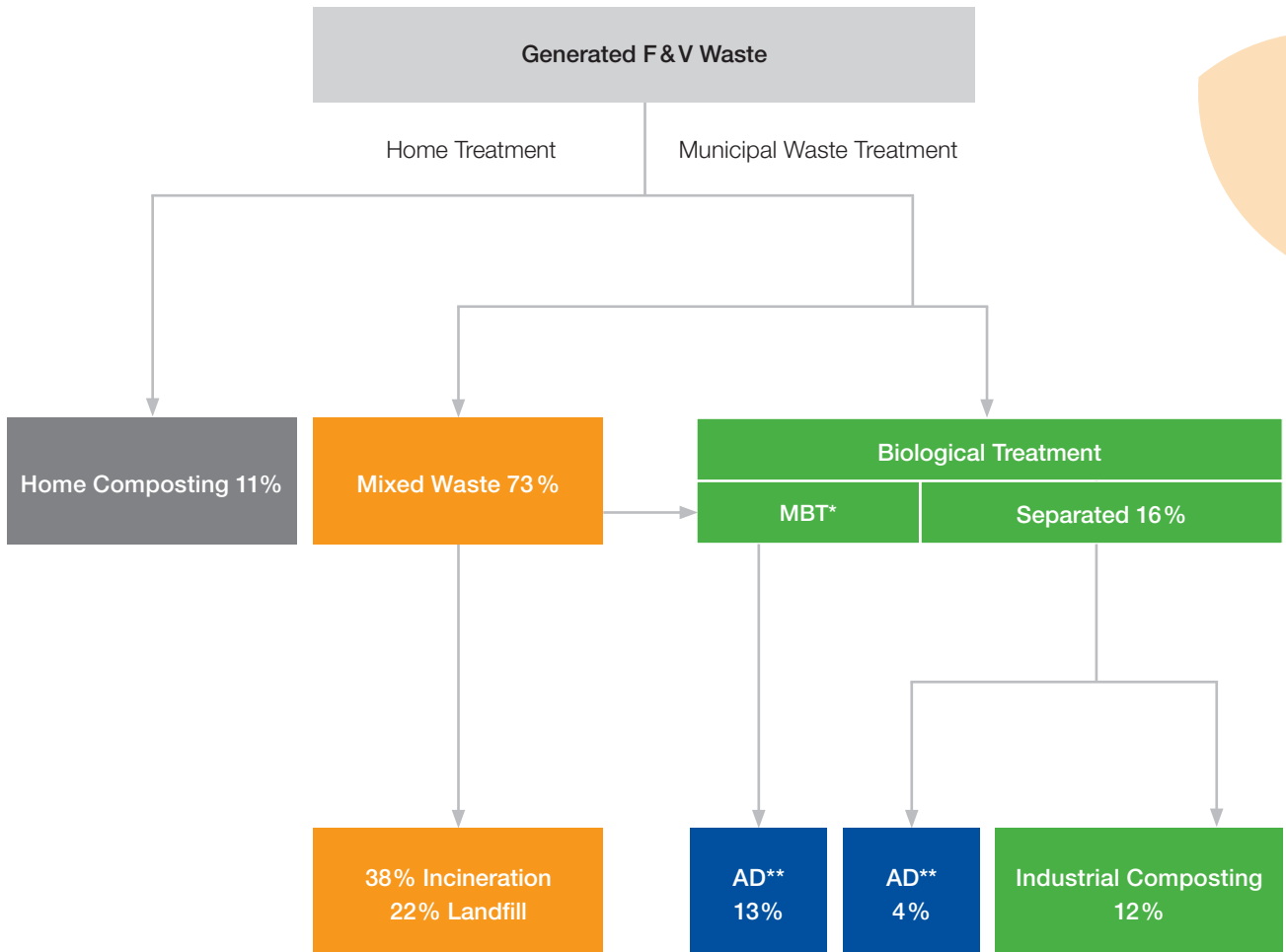


Figure 3b: Freshwater eutrophication



**No bag:**

- 11% home composting
- 22% landfill, 38% incineration with energy recovery
- 12% industrial composting
- 17% AD inclusive MBT

**Paper:**

- 13% home composting
- 17.5% landfill, 35% incineration with energy recovery
- 16.5% industrial composting
- 18% AD inclusive MBT

**ecovio®:**

- 13% home composting
- 15.5% landfill, 32% incineration with energy recovery
- 19.5% industrial composting
- 20% AD inclusive MBT

**PE:**

- 11% home composting
- 22% landfill, 38% incineration with energy recovery
- 12% industrial composting
- 17% AD inclusive MBT

\* MBT = Mechanical Biological Treatment, \*\* AD = Anaerobic Digestion

Figure 4: Estimated food waste disposal in France based on the OWS country report, PEF-OEF End of Life shares and expert judgements





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### **Note**

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