

# Biodegradable Polymer Packaging - Practical Experiences of the Model Project Kassel

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## 1 The “Model Project” Kassel

A market application test with packing made from BDP was carried out to investigate whether or not it is possible to label biodegradable packaging products plainly (see Figure 1) and in a recognisable manner, as well as to motivate consumers to properly separate these materials after use and place them into the municipal organic waste bin. One main objective of this project was to determine whether the concentration of impurities as conventional plastic packing, metals, etc., in the organic waste (“biowaste bin”) changes due to improper identification of BDP as conventional packaging by consumers. Once the products were introduced into the market, the materials were collected already mixed with the organic waste and transported to a full-scale processing facility for composting. The finished compost was thoroughly evaluated to determine its quality. Furthermore, the compost thus produced was tested on an agricultural pilot scale application. The project was conducted to prove the possible recovery and recycling via the municipal organic waste collection under real conditions.

The pilot test was carried out in the city of Kassel, Germany. Kassel has a population of approximately 200 000 inhabitants in about 100 000 households. Kassel was selected for the project for several reasons: the social-economical structure of the city; the existence of the “biowaste bin”, which covers around 60% of the households; the multitude of retail shops and the support of the authorities.

Biodegradable polymers were developed to close the materials cycle. A plant as starch producing corn is grown, its starch processed to a raw biodegradable material and used to make a biodegradable product, say a packing system (e.g. wrapping, tray, etc.). Products with biodegradable packing are sold to consumers via the retail trade and deposited after use by consumers in the adequate recovery system, here the separate organic waste collection. Source separated organics, including biopolymeric packing, are processed at a composting plant resulting in a compost fertiliser that is applicable for agricultural purposes.

Biodegradable items sold during the test included: bags, trays, racks for fruits and vegetables, packaging of diapers, dairy products, bakery and butcher’s products, bin liners and such compostable food ware/catering products as cups, plates and cutlery. Table 1 provides information about product types and their market share (all biodegradables sold in Kassel = 100%).

**Table 1: BDP products sold during the pilot test [source DIN CERTCO 2002]**

Product type	Market share
Organic waste collection bags	12%
Films	1%
Food-service articles	6%
Food packing	27%
Shopping bags	54%

Before all of these products were introduced into the market, they had to pass a certification procedure according to a DIN standard [DIN V 54900, 1998] that demonstrated their biodegradability. All of the products were marked identically with the label shown in Figure 1.



**Figure 1: Compostability Label**

Biodegradable packaging products were checked in a multi-stage examination procedure, based on a complete chemical analysis of all ingredients concerning their biodegradability, the complete biodegradability in lab-scale testing apparatus and their compostability at a full-scale composting plant. The composts that were produced were checked according to their quality. Maximum degradable thickness and the planned contents of the packaging were evaluated by DIN CERTCO (the body responsible for the product certification in Germany).

The main objective of this project was to determine whether the concentration of impurities (such as PE, PET, and others) in organic waste ("biowaste bin") changes due to improper identification of BDP packing as a conventional packing by consumers. The amount of impurities in organic waste influences the quality of produced compost and the extent of its treatment, (i.e. segregation of impurities, etc.). It is thus essential to minimise the concentration of impurities.

Once the products were introduced into the market, the materials were collected already mixed with the organic waste and transported to a full-scale processing facility for composting. It was decided to recommend that the citizens of Kassel, during the pilot test, deposit their biodegradable packing items only in the municipal organic waste collection system and **not** in their own home composting systems. In case there was no access to this collection system, they were afforded the chance to return the packaging items to one of the two municipal receiving offices for recyclables or to retail stores to assure their recycling. The finished compost was thoroughly evaluated to determine its quality. Furthermore, the compost thus produced was tested on an agricultural pilot scale application.

A communication strategy was planned to meet the following requirements: the consumer should be aware of biodegradable packaging materials and a certain incentive for buying such products should be ensured. Another point was to communicate the proper sorting behaviour of consumers, since it is common in Germany to sort packaging into a different storage container for a completely different collection system ("yellow bag"). It was strongly emphasised that this new product, due to its composition, had a predetermined way of being recycled - the organic waste collection. Communication and market analyses took place during the entire 20-month period of the testing phase.