

# FACT SHEET

European Bioplastics

## Better packaging with bioplastics

### Information on technology and market development

#### Plastics packaging – a good choice

There is no larger market segment in the plastics industry. More than a third of all plastics are made into packaging, that is 100 million tonnes worldwide and almost 20 million tonnes in the EU. In Western industrial countries, 50 percent of all goods are packaged in plastics.

Without packaging to protect sensitive goods en route to the customer, many products would go off or be damaged during transport. Packaging is also a means of advertising the product. It conveys important information to the consumer and makes efficient distribution of goods possible through compacting. In spite of its extremely light weight, plastic packaging can be easily adapted to meet specific application demands.

#### *The core question: how can plastics packaging be more sustainable?*

However, this alone does not meet all requirements. Due to the enormous consumption of packaging, the question arises how to produce, and to reuse, packaging more sustainably.

#### Bioplastics packaging – a logical outcome

Growing rubbish volumes and a noticeable shortage in fossil resources are accelerating the search for better packaging concepts. Functioning closed loops must be created and products generated from waste in order to halt the squandering of resources. Politicians have long called for the implementation of closed loop systems, as emphasized by the number of regulations of the packaging market.

*It is only when renewable resources are used in the production of packaging that it can be called a true closed loop.*

The development of bioplastics<sup>1</sup> and packaging made from bioplastics are the logical consequence of current demands placed on packaging materials. They incorporate all technical advantages of plastics, however, renewable resources are used in their production rather than fossil resources. The biobased carbon captured in the material can either be recycled in technical closed loops or via natural means<sup>2</sup>.

<sup>1</sup> For more information see Fact Sheet "What are bioplastics?" Download: [www.european-bioplastics.org/multimedia](http://www.european-bioplastics.org/multimedia)

### Bioplastics packaging – multiple use and high performance

Packaging from biobased plastics has been developed over the past 10 years. New materials such as PLA, PHA, cellulose or starch-based materials yield packaging with completely new functionalities. Whereas the behaviour of biobased versions of conventional plastics such as Bio-PE and biobased PET is technically equivalent to their fossil versions (so-called ‘drop-in solutions’). It is the reduced environmental impact through the use of renewable resources that makes a real difference.

The performance and ecological profile of packaging can be improved in many ways – through biomaterials and material combinations, such as the blending of different bioplastics, or in lamination with paper or cardboard. Recycling components of conventional plastics such as rPET are now being combined with bioplastics. The properties of bioplastics can be further improved through tailor-made additives, colour and processing aids. Last but not least, the continuous development of new biobased monomers contributes to producing countless possibilities. The packaging manufacturing industry, which is mostly comprised of medium-sized companies, is benefiting from these new materials and the creation of more sustainable packaging solutions for both small and large users.

*The medium-sized packaging industry is benefiting from new materials and the creation of sustainable packaging solutions for users.*

Packaging made from bioplastics can be processed with all standard plastics processing technologies. Specific machinery is not required. The processing parameters are simply adjusted for bioplastics. A large range of products suitable for numerous and varied applications has been developed in a short period of time. The quality of bioplastics packaging can easily match that of traditional plastics packaging. Biobased versions of plastics such as PE or PET are technically 100 percent equivalent. Packaging from novel materials are continuously being improved. Their development is forging ahead. Biobased multi-layer films for high-quality packaged goods introduced in recent years evidence this development.

### The market is demanding bioplastics packaging

Compostable food packaging is the first successfully commercialized product from bioplastics. Bags and trays from biodegradable bioplastics are particularly suitable for fresh produce such as fruit and vegetables as they enable longer shelf life. In addition, confectionaries such as chocolate and biscuits, or dry foodstuffs such as tea or muesli, are now also now being packaged with bioplastics.

Food service packaging is a large growth segment. No matter whether cups, plates, cutlery or carrier bags – the entire product spectrum can be made from bioplastics. They are used at sporting events, on planes or in trains. The biodegradability of bioplastics enables the joint recovery with food residue via composting or anaerobic digestion, as long as conventional plastics do not contaminate this stream.

*From a niche product in organic trade to premium packaging for branded goods – bioplastics are conquering all packaging segments!*

Single or multi-use carrier bags made from bioplastics are used across Europe by retailers such as Aldi, REWE, Coop and Carrefour. There is virtually no other plastic product that is so much the focus of environmental debate. Many arguments are in favour of bioplastics. Carrier bags, due to their large volume and large surface available for communication, are a key product for the market introduction of bioplastics packaging.

Bioplastics packaging has already been fully established for years in the strongly growing organic retail sector. A new trend, however, is its use for branded products. In 2009, Coca-Cola introduced biobased PET bottles for the most famous of all brands. Volvic followed in Europe with mineral water bottles a year later. Food company Heinz is currently making a start with its 500ml Ketchup bottles. Biobased PE has been recently introduced by Danone France for Actimel yoghurt drinks, and Procter & Gamble are using it for Pantene shampoo bottles.

Nonetheless, brand owners are not just using drop-in solutions, but are rather developing packaging from new materials. In Germany, Danone converted its premium yoghurt brand Activia to PLA tubs. The Italian St Anna Brunnen has been marketing premium water in PLA bottles for two years. For the past eight years, Ontex-Mayen has been using starch-based packaging for their Moltex-eco baby nappies.



**Driving forces and perspectives**

The packaging industry is, at the point of great change, strongly influenced by the mega-trend sustainability. New tools to assess sustainability of packaging are being used by large retail chains such as Walmart, hereby putting pressure on the entire supply chain.

*The market pulls, industry and political push – this decade will be hugely influenced by packaging made from bioplastics.*

Trendsetters see sustainability as an opportunity to differentiate from their competition. If Coca-Cola, Procter & Gamble and Danone are anything to judge by, all packaging ma-

terials will in future be biobased and easily recyclable. This is the desired outcome for consumers and backed up by their shopping behaviour.

Demand for packaging made from bioplastics is high for organic food as well as for premium and branded products with particular requirements. Market introduction is progressing very successfully, although it is still at a very early stage. Consumption is estimated to be at least 100,000 tonnes globally (2009). Growth rates exceed 20 percent annually. This can increase significantly if governments promote bioplastics packaging in the context of their innovation, resource and climate change policies. The transition from a fossil-based economy to a bio-economy is an important target of the EU 2020 Strategy.



**Process and typical applications for bioplastics in packaging**

|                         |     |     |     |                      |        | Blends made from |     |     |      |    | Bio-PE | Bio-PET           | Note |
|-------------------------|-----|-----|-----|----------------------|--------|------------------|-----|-----|------|----|--------|-------------------|------|
|                         | PLA | PHA | PBS | Cellulosic materials | Starch | PBS              | PHA | PLA | PBAT |    |        |                   |      |
| <b>Process</b>          |     |     |     |                      |        |                  |     |     |      |    |        |                   |      |
| Blow film extrusion     | o   | o   | +   | o                    | +      | +                | +   | ++  | ++   | ++ | o      |                   |      |
| Cast film extrusion     | ++  | +   | +   | +                    | +      | +                | +   | ++  | +    | ++ | +      |                   |      |
| Co-extrusion            | +   | +   | +   | o                    | +      | ++               | ++  | ++  | ++   | ++ | ++     | as component      |      |
| Lamination              | +   | +   | +   | ++                   | +      | ++               | +   | +   | ++   | +  | +      |                   |      |
| Paper lamination        | +   | +   | +   | o                    | ++     | +                | +   | +   | +    | ++ | o      |                   |      |
| Thermoforming           | ++  | +   | o   | o                    | +      | +                | +   | ++  | o    | o  | ++     |                   |      |
| Injection moulding      | +   | +   | +   | +                    | +      | ++               | ++  | ++  | +    | +  | +      |                   |      |
| Blow moulding           | ++  | +   | +   | o                    | +      | ++               | +   | ++  | +    | +  | ++     | preforms          |      |
| Injection blow moulding | +   | +   | o   | o                    | o      | o                | o   | +   | o    | o  | ++     |                   |      |
| <b>Flexibles</b>        |     |     |     |                      |        |                  |     |     |      |    |        |                   |      |
| Pouch                   | +   | o   | +   | +                    | ++     | +                | +   | ++  | ++   | ++ | +      |                   |      |
| Clear film              | ++  | o   | o   | ++                   | o      | +                | o   | ++  | o    | ++ | ++     |                   |      |
| Outer packaging         | o   | o   | +   | ++                   | ++     | +                | +   | ++  | +    | ++ | o      |                   |      |
| Stretch film            | o   | o   | o   | o                    | o      | o                | o   | o   | +    | ++ | o      |                   |      |
| Shrink film             | +   | o   | o   | o                    | o      | o                | +   | +   | ++   | +  | +      |                   |      |
| Shopping/waste bags     | o   | o   | o   | o                    | ++     | ++               | ++  | ++  | ++   | ++ | o      |                   |      |
| Nets                    | o   | o   | o   | o                    | +      | ++               | +   | ++  | +    | ++ | o      |                   |      |
| Labels                  | +   | +   | o   | o                    | +      | +                | +   | +   | ++   | ++ | +      |                   |      |
| <b>Rigid Packaging</b>  |     |     |     |                      |        |                  |     |     |      |    |        |                   |      |
| Bottles                 | +   | +   | o   | o                    | o      | +                | +   | +   | o    | +  | ++     |                   |      |
| Clear Trays             | ++  | o   | o   | o                    | o      | o                | o   | +   | o    | o  | ++     |                   |      |
| Other Trays             | +   | +   | o   | o                    | +      | +                | +   | +   | +    | ++ | ++     |                   |      |
| Container (larger)      | +   | ++  | o   | o                    | +      | ++               | +   | +   | +    | ++ | +      |                   |      |
| Tubes                   | o   | o   | o   | o                    |        | ++               | +   | ++  | +    | ++ | o      |                   |      |
| Caps                    | +   | +   | o   | o                    | +      | ++               | +   | ++  | +    | ++ | +      |                   |      |
| Cups                    | ++  | +   | o   | o                    | o      | ++               | ++  | +   | +    | +  | +      | beverages, yogurt |      |
| Blister packaging       | ++  | +   | o   | o                    | +      | +                | +   | +   | +    | o  | ++     |                   |      |
| Moulded foam            | +   | +   | o   | o                    | ++     | +                | +   | +   | o    | +  | o      | incl. loose fill  |      |
| Cutlery                 | +   | +   | o   | ++                   | ++     | ++               | +   | +   | +    | +  | o      | service packaging |      |

Legend: ++ very suitable ; + partly/well suitable ; o not suitable