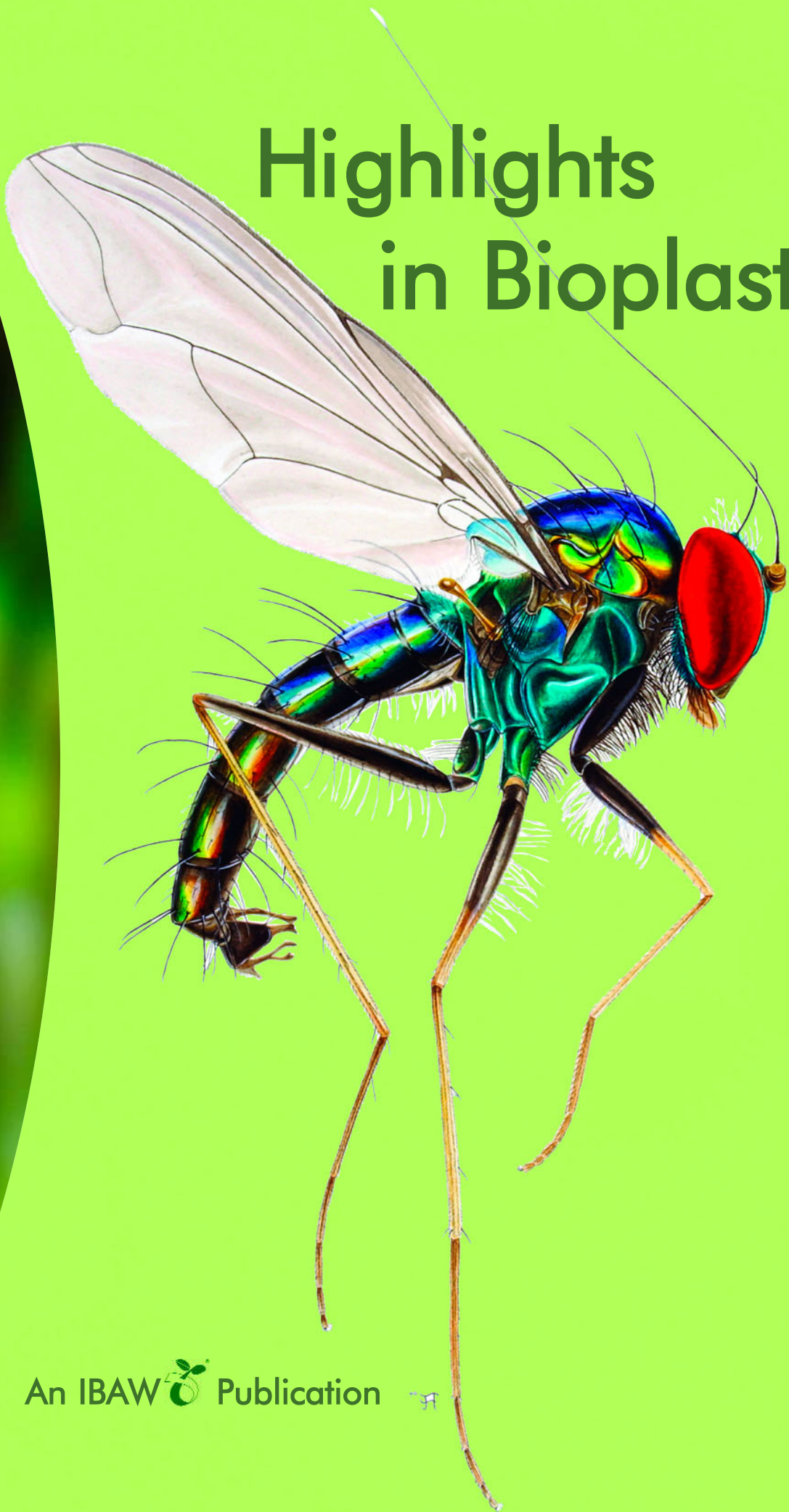


# Highlights in Bioplastics



An IBAW  Publication 



## Highlights in Bioplastics

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## Progress made and tasks ahead

Dear Reader,

Have you come across bioplastics during the past few months? We would not be surprised if you had. The spirit of optimism which has grasped the industry is a result of the growing demand for bioplastics. Numerous new products have been launched and enterprises' developing pipelines are filled to the brim. Undertaking research and development within the bioplastics sector has become a global trend and top industry names are among the protagonists.

We at IBAW, an international association of the bioplastics and biodegradable polymers industry, are publishing this newsletter for the first time to highlight these developments. Despite growing attention by experts, bioplastics are hardly known by the broader public. As you may well not read the professional journals of the plastics industry on a regular basis, we have chosen this means of communication. We hope this brief information arouses or confirms your interest.

Where do bioplastics stand today? They are on the verge of broad market introduction, leaving the niche areas they have occupied in the very initial phase. They can already be found as packaging in numerous supermarkets - definitely the prime market for plastics packaging. In the electronics, automobile and agricultural sectors high priority is being given to these new products.

The chemical and plastics industries have already invested several billion Euros into this new technology. They have high expectations of the new types of plastic which are competing with conventional, crude oil based plastics. The global plastics market is a good 200 million ton market which is constantly growing, with an annual growth rate of at least 5% - and growth will continue due to the performance of the versatile materials. So how can biobased plastics become a success story? Continuous effort by industry is needed to improve the performance of the products. Above all, supportive framework conditions have to be established. For example, the boom of renewable energy in Europe was triggered by a set of supportive measures, in particular the underlying legislation has a strong positive impact on investment and growth. For high-tech products such as bioplastics, this positive framework has now to be created, using legal measures, extended research funds, communication programs and tax incentives amongst others. IBAW will provide input to set up an appropriate framework.

The bioplastics industry sees a bright future ahead. Climate protection and intelligent use of natural resources will be essential policies of the 21st century. The road towards sustainable development will be build on innovation. Bioplastics can be a great contributor towards achieving these goals. Representatives of politics and private enterprise now have to screen for suitable instruments that will facilitate a dynamic and broad market introduction. It is my hope that this newsletter will provide a stimulus in taking the initiative.

Yours sincerely,



Harald Kaeb  
Chairman of IBAW

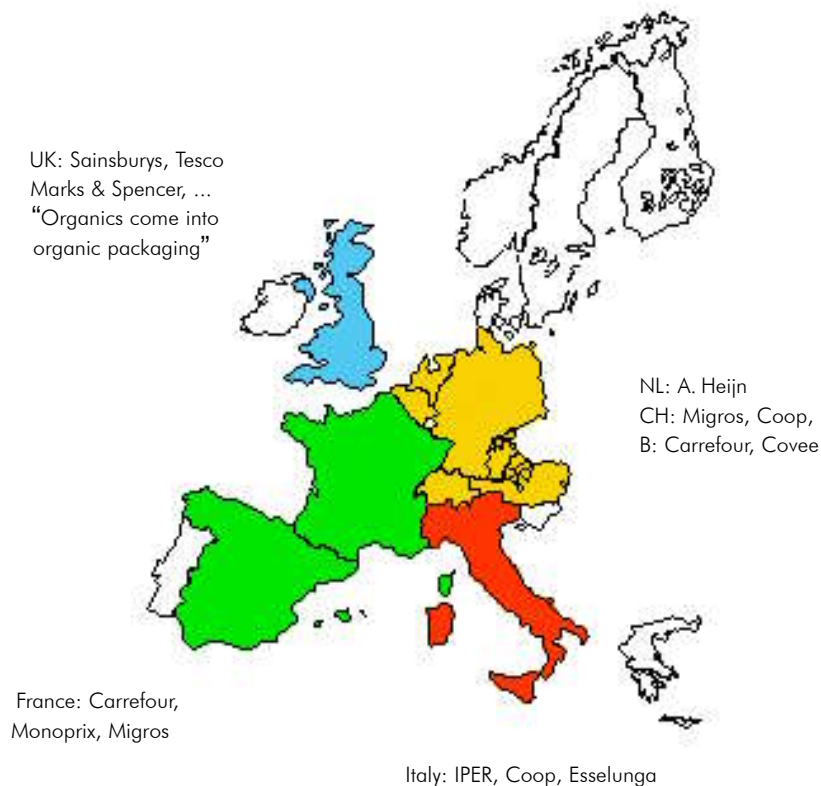
## From the Laboratory to the Market

### Market for bioplastics is growing

Bioplastics sector registers continuous growth: As estimated by IBAW, pan-European consumption of bioplastics in 2003 was at 40,000 tons. This indicates that consumption has doubled from 2001. Compostable waste-bags and starchbased loose fill had the biggest share of overall consumption in Europe. For the first time biopackaging made a substantial contribution to market growth. Especially in Great Britain, Italy and the Netherlands the market development was dynamic.

### Biobased packaging in Europe

Compostable biopackaging can currently be found in numerous supermarkets. Leading retailers are testing products or are already using them for part of their assortments. Figure 1 displays retailers with such activities. The majority of packaging is used for fruit and vegetable or hygienic products. In particular, organic food is often packed in bio-materials.



### Digital discs made by nature

The Japanese electronics group Pioneer has developed an optical media made from cornstarch, according to the Japanese newspaper Nihon Keizai Shimbun in November 2004. It claims it is suitable for the coming blu-ray disc generation. This "bio-disk" is 1.2 millimetres thick, has a capacity of maximum 25 gigabytes and is biodegradable. Sanyo already introduced a CD sample based on Polylacticacid (PLA) in 2003.



Compact disc made from corn, Photo: Sanyo

## New outfit for cell phones

Major producers of mobile phones are working on the development of phone covers made from biobased materials. Motorola recently announced it was developing cell phone covers which can be composted. The cover comes with an embedded sunflower seed, which grows a sunflower once it is composted. According to experts 10% of the plastic in electricals will be able to be replaced by bioplastics. This prognosis was expressed at the "Electronics Goes Green" congress in Berlin in September 2004. (Source: www.heise.de)

## New manufacturing plants - new polymers

The biotechnology department of the Japanese group Toyota has constructed a pilot plant with a capacity of 1.000 tons of polylacticacid (PLA). Toyota expects the production of biodegradable plastics to grow into a global business worth 38 billion dollars by 2020. Hycail, an enterprise from the Netherlands, has begun operating a PLA plant which is to produce 50.000t p.a. once the final phase of upgrading is complete. In the United States, agricultural group ADM and biotechnology company Metabolix plan to build up a manufacturing plant for a biobased type of polyester (polyhydroxyalkanoates, PHA) with a capacity of 50.000 tons. US group Procter & Gamble Chemicals is currently planning to set up a fermentative PHA production in Europe. In China a PLA plant is already operated by Tianan.

Producers of bioplastics also have many new compounds or polymers in their development pipelines, targeting new polymer types by using commercialized biobased and/or biodegradable polymers. These compounds offer new characteristics and specific performances in new applications. Compounds that are developed by using bioplastics in combination with natural fibres such as flax, wood, sisal or hemp also look promising.

BCPN award "seedling" -  
the compostability logo  
Photo: Jongboom

right  
PLA-plant  
Photo: CargillDow

below  
Cups for cold beverages  
from PLA, Photo: Huhtamaki

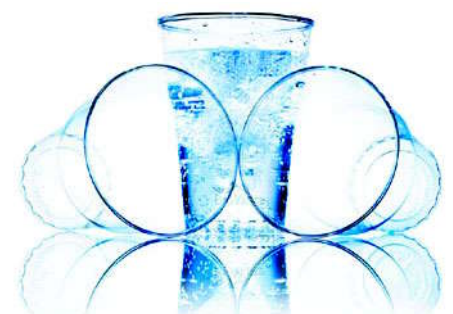


## Retailer Albert Heijn receives BCPN award

The Dutch association Belangenvereniging Composteerbare Producten Nederland (BCPN, www.bcpn.nl) awarded the BCPN prize to the largest Dutch retailer, Albert Heijn. The supermarket chain is a pioneer in the use of biodegradable packaging for fruit and vegetables. Customers can already find an extensive range of produce packed in bioplastic on Albert Heijn's shelves.

## Complete range of compostable foodservice packaging

Huhtamaki has been the first company to launch a complete range of compostable foodservice packaging under the trade name Bioware®. The Bioware line consists of single-use cold drink cups, plates, containers and cutlery, which are all based on renewable raw materials and are compostable after use.



## Environmentally-friendly gardening

The packaging manufacturer NNZ is offering new packaging for flowers and flower bulbs. This new packaging is made of 100% bio-plastic materials, based on annually renewable resources such as starch, and decomposes in home garden compost. This new packaging offers the opportunity to plant with zero waste, says NNZ.

Highly transparent wrapper made from PLA, Photo: Treofan



## How to become immortal

Plantic Technologies Ltd., an Australian company, received the Australian Museum's Eureka Prize for industry. The company was honored for its excellent achievements in developing biobased and biodegradable plastic products. In addition, the award includes becoming a member of the Australian Museum's Immortals Program. Plantic will be immortalized by having a new species of fly named after them: *Krakatauia planticorum*.

(Source: [http://www.amonline.net.au/eureka/industry/2004\\_winner.htm](http://www.amonline.net.au/eureka/industry/2004_winner.htm))

*Krakatauia planticorum*  
Artwork by Hannah Finlay, Australian Museum



## Premiere: Spring water in bioplastic bottle

The first spring water in PLA bottles was launched several weeks ago in Colorado, USA. By using bioplastics for the packaging of beverages, the company Biota Brands of America is doing pioneer work. Polylactic acid can replace PET in certain applications. PET is one of the world's fastest growing plastic types. At a cost of nearly 2 Euros per kilo, PET belongs to the most expensive group of plastics.

Spring water bottle made from bioplastic, Photo: Biota



## Cheese loves biopackaging

A laminate of Treofan's PLA-foil Biophan and paper has turned out to be a great match for the packaging of cheese. The performance of this product has convinced French producer Richard Laleu, who is the first to use this new product for his soft cheese products.

Brie packed in a laminate of paper and bioplastic, Photo: Treofan)



### Biopackaging soon to be launched by German retailers?

In fall 2004 a big German retailer tested the filling and marketing of organic carrots in starch based packaging. For this purpose ca. 120.000 carrot bags of natura Packaging GmbH were filled with carrots by the company Theis. IBAW expects that in 2005 the first compostable packaging will be launched in Germany.



Going for the market - starch based carrot bags, Photo: natura

### UV protection using new techniques

The Japanese company Arkhe has developed a new technology that enables them to color PLA sheets with a UV protection function. The company, which has its origin in the optical industry, anticipates new product applications due to this new technique. Arkhe furthermore produces calendar cases for Japan's biggest telecommunication company NTT DoCoMo. Other products, such as book-marks complete the product range.



Calendar case made from bioplastic  
Photo: Arkhe

### New cellulose films register strong growth

The British company Innovia Films Ltd. announced that their sales quadrupled in 2004 compared to the previous year. Their final applications now include a wide range of products, e.g. organic fresh produce, bakery, household, sanitary care and also adhesive tapes.



Sticky tape made from cellulose  
Photo: Innovia films

### The Greenery: Aiming for a complete change

The Greenery, one of the leading concerns in Europe in the vegetable, fruit and mushroom sector, plans to gradually convert its conventional packaging into biodegradable packaging. The Greenery already launched its first products at the end of 2004.



Flow Pack Packaging for fresh produce  
Photo: natura

### France: Innovation prize for salad packaging

At the French congress "Packinnove Europe 2004", French packaging producer Brodart received the annual innovation prize for its salad bag packaging. Mont Blanc Primeurs, a specialist for organic products is now using this packaging for its products. The water vapour transmission of the crystal clear PLA film can provide fresh products with a longer shelf life (nine days). With customers Auchon, Casino and Migros, Mont Blanc Primeurs already has a strong base in France.



Award winning: Salad packaging made from PLA, Photo: IBAW

### Chocolate and corn

The Australian subsidiary of the Cadbury Schweppes food group uses biodegradable trays for its milk tray chocolates. Plantic Technologies uses its new method to produce the trays that are made of a water-soluble cornstarch polymer.



Biobased trays in use in Australia  
Photo: Plantic

### Ireland: Bioplastic used with water dispenser

Irish company Tipperary Water is stocking its water coolers with drinking cups made from NatureWorks® PLA (Cargill Dow). They began deliveries of more than 500.000 cups to customers in Ireland and the U.K. in August 2004, and anticipate replacing their entire water cooler service of 30 million single-use cups per year over the coming months.



Cup made from PLA,  
Photo: Cargill Dow

### Metallised film for new applications

Metallised Biophan® is on the brink of being introduced into the market. The German-French company Treofan has advanced its PLA film, making the metallised type especially suitable for foods containing fat such as butter or high fat cheese, as well as twist wrapped confectionery.



Metallised PLA-films for twist-wrapping, Photo: Treofan

### Experimental and small-scale production

Agro-food Valley, a privately-managed R&D Centre in Belgium which is funded by the EU, will establish an experimental and small-scale production of bioplastics in 2005. The production of new monomers, modification of polymers and biocatalysis in chemical processes form their core activities.



### Italy: Biopackaging by the metre

The 22 large IPER supermarkets in Italy offer an impressive range of delicatessen products. Even more impressive for bioplastic promoters is their commitment to use only biodegradable and biobased packaging for their entire product range. Italy's leading organic pasta maker Biorigin S.p.A. now also sells its fresh pasta specialties in clear containers and film made from Polylacticacid – partly with modified atmosphere. Coop Italia and IPER also offer organic tomatoes in snap-lid punnets of corn based plastics.



Biopackaging - successful on the Italian market, Photo: Cargill Dow

### A clever solution for organic waste

The natura biowaste system MaxAir® was launched in Germany in 2004. It is listed by Waschbär, an environmentally conscious mail-order company. The container is air permeable, and the breathable waste bags made from starch assure clean and odourless handling of organic waste. It also features advantages for the composting process, says producer natura.



Clever handling of organic household waste using biobags, Photo: natura

### Austria: Urns made from a biocompound

A resin consisting of wood, corn and biodegradable polymers has been used to produce biodegradable urns since 2004. The material was developed by the Austrian Research Institute IFA.



Compounded bioplastics for urns  
Photo: IFA Tulln

### Seedling - Label of the month

The German Initiative for Consumer Protection (Verbraucher Initiative e.V.) awarded IBAW's "compostable" label as the label of the month in May 2004. Products made from biodegradable polymers cannot easily be distinguished from conventional plastics. The seedling allows customers to notice exactly this differentiation. "The compostability label plausibly contributes to the decrease of the waste accumulation by giving the possibility for recycling or rather disposal through composting of bioplastics", said Heike Dickhut, speaker of the initiative. IBAW has been working on the establishment of this certification system for several years. Today it is in use in Germany, Poland, the Netherlands and Great Britain - with more countries to come (cf. next article).

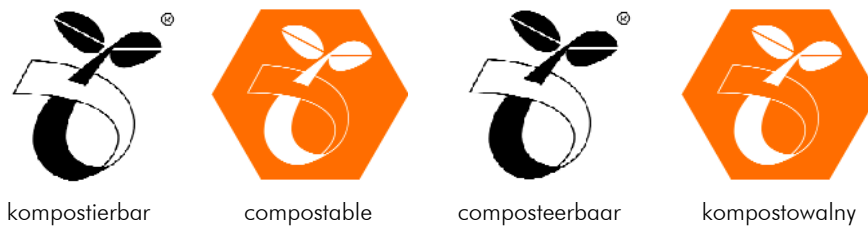


Seedling - Label

## Framework conditions

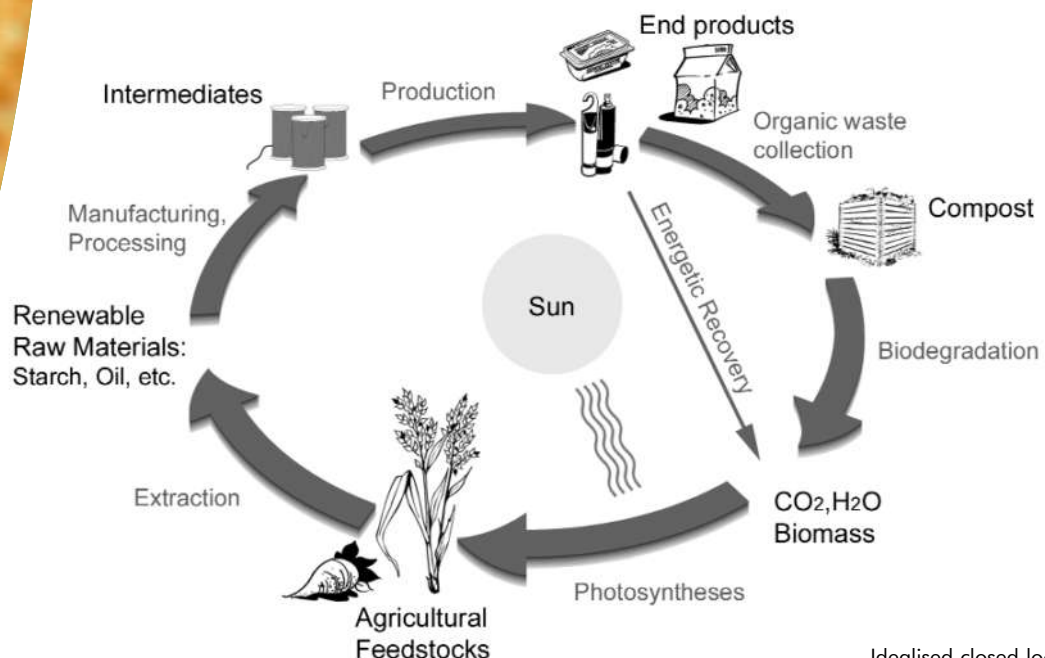
### Biodegradable? Compostable? Certification!

Without standardised tests and labelling, customers are fishing in troubled waters. Risks due to unwanted or toxic components cannot be completely eliminated either in application or disposal. The bioplastics industry, organised under IBAW, has therefore developed a system for the certification and labelling of biodegradable materials and compostable plastic products based on the European standard EN 13432. Certification is executed by independent and accredited third party institutes. Now the industry together with European DG Enterprise developed a self-commitment for the industry, in which companies commit themselves to certify their products as soon as they advertise with terms like “biodegradable” or “compostable” or if their products are composted after use. The certification scheme based on EN 13432 guarantees safety for the environment and for customers.



### Biopackaging supported by legislation in Germany

The recently amended German Packaging Ordinance comprises a new distinct regulation for certified compostable packaging made from biodegradable polymers. These products are thereby exempted during the market introduction phase until the end of the year 2012. Industry now has more freedom and time to build up an independent disposal system based on the underlying closed loop life cycle. With this amendment, politics has given an important signal by specifically supporting this technology for the first time. Furthermore, IBAW expects the regulation to provide a strong impulse towards dynamic market development.



Idealised closed loop life cycle

## High price of crude oil assists bioplastics development

While prices of conventional plastics increased 30-70% during the past few months due to high crude oil prices, bioplastic producers partly decreased their prices. The new biomaterials are still more expensive than their petro-based relatives but the gap is decreasing. Agricultural products, such as starch and sugar, are economically viable raw materials for plastics (sugar [EUR/t]: 200-250, starch: 300-400, ethylene / propylene: 400-600). The reason bioplastics cannot yet fully compete with standard plastics is a combination of the high development costs and small capacities. Based on the forecasted upward trend in crude oil prices, it is anticipated that the use of renewable raw materials will pay off. To ensure that growth continues, it is essential to market bioproducts profitably, even in this initial phase. Framework conditions can guide the development by allowing further investment according to a long term strategy.

## IBAW's activities

### Multi-sector platform with new members

IBAW keeps growing: Eight companies, among them Tetra Pak and Kraft Foods, joined the association in 2004. Besides the chemical and bioplastic industry, more and more producers of raw materials, converters and end users of plastics are getting involved in our association. Thereby the closed loop life cycle underlying the concept of bioplastics is also reflected in IBAW's member structure. A list of members and information about IBAW's activities can be found at [www.ibaw.org](http://www.ibaw.org).

### Impressive Consumer Interest

In January 2004 IBAW was represented at the largest international consumer fair in Berlin, the International Green Week. Consumers loved the diversity of products presented and the practical benefits of the bioplastic innovation. "Where can I buy these products?" was a frequently asked question. High ranking politicians promised to stand up for better framework conditions. Matthias Berninger, State Secretary of the German Ministry for Consumers, declared at a podium event: "Bioplastics are at the beginning of a promising future."



Bioplastics attracted visitors at IBAW booth, Photo: A.Gersmann, IBAW

## Federal State of Hesse provides a stage for bioplastics

On March 30th IBAW informed approximately 100 high-ranking German representatives from politics, authorities and economy about the status of market introduction. The German federal State of Hesse, where the trend-setting Kassel Project had taken place, hosted this event. The participants favoured supporting the bioplastic innovation with a set of measures.

### Towards a biobased economy

The 300 visitors to the conference “Weg vom Öl” expressed broad agreement concerning bioplastics and biodegradable materials. The event held on November 13th in the German Bundestag was organised by The Green Party. State Secretary Wolf of the Ministry for Environment said in her speech: “In order to support the use of renewable raw materials in this segment too, the [German] Packaging Directive contains regulations to ease the setup of a disposal system for such materials and facilitate the conditions for composting. Further relief for this method of recycling must be provided.” At IBAW's information booth a broad spectrum of products and packaging were showcased for the visitors. Their feedback was very motivating for IBAW.

### A Brief Outlook to Conclude...

#### IBAW goes to Brussels

IBAW has become an international platform of the bioplastics and biodegradable polymers industry within the past few years. Within the scope of strategic considerations the association plans to establish a branch in Brussels. IBAW will focus its political work on Europe. In fall 2005 an information day for representatives of European politics and private enterprise is being planned, in cooperation with the agency of the Free State of Bavaria in Brussels.

#### Organic products and bioplastics a great fit

Many producers have been presenting their products made from biodegradable polymers at the world's greatest fair for organic products, the BioFach in Nuremberg over the past few years. In 2005 a broad range of goods and innovations will again be showcased at the BioFach (February 24th–27th). IBAW member C.A.R.M.E.N. e.V. is organising a joint booth in Hall 7 (Nr 602), where visitors can obtain information about bioplastics and biodegradable polymers. C.A.R.M.E.N. and IBAW will also organise two workshops on the topic of biopackaging. [www.carmen-ev.de](http://www.carmen-ev.de)

#### Loop Linz - Austria looks at Bioplastics

On March 9th, 2005 a demonstration project with biopackaging will start in Linz, Austria. This project follows on from the positive experiences in Kassel and is designed to demonstrate opportunities and advantages of biopackaging. Its aim is the long-term market introduction of products packed in biopackaging into the Austrian. See also [www.loop-linz.at](http://www.loop-linz.at)



Discussing measures for Bioplastics  
Photo: IBAW



Bioplastics in the German Bundestag,  
Photo: A.Gersmann, IBAW



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[www.ibaw.org](http://www.ibaw.org)

IBAW members

