

Think Sustainable ...



BIO-FED 
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BIO-FED
Branch of AKRO-PLASTIC GmbH

Added Value Through Global Plastics Expertise



BioCampus Cologne – one of Germany’s largest biotech parks, in Cologne.

BIO-FED was founded as a branch of AKRO-PLASTIC GmbH in October 2014. Since then we have produced and marketed biodegradable and/or biobased plastics under the brand name M-VERA®.

With our expert team of highly experienced plastics specialists, we are ready to serve you at our company headquarters, BioCampus Cologne – as well as on-site at your production facility where necessary.

As experts in developing, compounding and marketing biodegradable and/or biobased plastics, we provide customised technical solutions developed specifically for your applications. And with AF-Eco®, we also have just the right biopolymer-based color and additive masterbatches in our product range. Our compounds are produced at AKRO-PLASTIC and our masterbatches at AF-COLOR, both located in Niederrissen, Germany.

As a branch of AKRO-PLASTIC GmbH, we are a member of the international Feddersen Group, which is headquartered in Hamburg. Our company name, BIO-FED, is derived as follows: “BIO” denotes our activities in the bioplastics area; “FED” symbolises our association with the Feddersen Group.



The headquarters of AKRO-PLASTIC GmbH in Niederrissen, Germany.



The Feddersen Group headquarters in Hamburg, Germany.

The Feddersen Group has its origins in K.D. Feddersen & Co., a trade firm for chemical products founded in 1949 by Hamburg merchant Karl-Detlef Feddersen. The divisions in

the Group focus on distribution in chemicals and engineering products worldwide, representing renowned companies in the chemical, investment and consumer goods indus-

tries with their own branch offices in Europe and throughout the world. In addition to foreign trade, the alliance today is engaged in the worldwide distribution and production of plastics, the stainless steel trade and mechanical engineering.

Through our partnerships with other divisions in the Feddersen Group and our use of a global distribution network, we are able to offer you global service, providing you with added value. We operate four production sites on three continents with access to the major sales markets.

K.D. Feddersen Holding GmbH is the proprietor of the divisions in the Feddersen Group. Their sole shareholder, the non-profit K.D. Feddersen Foundation, operates an assisted-living facility in Hamburg. Our profits go primarily towards supporting the work of the Foundation – true to the motto of our company’s founder, Karl Detlef Feddersen: “Acting on behalf of people – acting through global trade”.

Our Services at a Glance

With over 50 years of experience in the plastics industry, we offer within our corporate alliance expert advice, customer-focused service and a sales and distribution operation performing to the highest standards, as well as:

- Expert knowledge in the area of biodegradable/biobased plastics
- Research and development in our in-house laboratory
- Global raw materials procurement
- Broad portfolio of biodegradable and/or biobased compounds
- Expertise in global order processing and logistics

- Flexibility of a customer-focused compounder with state-of-the-art compounding
- International sales team and team of engineers
- Assistance with product development, material selection and processing
- Bioplastics trainings on-site at your facility



Sustainable Products for Our Environment

What are Bioplastics?

Bioplastics are plastics which are biodegradable and/or produced based on renewable resources (biobased).

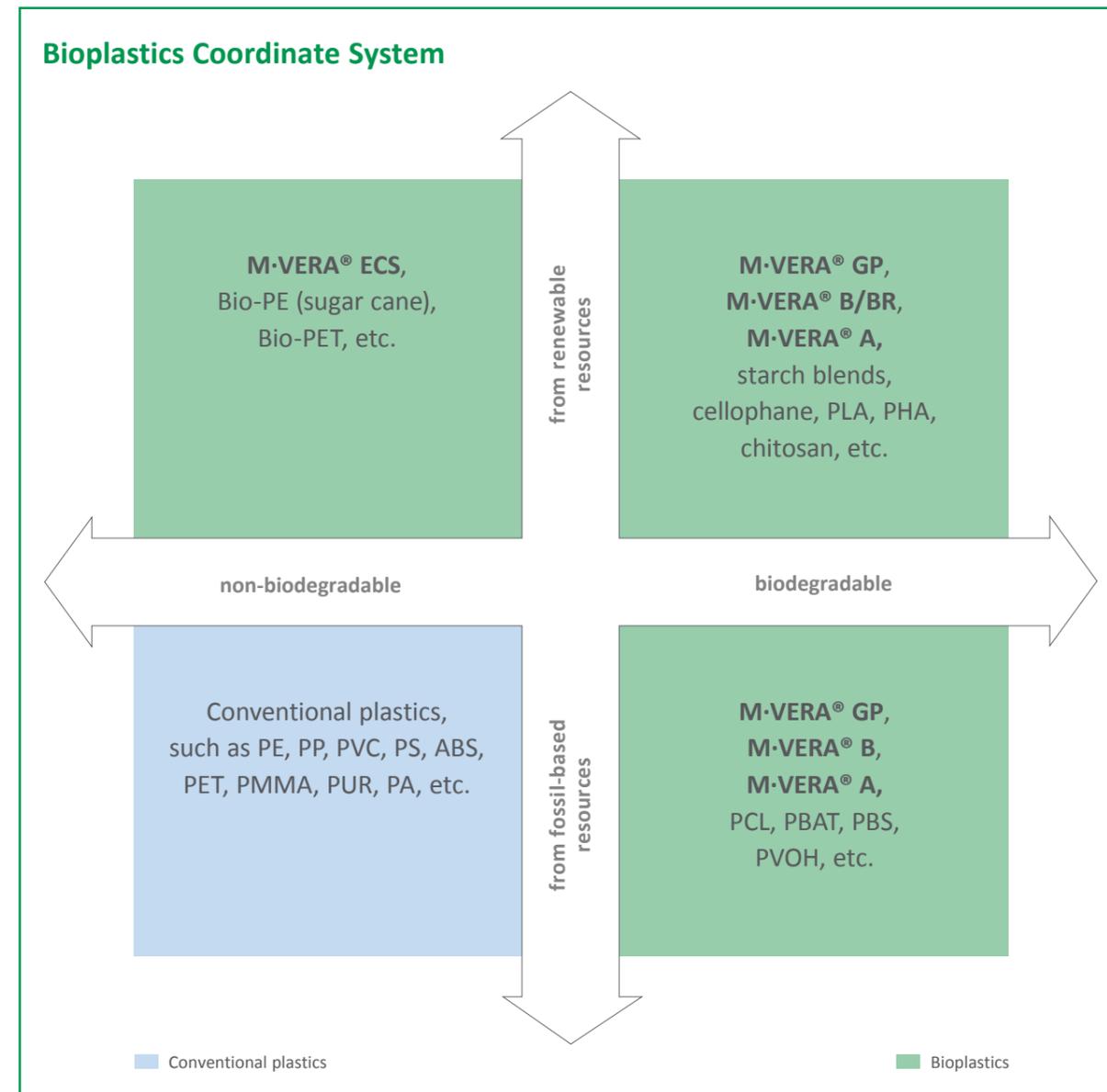
We distinguish between:

- Biobased and non-biodegradable
- Biobased and biodegradable
- Non-biobased and biodegradable

Depending on the chemical structure of a biodegradable plastic, it can degrade in various environments.

Biobased plastics can be manufactured on the basis of plant starch or sugar, for example. Production of such biobased plastics is not in competition with food production. According to a study by IfBB Hannover (Germany), a surface area of around 1.4 million hectares will be used for the production of bioplastics in 2019. This corresponds to approximately 0.02 % of the global agricultural area of approximately 5 billion hectares.

Bioplastics have properties similar to those of conventional fossil-based plastics and can be warehoused in a comparable manner. They are processed on commercially available plastics machines. Below you will find a chart showing a selection of conventional bioplastics. The coordinate system is sorted according to raw material source and degradability.



Some Standards and Certificates for Bioplastics

No product is created to last forever. At some point, the question arises as to what will happen once it reaches the end of its life cycle. For bioplastics, there are various end-of-life scenarios. One of these is biological degradability in different environments, such as an industrial composting facility, in household compost, in the ground or in the waters.

Independent testing institutes are charged with measuring the degradability and/or biobased content and confirm this by awarding a test mark. This provides market transparency and serves as orientation for customers and consumers.

Amongst the most important certification institutes in Europe are TÜV AUSTRIA (Belgium) and DIN CERTCO (Germany). In North America, it is the BPI institute.

Materials which do not exceed the prescribed heavy metal limits and which biodegrade within a defined period of time under the conditions

of industrial composting are given an “OK compost INDUSTRIAL” certificate according to EN 13432. This involves testing a specimen made from the material with a defined sample thickness. An ecotoxicity test must also be passed with positive results. Many of our products are certified to “OK compost INDUSTRIAL” standards, for example.



We perform our own tests to verify the soil degradability of our materials.

Our Contribution to the Future: Research and Innovative Products



Bioplastics – the Sustainable Alternative

Bioplastics are already available in a broad, market-ready selection for a variety of applications. These are used to develop innovative, alternative solutions aimed at reducing dependency on fossil-based raw materials. The carbon footprint of biobased products is thus improved, due to the fact that the plant-based (biobased) raw materials have already removed CO₂ from the environment during their growth phase. Bioplastics also allow for additional methods of disposal and recycling, thereby lessening the burden on our existing waste systems and thus also the environment. The packaging industry is currently one of the largest users of bioplastics, but these mate-

rials provide interesting perspectives for many other applications and are attracting increasing interest.

The reasons for this are as follows:

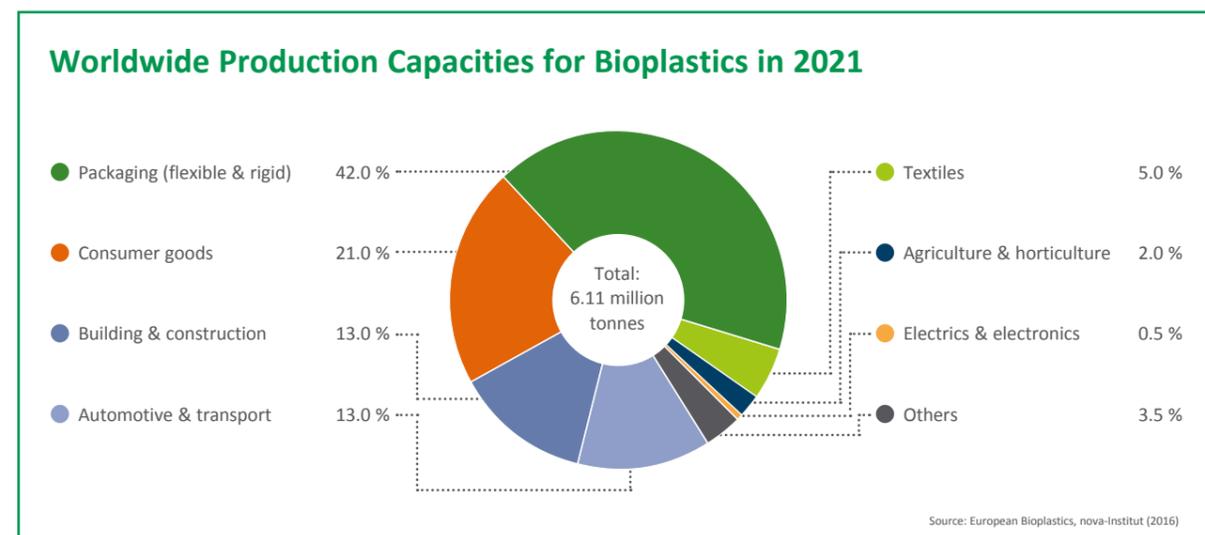
- Growing environmental awareness of society and a demand for sustainable, environmentally friendly products
- Legal requirements such as a ban on plastic carrier bags in a number of countries
- Biodegradability as additional uses such as flower pots which are planted along with the plant and then biodegrade in the soil
- Reduction of waste through the use of bioplastics

Growth Market for Bioplastics

Approximately 300 million tonnes of plastics are currently being produced each year. Of these, one percent is bioplastics, according to European Bioplastics e.V. Demand for bioplastics is steadily growing, however, since they are already

being used in a number of markets for additional and more complex products. At over 40 percent, the global production capacity of bioplastics for the packaging industry is the highest and will remain so, following by that of consumer

goods at 21 percent in 2021. It is assumed that the global production capacity for bioplastics will grow over the medium-term from around 4.2 million tonnes in 2016 to around 6.1 million tonnes in 2021.



Our Laboratory Services

The aim of our research and development work is to incorporate trends and new ideas to best satisfy your needs. At BIO-FED, we combine the latest developments from the markets with decades-long production experience to create innovative solutions.

To provide you with high quality all times, we have expanded our laboratory capacities in recent years. By adding an additional laboratory area and acquiring a second blown film line for testing our M-VERA® film types, we will soon be able to offer you significantly enhanced service and respond more quickly to queries.

AKRO-PLASTIC is one of just a few compounders to operate an accredited



We examine carefully all material properties in our in-house laboratory.

test lab certified to DIN EN ISO 17025 by the German Accreditation Council DAkkS (Deutsche Akkreditierungsstelle GmbH). Additional test methods for biocompounds are

available from AF-COLOR, another branch of AKRO-PLASTIC, also in Niederzissen, and can also be used for quality testing as well as research and development.

Tested Quality for Your Success

AKRO-PLASTIC and its branches BIO-FED and AF-COLOR are certified according to the DIN EN ISO 9001:2015 standard (Quality Management System) as well as to ISO 50001:2011 (Energy Management System). In addition, the companies each have an Integrated Management System. Amongst others, our production sites AKRO-PLASTIC and AF-COLOR are certified according to the following standards:

- IATF 16949:2016 with product development (Quality Management System)
- DIN EN ISO 14001:2015 + Cor 1:2009 (Environmental Management System)
- BS OHSAS 18001:2007 (Occupational Health and Safety Assessment System)
- DIN EN ISO/IEC 17025:2005 (Accredited Laboratory)



Diversity in Application

Our Product Portfolio

Our product line includes a broad range of bioplastics compounds with different properties, such as biodegradability and/or a biobased content. Our M-VERA® products are already well-established in a number of applications and can be used with various processing methods. In addition, all of our compounds can be colored individually.



M-VERA® series

- M-VERA® A series for agricultural applications
- M-VERA® B series for bag applications
- M-VERA® BR series for high biocontent film applications
- M-VERA® ECS series for technical applications
- M-VERA® GP series for general purpose applications

AF-Eco® biomasterbatches (EN 13432 certified)

- Color and carbon black masterbatches
- Additive masterbatches
- Scent masterbatches
- Odour absorbers



We will be happy to assist you with materials selection and provide technical service and on-site support for machine and process parameter setup.



Film applications

- Shopping bags
- Fruit and vegetable bags
- Biowaste bags
- Agricultural films such as mulch film
- Food packaging



Injection moulding applications

- Coffee capsules
- Disposable cutlery and dishes
- Food and cosmetics packaging
- Lids and plugs
- Agricultural applications such as flower pots, plant ties
- Toys
- Engineering applications (ECS)



Latest Production Methods

With one of the most advanced production plants in Europe, AKRO-PLASTIC can easily meet the steadily increasing demand and growing requirements for plastics compounding. Key developments making this possible were the construction of a new production facility in summer 2002, the expansion of the warehouse and administration building concluded in 2010/11, as well as the production expansion which took place in August 2012. With additional production sites in Brazil and China, AKRO-PLASTIC currently has a total production capacity of > 150,000 to/year.

Stricter requirements regarding order lead times, consistent quality in manufactured products, greater product variety, and of course, global availability at competitive prices: these are the hallmarks of our business environment. Our goal is to guarantee satisfied customers and our competitive capacity. The key component for flexible production is our ICX® (Innovative compounding and extrusion) technology, a standardised plant concept developed by AKRO-PLASTIC GmbH in cooperation with its sister company FEDDEM

GmbH & Co. KG. The FED 26 MTS to FED 82 MTS line from FEDDEM is a standardised machine fleet available in six different sizes, optimally designed to cover applications ranging incrementally from 10 to 100 kg/h all the way to 1,500 to 3,500 kg/h, depending on the machine size. The identical design makes for easy up-

scaling to support the capability of flexible line utilisation. In addition to uniform extruder design, our standardised line concept features a uniform design of the peripheral equipment starting with material conveyance, including the dosing units and ending with pelletisers with a sorting screen and filling units.



Is the product overview missing?
You will find the latest version here:
www.bio-fed.com/downloads



Working Methods and Maxim

ICX® Technology

Innovative compounding and extrusion technology

$$\text{Customer value (CV)} = \frac{\text{Quality (Q)} \cdot \text{Flexibility (F)}}{\text{Price (P)} \cdot \text{Time (T)}} \triangleq \text{Investments}$$

Disclaimer: The information contained herein is based on our current knowledge and experience. A legally binding promise of certain characteristics or suitability for a concrete individual case cannot be derived from this information. The information supplied here is not intended to release processors and users from the responsibility of carrying out their own tests and inspections in each concrete individual case. BIO-FED® and M-VERA® are registered brands of AKRO-PLASTIC GmbH.

We Will Be Pleased to Meet You!

BIO-FED

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