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*Fakultät II
Maschinenbau und
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IfBB
Institute for Bioplastics
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Marine Degradability of Bioplastics

Contact

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*What opportunities and prospects
are offered by degradable bio-based
plastics under marine conditions?*

*Where is their application useful?
What challenges exist?*

*These and other questions are being
addressed in one of the main fields of
research at the IfBB. In recent years,
the IfBB has thereby focused its
attention increasingly on the marine
degradability of bioplastics.*

Source: TU Braunschweig/Malke Paul

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Can degradable bioplastics solve the problem of marine pollution by plastic waste?

At present, solely initial fundamental studies into the degradability of bioplastics in the sea exist. For this reason, the IfBB recognizes an urgent need for scientific research in this field, in order to counteract marine pollution.

According to estimates by the German Nature And Biodiversity Conservation Union (NABU), around 10 million tonnes of waste end up in the sea each year, around 7.5 million tonnes of which are waste plastics.

Whether as plastic bags, bottles or cigarette butts from onshore use, as nets, ropes, pots and fish boxes from fishery, as a result of insufficient waste management, particularly in emerging countries, or as microplastics from the cosmetics industry – plastics enter the seas from many different sources.

The most successful way to reduce waste in the sea would be the controlled recycling or disposal of plastic waste. However, as not all plastic waste can be collected through this approach, attempts such as

- ▶ “Fishing for litter” by various organizations and
- ▶ raising awareness concerning the more cautious handling of plastic products and their waste

are being made in order to reduce the input of plastic waste in the sea. A further approach, which can provide a partial solution for particular points, is the use of bioplastics which decompose completely under marine conditions.



Source: IfBB/S. McGowan

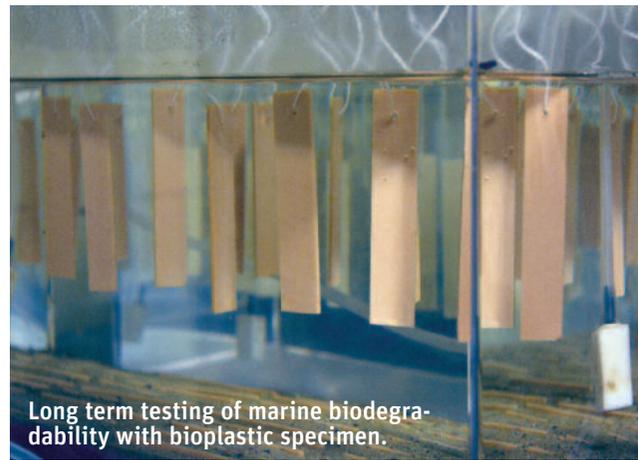
The demands on bioplastics are thereby high:

Expectations include:

- a. biodegradability – complete biological degradation of the products in the marine environment,
- b. minimization of the ecotoxicity – reduction of environmental damage,
- c. avoidance of heavy metals and other questionable plastic additives,
- d. optimum processing and performance characteristics.

There is still a great deal to do:

- ▶ Consideration of the product life cycle of bioplastics,
- ▶ creation and promotion of social dialogue,
- ▶ presentation of successful models,
- ▶ investigation of bioplastics under clearly defined, standardized marine conditions,
- ▶ attainment of necessary long-term findings,
- ▶ evaluation of products and/or product parts which could and should be substituted,
- ▶ cost-benefit analysis (What economic damage is caused by littering the seas? How much do possible alternatives cost?)
- ▶ and many more.



Source: IfBB

Degradable bioplastics under marine conditions in coastal protection

An other research area where marine biodegradability could be a key aspect, is the seagrass restoration. In this area the potential of biodegradable plastics in the context of additional benefits is determined.

The project “SeaArt” explores the advancement of the long-term establishment of natural seagrass ecosystems under the protection of marine biodegradable artificial meadows.

What are seagrass meadows?

Important ecosystems of the seas which, amongst other things, offer coastal protection against erosion and provide breeding grounds for many marine creatures.

They are, however, simultaneously seriously endangered and threatened by decline.

The re-establishment of seagrass is problematic, as without established areas of seagrass, hydrodynamic energy and turbidity increase, which in turn prevents seagrass growth.

The task of the IfBB is the development of materials which are suitable for the production of an artificial seagrass which is functionally and visually similar to natural seagrass. Both biodegradable plastics and natural materials (e.g. plant fibres), or combinations of both, are being considered.

“SeaArt” is a joint project under the direction of the Institute for Geoecology of the Technical University of Braunschweig and is funded by the Lower Saxony Ministry of Science and Culture within the framework of the Volkswagen Foundation “Niedersächsisches Vorab” funding initiative.

www.sea-art.org

The project SeaArt is funded by:

