



# Enzymatic degradation studies for Polymers

Uncertain about a (bio)plastic's true sustainability? acib's enzymatic degradation studies provide the answer you need. Let acib help you unveiling the fate of your (bio)polymer in various environments.

## BACKGROUND

The world is struggling to meet its ambitious waste reduction goals. Traditional methods often lack sustainability, creating environmental burdens. There's a pressing need for innovative solutions to achieve a truly circular economy and understanding the degradation of (bio)polymers is paramount.

## TECHNOLOGY

acib's approach encompasses a holistic view, considering both biotic and abiotic factors that influence degradation processes, as well as potential environmental impacts, in specific environments:

- **Aquatic environments:** Rivers, lakes, oceans, and sewage treatment plants, ...
- **Anaerobic environments:** landfills, biogas plants, ...

acib goes beyond basic degradation; our studies consider all the factors at play:

- **Biotic factors:** Microorganisms and enzymes that drive decomposition, ...
- **Abiotic factors:** Sunlight, physical forces, and oxidation influencing the process, ...

acib utilizes a robust suite of **advanced analytical techniques** to provide a complete picture:

- **GC, HPLC, GPC/SEC, TOF:** Quantify degradation products and monitor the breakdown process.
- **<sup>13</sup>C-labeling:** Track the fate of specific carbon atoms within the bioplastic.
- **Microscopy (CLSM, SEM):** Visualize changes in the bioplastic's structure during degradation.
- **Dynamic light scattering, respirometry:** Measure biodegradation rate and microbial activity.
- **FTIR-analysis:** Identify breakdown products and detect complete degradation.

acib also considers:

- **OECD criteria for sustainable plastics:** Ensure your bioplastic meets international sustainability standards.
- **Microbial community shifts:** Analyze how your bioplastic affects surrounding microbial populations.
- **Harmful byproduct formation:** Identify and mitigate potential risks associated with degradation byproducts.

## OFFER

We can analyze all kind of (bio)plastics, offer a range of techniques to suit your needs and tailor studies to meet your specific real-world scenarios. Whether you have foils, bottles, textiles, zippers, fishing nets, balloons, straws, mulch films, diapers, outdoor/camping items, coffee pods, cigarette filters, phone cases, toys, or liquid polymers. Your benefits:

- **Data-driven sustainability:** Gain scientific evidence for your bioplastic's eco-friendliness.
- **Proactive risk management:** Identify and address potential issues with degradation byproducts.
- **Informed decision-making:** Make strategic choices for product development and waste management.

**Let us help you ensure your (bio)polymers truly deliver on their sustainability promises!**

## acib-EXPERTS:

Dr. Sara Vecchiato  
Priv.-Doz. Dr. Doris Ribitsch  
Univ.Prof. Dr. Georg Gübitz

## DEVELOPMENT STATUS:

TRL 3-5

## KEYWORDS:

Biodegradable Materials  
Special Environment  
Degradation  
Environmental Impact  
Sustainable Plastics  
(Bio)polymer behavior

## CONTACT:

Dr. Martin Trinker  
Director Business Development  
tel: +43 316 873 9316  
e-mail: [martin.trinker@acib.at](mailto:martin.trinker@acib.at)

Austrian Centre of Industrial  
Biotechnology (acib)  
Krenngasse 37  
8010 Graz  
<https://acib.at>