



Enzymatic baby diapers recycling

The area of Polymer and Environmental Biotechnology deals extensively with issues related to the environmentally sustainable treatment of waste by using different enzymatic strategies for polymer processing. It is well known, for example, that disposable baby diapers are so widely used, that they present a pollution problem. Due to its structure, this particular waste material can be considered as potential substrate for enzymatic recycling of the valuable components without worsening the current situation in the landfills.

BACKGROUND

In recent years, baby diapers waste has received a lot of attention due to the high volume produced and the difficult recycling processes. In fact, in the European Union, the annual market demand for disposable baby diapers exceeds 20 billion units, dramatically increasing the amount of dry weight waste (1.3 t/min). Despite the high value of their components, especially the super-absorbent polymer, the waste baby diapers have been mostly landfilled or incinerated. Lately, some processes have been developed in order to mechanically recycle the different diaper components. However, this methodology has still some issues regarding the complete separation of all the components, thus not allowing to retrieve highly pure materials. Therefore, enzymatic treatment of these substrates can be considered a powerful strategy for a complete economic circle solution.

TECHNOLOGY

1) acib develops advanced enzymatic processes for the degradation in mild conditions of various synthetic and bio-based polymers into their building blocks. With different enzymes, due to their specificity, it is possible to fully degrade composite materials consisting of e.g. PET (polyethylene terephthalate), cellulose, etc. It is even possible to identify novel enzymes for specific industrial applications.

2) Furthermore, in our labs, sustainable processes have been developed for the re-use of recovered valuable molecules. Recovered sugars can be used to perform different fermentation processes for the production of e.g. bioethanol, lactic acid, etc. The recovered building blocks can be used in syntheses and can be re-used in secondary raw materials. These activities make use of the latest biotechnology tools and sophisticated analytical equipment as well as facilities for scale-up.

EXPERTS

Dr. Sara Vecchiato
Prof. Dr. Georg Gübitz
Matthias Slatner

AVAILABLE FOR

- Funding
- Investment
- Joint Research Project
- Contract Research

DEVELOPMENT STATUS

TRL 1-2

KEYWORDS

- Enzymatic degradation
- Waste material
- Recycle
- Valuable components
- (Bio)polymers
- Environment



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CONTACT

acib GmbH, Krenngasse 37, 8010 Graz

+43 676 884 188 95

matthias.slatner@acib.at

www.acib.at