Pilot Plant Facility for the Conversion of Renewables in Biotechnological Processes
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Renewable resources can be utilized directly, e.g. as energy carriers, as packaging materials, as fibers, for the production of colouring agents or as lubricants. However, they can also be converted biotechnologically by enzymes and microorganisms, giving us access to a multitude of new, biocompatible products and possible uses.

**Raw Materials & Substrates**
- Preparation of sugar-containing broth for fermentation processes
- Enzymatic hydrolysis of several biomass and residues (e.g. cereals, lignocellulosics, straw, bagasse etc.)
- Substitution of expensive micro-/macro nutrients for the lactic acid bacteria by suitable renewables
- Pre-treatment of green biomass and adding thereof to the different hydrolyzates media as a nutrient extract/supplement

**Products & Processes**
- New continuous lactic acid fermentation process with cell retention and control of the substrate concentration
- Supply of product samples for the further processing of lactic acid (e.g. PLA, solvents etc.)
- Assessment of an optimal down-stream processing based on membranes (minimized number of process steps)
- Development of fundamentals for new bioconversion processes

**Pilot plant facility for the manufacture of valuable products from renewable resources**
Besides the research projects screening and characterization of suitable microorganisms, phenotypic optimization of product formation, development of methods for process control, down-stream processing of fermentation products, application and refining of lactic acid, economic assessment of bioconversion processes the scale-up to a technical scale of several processing steps have to be developed for transferable solutions of bioconversion technologies of agricultural or renewable materials respectively. For that purpose a multifunctional pilot plant was planned and built at the site of ATB to investigate different raw materials and products.

Exploitation of high quality lactic acid for the production of biodegradable polymers (PLA) is one of the recent applications. Conventional processes for down-streaming are based on precipitation steps that generate large amounts of chemical effluents. Consequently the environmental impact and the operating costs of traditional processes can be reduced by using alternative technologies, such as electrodialysis with monopolar and bipolar membranes. Desalination, purification and concentration of lactates after fermentation are possible by conventional electrodialysis and the concentrated lactates can be converted into lactic acid and cleaned further by means of water-splitting electrodialysis with bipolar membranes.