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Biotechnologically produced D-lactic acid – starting material for biopolymers

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Biopolymers from D- and L-lactic acid represent an alternative to petrochemical plastics, e.g., in the packaging and food industry, and can be produced from renewable resources. In the last 20 years L-lactic acid gained importance as starting material for the poly L-lactic acid (PLLA). This plastic is a promising material, but the softening point is too low for a variety of applications. Whereas, the melting point of the stereocomplex of PLLA and poly D-lactic acid (PDLA) is about 50 °C higher than that of single polymers. In contrast to L-lactic acid, there is no large-scale process for the biotechnological production of D-lactic acid. Thus, the development of an effective biotechnological production process of enantiomerically pure D-lactic acid is required. Therefore, two strains from the genus *Sporolactobacillus* were characterized. In the majority of biotechnological processes yeast extract is used as a complex nitrogen source which is expensive and influences the cultivation in an undefined way. To replace yeast extract, 61 different nutrient sources were fully analyzed for its constituents. The analytical data in combination with cultivation experiments as well as successfully tested immobilized cells were used in bioreactor scale to achieve the aim of converting inexpensive raw materials. Rapeseed meals were used as replacement of yeast extract and thin juice from sugar beet production as substrate. Successfully 153 g/L D-lactic acid with a yield of 91% and maximum productivity of 4.67 g/(Lh) were produced biotechnologically with an enantiomeric excess of ≥99% ee within 48 hours using inexpensive raw materials.

Biography

Anja Kuenz has completed her PhD with the theme "Itaconic acid production based on renewable resources to replace petrochemical acrylic acid" from Thünen-Institute of Agricultural Technology, Braunschweig, Germany. She is a Senior Scientist at the Thünen-Institute of Agricultural Technology and she is working in the fields of biotechnology, immobilisation and the biotechnical conversion of renewable resources. She has more than 35 papers and conference contributions in those fields.

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