

iv2splus INFONET

a3plus, 4th Call (2010)

ABEFerm

Butanol aus biogenen Reststoffen

Biobutanol is a biofuel, which is miscible with gasoline as well as gasoil in each ratio, gaining more and more importance. In this project a competitive biobutanol process should be established based on the well known ABE fermentation using different kinds of bioresidues.

Central point is the concept and test of an integrated fermentor and product upgrading system.

In order to reach the aims of Kyoto, several national as well as european initiatives were launched to replace fossil fuels by biofuels to a certain extent. Beside biodiesel and bioethanol, butanol is another type of biofuel, which can serve to reach these aims. In Austria several biodiesel plants are in operation with a total capacity of 325000 t biodiesel per year, as well as a large bioethanol plant with a capacity of 200000 m3. Biobutanol is not produced to this date.

Butanol (1-Butanol, n-Butanol, CH₃-CH₂-CH₂-CH₂OH), an aliphatic, saturated C₄-alcohol can be used as an fuel additive for transport. It is miscible with gasoline as well as with gasoil. An especial sustainable pathway for its production is the biotechnological way, the so called ABE fermentation, a strict anaerobic process, which was well known as Weizmann-process in world war 1. Therein different substrates are converted to acetone, butanol and ethanol, by different Clostridia sp., under participation of several metabolic pathways interacting in a complex manner. During exponential growth of the cells the main products are different acids like lactate, acetate und butyrate as well as hydrogen and CO₂ (acidogenesis). Only at the stationary growth phase the production of solvents is taking place (solventogenesis). During the fermentation using C. acetobutylicum acetone, butanol und ethanol are produced in a ratio of 3:6:1 and up to a concentration of 12 g/l butanol. However, this process is characterised by several drawbacks like low yields and productivities, low end product concentration, as well as process instabilities.

Aim of this project is the setting up of a competitive process for biobutanol production, by approaching the main scientific goals: Identifying the optimal microbiological system, application of an innovative substrate pretreatment and concept and test of an integrated fermentor and product upgrading system.

Programme

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Project coordination

Project partners

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