

Biotechnological production of β -1,3-Glucan in a technical pilot plant

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The protozoa *Euglena gracilis* is able to change its metabolism if sufficient nutrients are available in media from phototrophic to heterotrophic. Under heterotrophic conditions the production of the storage carbohydrate Paramylon (a polysaccharide with β -1,3-linked glucose molecules) is increasing.

Paramylon and several β -1,3-glucans from other organisms are known for their immunostimulating effect and three types of them produced by yeast, oat and a strain of the bacteria *Alcaligenes faecalis* already have an FDA-approval.

Several applications of β -glucan for functional food, cosmetics and pharmacy are conceivable. In contrast to other β -glucan sources the concentration of Paramylon in *Euglena gracilis* is high (about 60 % of dry matter) and the downstream processing is not elaborate.

A 4 m³ pilot plant was established at Emsland-Stärke GmbH in Emlichheim (in cooperation with the University of Bielefeld) and the complete process from fermentation, downstream processing to the dry product was carried out in a technical scale.

Potato fruit juice (PFJ) could be used as a fermentation media and alternatively diluted potato protein liquor (PPL) is available. Because of the high amount of proteins, minerals and vitamins in PFJ, there is no need for additional nutrients apart from glucose.

To observe the fermentation without the risk of infection online-monitoring by 2-D-fluorescence spectroscopy (BioView) was performed.

The BioView generates excitation wavelengths from 270-550 nm and is measuring the emission in a range from 310-590 nm.

The concentration of biomolecules like amino acids could be observed and the chronological variation of these concentrations implicates the increasing biomass. The changes from lag phase to exponential growth and the end of exp. phase (end of fermentation) are apparent. This method delivers data about cell growth, eventually infections and status of the fermentation without sampling and could be used also in an industrial plant.