



# Biotechnological production of $\alpha$ -1,3-Glucan in a technical pilot plant



Joachim Ryll<sup>1</sup>, Thomas Scheper<sup>1</sup>, Martin Lotz<sup>2</sup>

<sup>1</sup>Institut für Technische Chemie der Universität Hannover, Callinstr. 3, 30167 Hannover

<sup>2</sup>Emsland-Stärke GmbH, 49824 Emlichheim

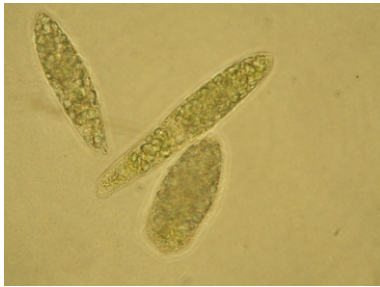
### Introduction

The phototrophic organism *Euglena gracilis* is able to live under heterotrophic conditions as well. The store carbohydrate Paramylon is a type of 1,3-Glucan. This substance class is known for its effect on our immunosystem. Because of several applications in the field of functional food, cosmetics and pharmacy the industrial production of Paramylon seems to be of interest.

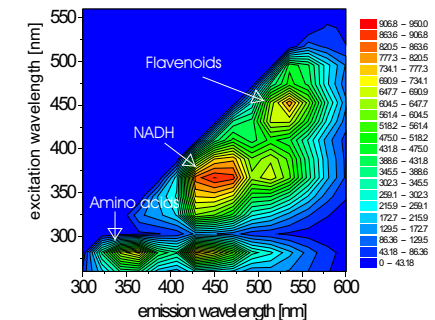
In a cooperation with the University of Bielefeld a pilot plant with a 4 m<sup>3</sup> reaktor was established at Emsland-Stärke GmbH, where the fermentation and the down stream processing was carried out at a technical scale.

Online-monitoring of the fermentation plant was performed by 2-D-fluorescencespectroscopy to prevent the risk of infection by sampling.

The concentration of important biomolecules could be measured by fluorescence spectroscopy - especially the data for the amino acids is correlating with the growth of cells.

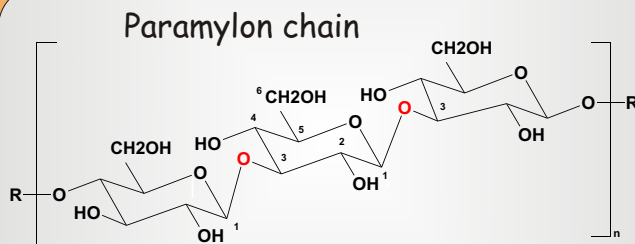


Microscopic picture of *Euglena gracilis* with Paramylon bodies  
1000 X magnification

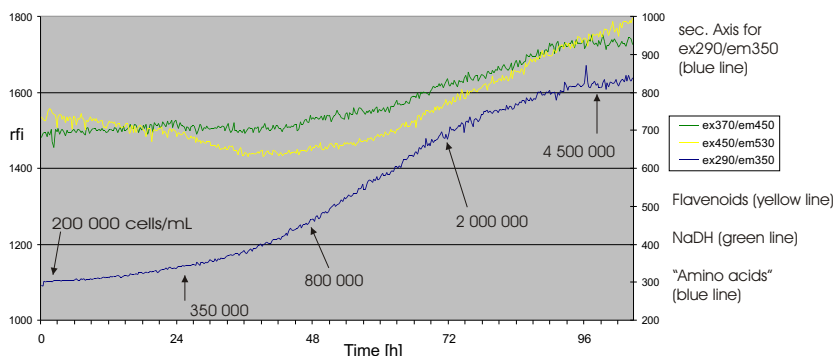


Fluorescence spektrum of a fermentation with PFJ

Scale-up from the bench to a 4000 L-pilot plant of Emsland-Stärke GmbH in Emlichheim. Fermentation with potato fruit juice (PFJ) as a media or optional with potato protein liquor (PPL).



Fermentation with potato fruit juice



Online-monitoring using 2-D-Fluorescencespectroscopy in a lab-scale fermenter (30L) at 3 excitation- and emission wavelength (nm). The ordinates shows rel. fluorescence intensity. Additionally the cell density was measured offline