

## EXPLOITABLE FOREGROUND

### A specific Arabinose Transporter for improved fermentations of lignocellulosic hydrolysates with recombinant yeasts

#### Explanation and Purpose

Lignocellulosic hydrolysates used for the production of 2<sup>nd</sup> generation biofuels typically contain sugar mixtures consisting of glucose and xylose, and minor amounts of arabinose. The yeast *Saccharomyces cerevisiae* is the preferred microorganism for the fermentative production of ethanol but is only able to ferment the pentose sugars xylose and arabinose after genetic engineering. Although pentose fermenting *S. cerevisiae* strains have been constructed recently, pentose uptake is still a limiting step in mixed-sugar fermentations.

#### Exploitation Strategy

GUF has cloned a sugar transporter Stp2 from the plant *Arabidopsis thaliana*, which mediates the uptake of arabinose, but not of glucose into *S. cerevisiae* cells. Expression of the heterologous transporter supported faster utilization of arabinose especially at low arabinose concentrations.

#### IPR Measures

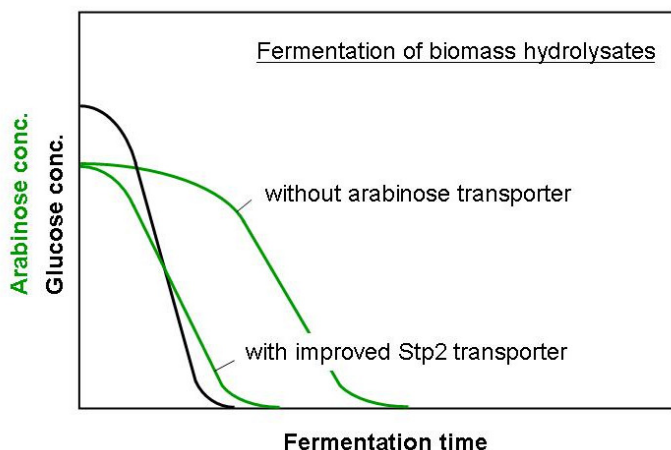
A patent application has been filed concerning the use of the Stp2 arabinose transporter for expression in yeast.

#### Further Research

The transporter is being further engineered for reduced inhibition by glucose. Substitution of an already identified amino acid residue resulted in further improved properties of the transporter.

#### Impact of Exploitation

The specific Stp2 arabinose transporter will enable yeast strains to ferment arabinose simultaneously with glucose, especially at low arabinose concentrations. This will significantly reduce the time for the complete fermentation of biomass hydrolysates and will therefore reduce the production costs for lignocellulosic ethanol.



## Novel Microbes and Enzymes for 2<sup>nd</sup> Generation Bioethanol Production



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