



Laboratório Nacional de Energia e Geologia

Research Areas

Biofuels / Biomass for Industry / Biorefineries

Contacts

Helena Albergaria

LNEG, Unidade de Bioenergia e Biorrefinarias
Estrada do Paço do Lumiar, 22
Ed. F, R/C
1649-038 Lisboa

(+351) 210924600

info@lneg.pt

Project Co-Funded by:

FCT Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA EDUCAÇÃO E CIÊNCIA



REPÚBLICA PORTUGUESA

AMBIENTE E
AÇÃO CLIMÁTICA

BIOCONTROL -

Improving biological control of industrial bioethanol fermentations by using *Saccharomyces cerevisiae's* own weapons



Motivation

Microbial contaminations are a major problem in industrial bioethanol processes, leading to significant economic losses that can reach 20-30% of the final product-cost. Lactic acid bacteria and *Brettanomyces bruxellensis* are the main contaminants of bioethanol fermentations, affecting *Saccharomyces'* performance and decreasing ethanol yields and productivity. Several treatments with chemicals (e.g. acids or ammonia) and antibiotics are currently used to combat these undesirable microorganisms. However, these treatments can affect *Saccharomyces'* performance and put disposal waste problems. Therefore, there is a definitive need to find alternative biocontrol agents for bioethanol fermentations. Recently, members of the present research team found that *Saccharomyces cerevisiae* secretes a natural biocide (named saccharomycin) during alcoholic fermentation that is active against *B. bruxellensis* and lactic acid bacteria. Thus, the motivation of the present project is to explore the biocontrol potential of this newly-found biocide.

Objectives

The main goal of the present project is to improve biological control of fuel-ethanol fermentation processes by exploiting *Saccharomyces'* own weapons. With this goal the following strategy will be used:

- Construction of genetic modified *Saccharomyces* strains to over-produce the natural biocide (saccharomycin)
- Use of the genetic-modified strains as starters of bioethanol fermentations performed with agro-industrial residues and evaluate their biocontrol effect on the contaminants;
- Evaluate the ability of the agro-industrial residues as raw-materials to produce the newly-found biocide (saccharomycin) in large scale.

Partnership

Associação para a inovação e desenvolvimento da Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa (NOVA.ID.FCT/UNL) Campus da Caparica 2829-516Caparica

Instituto Superior de Agronomia, Universidade de Lisboa (ISA/UL) Tapada da Ajuda 1349-017 1349-017Lisboa

(Consultores)

Nils Arneborg/ Universidade de Copenhaga, Dinamarca

Boris Stambuk/ Universidade Federal de Santa Catarina, Brasil

Web page

NA

Project Duration

01/10/2018 to 31/03/2022

The strategy of the project will be to construct industrial (wild) strains of *Saccharomyces* genetically modified to over-express saccharomycin and to evaluate their ability to prevent the development of undesirable contaminants when used as starters in bioethanol fermentation processes. The natural biocide will be also produced and purified in amounts that will allow testing its potential as an alternative biopreservative for use in different processes involving ethanol fermentations.