Creation of single cell protein-producing mutants of *Phaffia rhodozyma*

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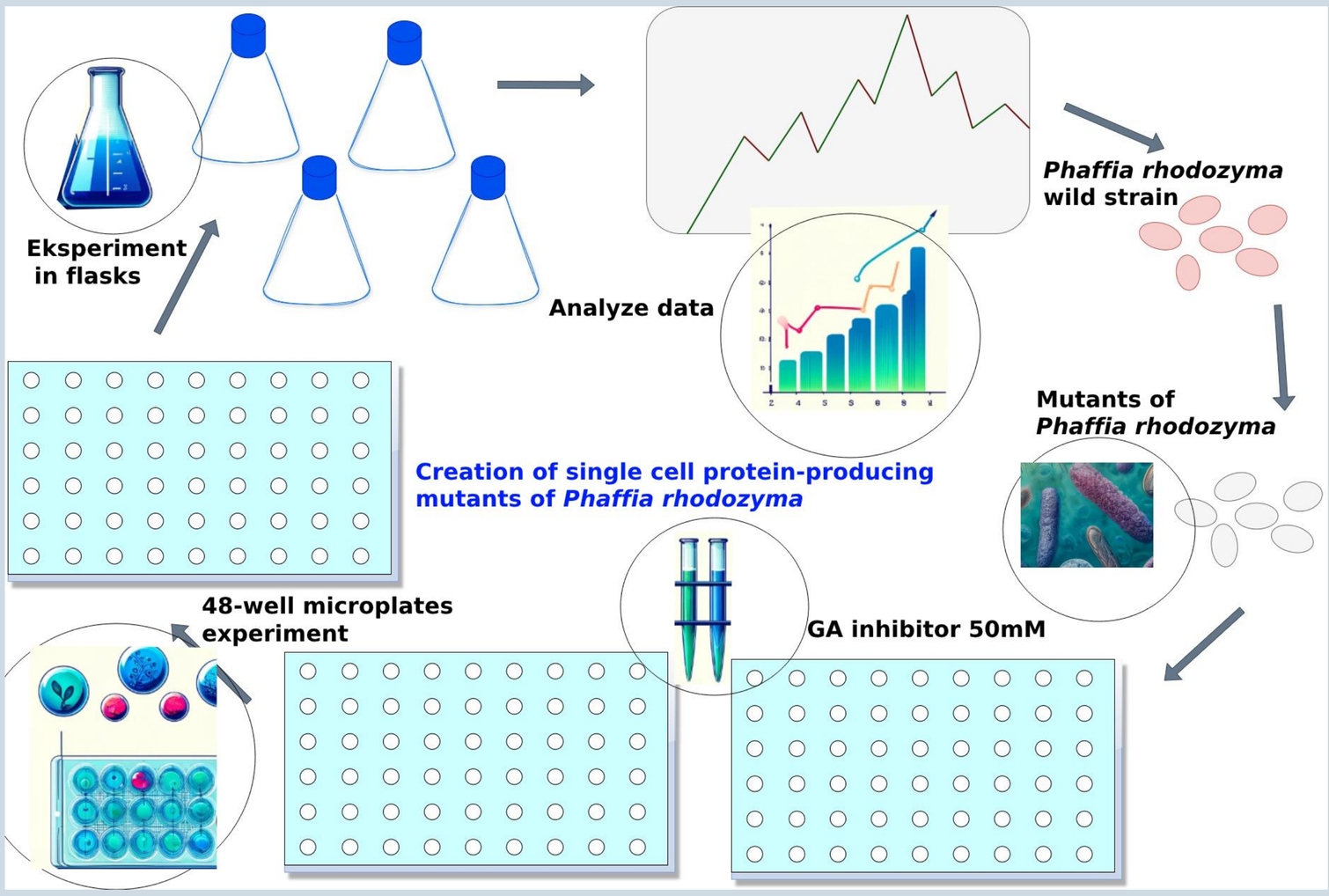
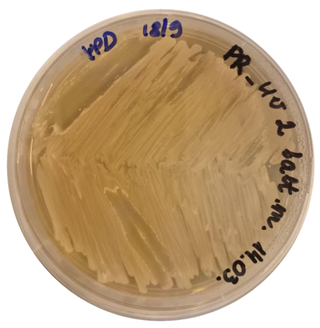


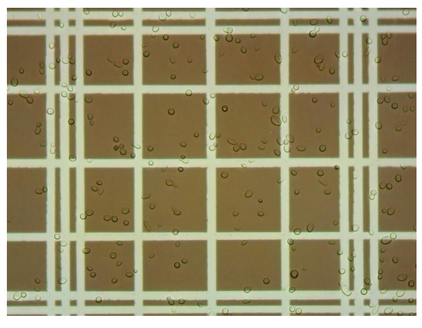
The aim of study is to create mutants from the yeast *Phaffia rhodozyma* with higher protein content in comparison with the wild strain, using the amino acid inhibitor Glufosinate-ammonium as a selective agent for the selection of mutants

Introduction

This study goal is the creation of *Phaffia rhodozyma* yeast mutants to produce single-cell protein production, aligning with the need for sustainable protein sources in aquaculture.

Selected for its rapid growth and high protein content, *Phaffia rhodozyma* offers considerable industrial potential beyond its traditional role in synthesizing astaxanthin. Utilizing both the wild-type yeast strain DSM 5626 and white mutants of yeast, the research aims to create mutants that can increase protein output effectively.





Methods

- Prepared inorganic nitrogen media, adjusted pH to 6, and maintained a growth temperature of 22°C
- Growth experiments in flasks over seven days, with biomass sampling starting on day three
- Analyzed high biomass samples for protein content using the BCA assay
- High protein samples underwent random mutagenesis with EMS (Ethyl methanesulfonate)
- Used Glufosinate-ammonium (50 mM) as a selective agent in 48-well microplate screenings for optical density
- Repeat the BCA assay

Acknowledgment

The work has been developed by the Fundamental and Applied Research Project ‘Herbicides as tool for selection of edible protein-rich mutants’, project No. lzp-2022/1-0126, funded by the Latvian Council of Science.

Results

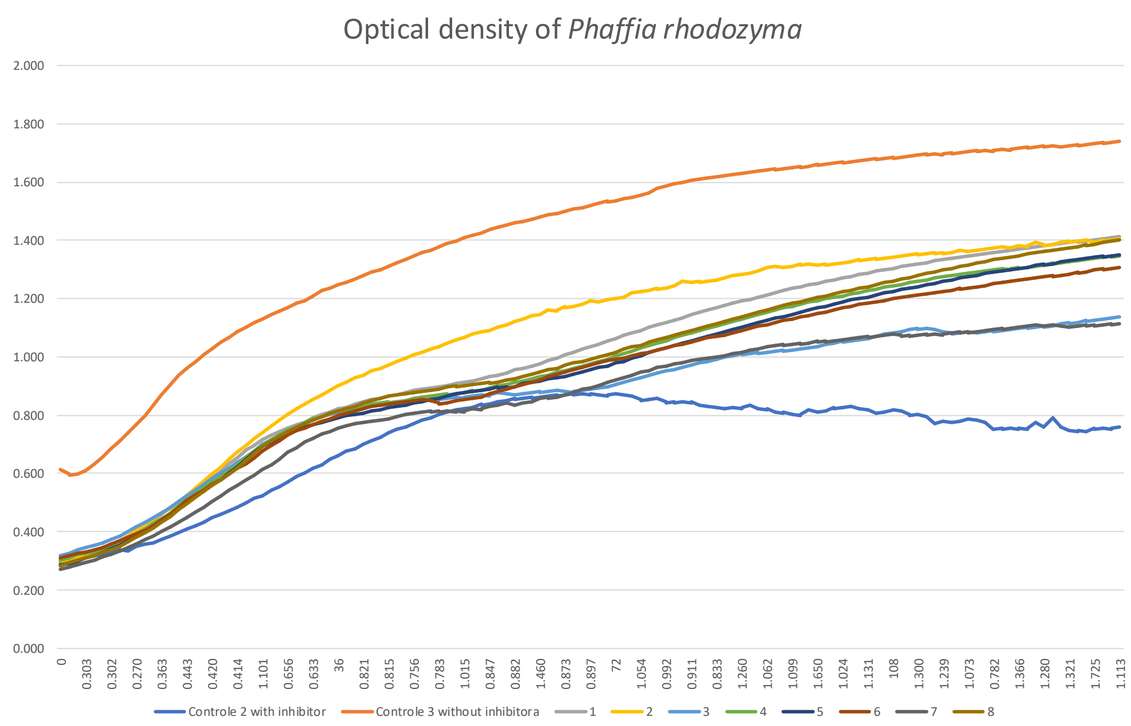


Fig.1

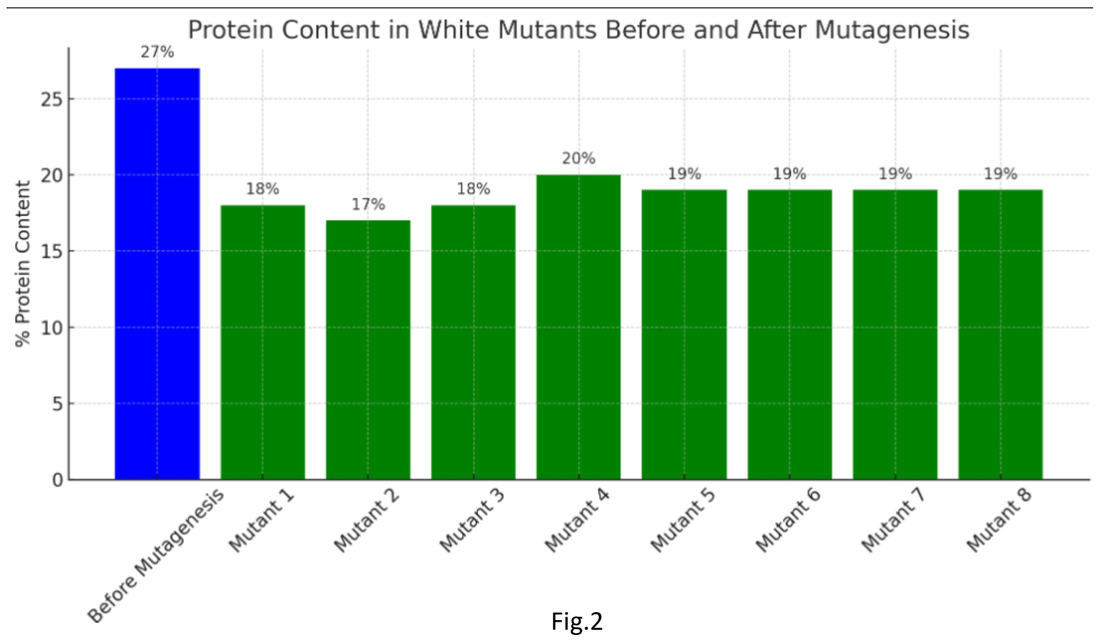


Fig.2

Conclusions

- Confirmed the viability of *Phaffia rhodozyma* on inorganic nitrogen media
- The best result for protein in white mutant showed 26,8% protein in biomass, while the new GA mutant had 20,8% protein in biomass