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CREATION OF SINGLE CELL PROTEIN-PRODUCING MUTANTS OF *PHAFFIA RHODOZYMA*

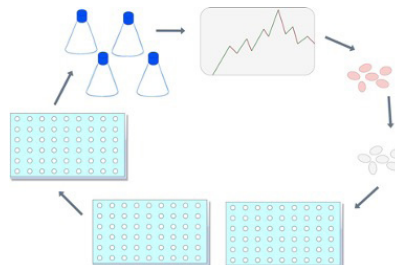
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Abstract – Recently, there has been an increasing demand for sustainable protein sources for aquaculture that can be produced with a minimal environmental footprint, such as single-cell proteins, proteins from algae, insects, and by-products from the agricultural industry. Single-cell proteins that are derived from microorganisms show a sustainable alternative to traditional protein sources due to their high protein content and rapid growth. This research focuses on creating mutants of the yeast *Phaffia rhodozyma* to increase single-cell protein production. This yeast has significant industrial potential and biological features. The yeast *Phaffia rhodozyma* is already known for its unique ability to synthesize astaxanthin, so this case will focus on its ability to produce protein. In the present study, wild-type yeast strains DSM 5626 and previously obtained white mutants without the ability to synthesize astaxanthin were used for further random mutagenesis methods to introduce specific mutations into the genome aimed at improving their ability to biosynthesize protein. The amino acid inhibitor glufosinate-ammonium at a concentration of 50 mM was used as a specific pressure agent to select potential protein-producing mutants. Screening of potential mutants was carried out in 48-cell microplates by assessing cell growth using optical density measurements. The protein content of the biomass obtained from the experiments was analyzed in detail using BCA (Protein Assay Reagent) analysis, which confirmed their potential as a source of nutrients for aquaculture. This research showed that the yeast *Phaffia rhodozyma* can grow on a medium without an organic nitrogen source. The study also showed good potential in terms of protein content. During research, one of the white mutants showed the best results in comparison to other white mutants and the wild strain of yeast. 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. The results obtained allow further research into the development of cost-effective and environmentally friendly alternatives for feed in aquaculture.

Keywords – Amino acid inhibitor; aquaculture; glufosinate-ammonium; herbicide; mutagenesis; sustainable protein sources



Process of creation single cell protein-producing mutants of *Phaffia rhodozyma*.

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