PRESS RELEASE

EFFECTS OF CHEMICAL CHAPERONE ON RECOMBINANT PROTEIN AND SOLUBILITY.

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Proteins are important in many scientific fields. Due to their sensitivity to denature or to misfold because of variations such as pressure, temperature and other factors, chemical chaperones are sought after to aid cells adapt to these extreme conditions thereby making cells viable.

A Master’s Degree thesis in the field of life science technologies, presented by Richard Dwamenah.

This work focused on the effects chemical chaperones have on recombinant protein production and solubility. The presence of chemical chaperones could yield more recombinant antibodies for therapeutic and diagnostic utilization as they tend to aid protein folding. It is important to identify optimal concentrations of the chemical chaperones.

During this research, Richard Dwamenah investigated and analysed the interactions between chemical chaperones and protein production giving an understanding of the interactions of various chemical chaperones on the antibody production by baker’s yeast. Four groups of different chemical chaperones were included, being sugars (mannose, sucrose, trehalose), sugar alcohols (glycerol, mannitol, arabitol, sorbitol), amino acids (betaine, proline, glutamic acid, glycine, alanine, taurine) and other osmolytes (DMSO, TMAO, 4-PBA).

The experiments were done by analyzing the effects of chemical chaperones on growth, and productivity using ELISA techniques for detection and quantification of the secreted antibody.

The result indicated that the antibody concentrations at the lowest sucrose concentration was higher than at the highest sucrose concentration tested. The OD_{600} was half higher for cultures enhanced with 200 mM sucrose than for cultures enhanced with 50 mM sucrose. The outcomes demonstrated that the antibody titer diminished as the concentration of trehalose increased. In general, addition of sugars negatively affected antibody production. The obtained titers diminished with increasing sugar concentrations. This impact is because of incompatibility of these sugars with the galactose promoter system.

The results showed higher antibody yield for cultures grown with a mixture of proline and TMAO yielding 2-fold higher antibody concentration than with other chemical chaperones. Hence, this research work showed the viability of Glycine, TMAO, and Proline as chemical chaperones and determined optimal concentrations of chemical chaperones for growth and cellular productivity in yeast.

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