

INFLUENCE OF THE MEDIUM ON THE ALCOHOLIC FERMENTATION PERFORMANCE OF TWO DIFFERENT IMMOBILIZATION YEAST TECHNIQUES COMPARED TO FREE YEAST CELL FERMENTATION

Vilma Gurazi^{1*}, Luljeta Xhagolli¹, Rozana Troja¹, Shpresa Hereni¹

¹Department of Industrial Chemistry, Faculty of Natural Sciences, University of Tirana, Bulevardi Zogu I nn, 1000 Tirana, Albania

*e-mail: vgurazi@gmail.com

Abstract

The idea of immobilization or known also as microencapsulation was first introduced in 1964 and the aim was transplanted cells protection. Cell immobilization in alcoholic fermentation is a rapidly expanding research area because of its attractive technical and economic advantages compared to the conventional free cell system. In this study we analyze two different immobilization techniques of beer and bread yeast in alginate beads.

Yeast was immobilized with two different methods of immobilization, entrapment and capsulation in alginate and inoculated in two different mediums. Objective was to compare immobilized fermentation rate related to free yeast cells process and how the medium influence the fermentation process. Mediums used were beer wort and sugar solution. Comparison was made in terms of substrate consumption rate, fermentation kinetic coefficients and optimum fermentation medium. A continuous fermentation process was developed.

There were no notable differences between two methods of immobilization in the same fermentation medium. Differences are shown between immobilized and free yeast cell fermentation rate and also between same immobilized fermentation developed in different mediums. Immobilized yeast fermentation results very productive in continuous fermentation compared to free yeast cell fermentation, making this an approachable technique. There is a notable difference in free and immobilized yeast fermentation in beer wort compared to sugar solution, developed by beer yeast, this because of the more complex substrate in the first case that is especial in normal metabolic growth activity.

Comparing two immobilized yeast cell techniques we prefer entrapment technique because we take more uniform, consistent and smaller in diameter beads compared to capsulation, resulting in a higher wort diffusion rate.

Key words: *Yeast, Immobilized cells, Entrapment, Capsulation, Free cell, Fermentation rate.*