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Improvement of Ethanol Fermentation of Corn Semolina Hydrolyzates with Immobilized Yeast by Medium Supplementation

Svetlana Nikolić¹, Ljiljana Mojović^{1}, Dušanka Pejin², Marica Rakin¹ and Vesna Vučurović²*

¹**Faculty of Technology and Metallurgy, University of Belgrade, Karnegijeva 4, RS-11000 Belgrade, Serbia**

²**Faculty of Technology, University of Novi Sad, Bul. Cara Lazara 1, RS-21000 Novi Sad, Serbia**

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Summary

The possibilities of improving ethanol fermentation of enzymatically obtained corn semolina hydrolyzates with alginate-immobilized yeast *Saccharomyces cerevisiae* var. *ellipsoideus* by medium supplementation with mineral salts as sources of magnesium, zinc, calcium and copper ions, and vitamins (pantothenate, thiamine, pyridoxine, biotin and inositol), separately or as combined mixtures, have been investigated. Among all tested minerals, alone or combined, the most efficient in improving ethanol productivity during fermentation of corn semolina hydrolyzates was a mixture of magnesium and zinc salts: MgSO₄ (2 g/L) and ZnSO₄ (0.3

g/L). Positive effects were also obtained with the addition of copper ions (CuCl_2 , 1 mg/L) or calcium ions (CaCl_2 , 40 mg/L). Among vitamins, the most effective was Ca-pantothenate (1 g/L), which caused an increase in the fermentation efficiency for approx. 8 %, compared to the control sample. Based on these results, an effective mixture of vitamins and minerals consisting of MgSO_4 (2 g/L), ZnSO_4 (0.3 g/L), CuCl_2 (1 mg/L), Ca-pantothenate (1 g/L) and inositol (1 g/L) was arranged for the supplementation of the medium based on corn semolina hydrolyzates. The supplementation with this mixture provided an increase of the fermentation efficiency for 20 % compared to the control sample, without supplementation.

Key words: bioethanol, fermentation, *Saccharomyces cerevisiae* var. *ellipsoideus*, alginate-immobilized yeast

*Corresponding author: E-mail: lmojovic@tmf.bg.ac.rs

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