

Evaluation of factors influencing the enantioselective enzymatic esterification of lactic acid in ionic liquid

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In this paper esterification of ethanol and lactic acid catalyzed by *Candida antarctica* B (Novozyme 435) in ionic liquid (Cyphos 104) was studied. The influence of different variables on lipase enantioselectivity and lactic acid conversion was investigated. The variables investigated were ionic liquid mass/lipase mass ratio, water content, alcohol excess and temperature. Using the Design Expert software 2^3 factorial experimental plan (two levels, three factors) was performed to ascertain the effect of selected variables and their interactions on the ethyl lactate enantiomeric excess and lactic acid conversion. The results of the experiments and statistical processing suggest that temperature and alcohol excess have the highest effect on the ethyl lactate enantiomeric excess, while temperature and water content have the highest influence on the lactic acid conversion. The statistical mathematical model developed on the basis of the experimental data showed that the highest enantiomeric excess achieved in the investigated variable range is 34.3%, and the highest conversion is 63.8% at the initial conditions of water content at 8%; 11-fold molar excess of alcohol and temperature at 30°C.