

August 13-14, 2018
Paris, FranceAyse Ezgi Unlu et al., Insights Enzyme Res 2018, Volume 2
DOI: 10.21767/2573-4466-C1-002

ENZYMATIC ETHYL LACTATE SYNTHESIS IN A GREEN REACTION MEDIUM

Ayse Ezgi Unlu, Arikaya A and Takac S

Ankara University, Ankara, Turkey

Ethyl lactate is a commonly used biodegradable solvent and it is widely used in food additives, pharmaceutical preparations, and also in fragrances. It is naturally found in alcoholic beverages, various foods, such as cabbage, vinegar, butter, chicken and some fruits. In the literature, searches on ethyl lactate synthesis by the esterification reaction of lactic acid are mainly focused on i) the enhancement of the product yield by removing water employing various procedures ii) the facilitation of down-stream processing by using heterogeneous catalysis, and iii) the environmentally friendly processes by using enzymes. In this study, we investigated the synthesis of ethyl lactate by esterification reaction of lactic acid using lipase enzyme in a choline chloride-based deep eutectic solvent as green reaction medium. The synthesis of ethyl lactate was carried out in a batch system under different reaction conditions. According to the results, the initial reaction rate increased with the increase in initial lactic acid concentration at constant ethanol concentration. The molar ratio of the substrates strongly affected the rate of this reversible reaction. The temperature of the synthesis was found to have a significant effect on the initial reaction rate. Bell-shaped curve was obtained for the initial reaction rate as the temperature increased. High agitation rates increased the reaction rate by decreasing the mass transfer limitation in the medium. The overall results showed that deep eutectic solvent was successfully used in the esterification reaction of lactic acid.

Biography

Ayşe Ezgi Unlu graduated from Ankara University, Faculty of Engineering, Department of Chemical Engineering in 2002. She completed her master degree in 2005 at Ankara University in Turkey. The synthesis of Naproxen, a member of NSAIDs, was the subject of the master thesis using commercial lipase subjected to various pre-treatment strategies that enhanced the activity. Investigation of different parameters on the production of lipase by *Candida rugosa* and also proteomic analysis of the isoenzymes was another subject of interest. Ayşe Ezgi Unlu completed her Ph.D. in 2012 at Ankara University in Turkey. Two important antioxidant enzymes, catalase and superoxide dismutase production by *Rhodotorula glutinis* was studied comprehensively during PhD thesis. She received a postdoctoral grant from TÜBİTAK, with a project about the synthesis of flavonoid polymers using green solvents, at the Institute of Technical Biocatalysis, Technical University of Hamburg, Harburg in Germany, between 2014-2015. She is currently working at Biotechnological Research Group in the Department of Chemical Engineering, Ankara University. The research area includes enzymes, enzymatic reactions, fermentation, protein synthesis, proteomics, experimental design, enzymatic biopolymers and green solvents.

aeunlu@eng.ankara.edu.tr

