Esterification of bio-based succinic acid in biphasic systems: Comparison of chemical and biological catalysts

Abstract:
Different chemical and biological catalysts were screened for the biphasic esterification of aqueous solutions of succinic acid with 1-octanol. Among them, DBSA, Nation NR-50 and Novozym 435 were found to be the most attractive catalysts. The pH, the temperature and the catalyst concentration had high impacts on the reaction rates. The optimization of the reaction conditions with a single-variable approach for the chemical catalysts and a Response Surface Methodology for the enzyme allowed an increase of the rates by a factor 1.5 for DBSA, 2.3 for Nation NR-50 and 1.3 for Novozym 435. Real fermentation broths produced from recombinant Escherichia coli could be successfully esterified with conversions up to 93.

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