LIPASE CATALYZED TRANSESTERIFICATION OF DEXTRAN WITH VINYL ESTER

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ABSTRACT

The application of enzymatic catalysis for the synthesis of biopolymeric surfactants was investigated. Dextran T-40 was enzymatically modified by the attachment of hydrophobic groups through a transesterification reaction with a vinyl decanoate. From enzyme screening, it was found that lipase AY (lipase from Candida rugosa) was the best enzyme for transesterification in dimethylsulfoxide. The transesterification of Dextran T-40 with vinyl decanoate at 1:4 of a mole ratio of dextran to vinyl ester catalyzed by 26.6 mg/ml of pH-adjusted lipase AY (pH 7.5) was the optimal condition. The position of the hydrophobic group attached to the backbone was characterized. This work revealed that lipase AY can not distinguish clearly between position 2 and position 3 of hydroxyls of the glucopyranosides residues in the presence of medium chain of acyl donor. The kinetics study of lipase AY-catalyzed modification of Dextran T-40 with vinyl decanoate in dimethylsulfoxide revealed the enzyme is inactive after 11 h of reaction and the gradual rise of the conversion is due to the chemical modification of Dextran T-40. The kinetics and regioselectivity of lipase AY-catalyzed modification are fundamental for controlling the physico-chemical properties of the final biopolymeric surfactants.

KEY WORDS: LIPASE / TRANSESTERIFICATION / VINYL DECANOATE / DEXTRAN / BIOPLOYMERIC SURFACTANT

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