

Screening of Lipase for Microwave Assisted Esterification of Oleic Acid

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Biodiesel is composed of alkyl esters of fatty acids with a short-chain alcohol. It's currently the most widely accepted alternative fuel for diesel engines due its environmental, technical and strategic advantages and can be produced for chemical and enzymatic means. The enzymatic processes are preferred because of their mild reaction conditions.

In the present study, the commercial lipases, Lipozyme RM IM, Novozyme 435, PS Amano and Lipozyme TL IM, were used to catalyzed the esterification of oleic acid with ethanol in presence of microwave and conventional heating.

Esterification of oleic acid by conventional heating was carried out in 25mL flask, oleic acid (2.84g), ethanol (0.81g, 1.7mL), immobilized lipases (10% weight of oleic acid) and cyclohexane (2mL) were kept under magnetic stirred at 80°C.

In the microwave assisted esterification experiments was used a monomode microwave unit (CEM Discover). The system was equipped with a reflux condenser and magnetic stirrer bar. Powers of 10, 50, 100 W were evaluated and the maximum temperature of the system did not exceed 85°C. The quantities of reagents were the same used for the reactions used in conventional heating. Gas chromatographic analysis was used to determine the conversions.

Novozyme 435 presented the best result among the enzymes used. This showed conversion of 98.17% in 10 minutes of reaction and power of 10W. Already performed the reaction with conventional heating, showed 93.94% of conversion in 30 minutes