

Transesterification of Soybean Oil Catalyzed by Lecitase Ultra® Immobilized on Hydrophobic Support

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Biodiesel is composed of alkyl esters of fatty acids and can be used as an alternative diesel fuel. These fatty acid esters are typically synthesized by the transesterification of triacylglycerides from seed oils (e.g., soybean) with a short-chain alcohol (e.g., methanol) using chemical or enzymatic catalyst. Lipases (triacylglycerol acylhydrolase EC 3.1.1.3) are utilized as versatile biocatalysts in various processes, especially for modification of fats and other lipids. Preliminary reactions of transesterification of soybean oil with ethanol using Lecitase Ultra ® (*Thermomyces lanuginosus*) as biocatalyst were carried out. The phospholipase was immobilized by the method of adsorption in Amberlyte ® XAD-7HP hydrophobic support. For the experiments there were used 5 or 20% of the free and immobilized enzyme, 2,27mmol of the soy oil, a ratio oil/ethanol of 1:3 or 1:10, 0 or 10% of water and 40 ml of n-hexane in accordance with previous successful experiments developed in or laboratory. The reactions were performed at 35°C, 200 rpm, 3 hours and by using 40 ml of n-hexane as solvent system. The reactional products were analyzed and quantified by gas chromatography (GC) by using heptadecanoate as internal standard. The chromatographic analysis showed that, 20% of the immobilized enzyme, 10% of water and an oil/ethanol ratio of 1:3 promoted the best conversion rate (around 42%) into fatty acid esters. The worst reaction was that in which it was used 5% of the free enzyme, 10% of water and an ratio oil/ethanol of 1:10, showing that the enzyme concentration and the oil/ethanol ratio should be important for a reasonable conversion rate. From this result we are going to conduct an experimental design considering all the parameters analyzed in order to increase the yield of fatty acid esters