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Supplementary Materials

Enzymatic Production of Ecodiesel by Using a Commercial Lipase CALB, Immobilized by Physical Adsorption on Mesoporous Organosilica Materials

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Abstract: The synthesis of two biocatalysts based on a commercial *Candida antarctica* lipase B, CALB enzyme (E), physically immobilized on two silica supports, was carried out. The first support was a periodic mesoporous organosilica (PMO) and the second one was a commercial silica modified with octyl groups (octyl-MS3030). The maximum enzyme load was 122 mg enzyme/g support on PMO and 288 mg enzyme/g support on octyl-MS3030. In addition, the biocatalytic efficiency was corroborated by two reaction tests based on the hydrolysis of p-nitrophenylacetate (p-NPA) and tributyrin (TB). The transesterification of sunflower oil with ethanol was carried out over the biocatalysts synthesized at the following reaction conditions: 6 mL sunflower oil, 1.75 mL EtOH, 30 °C, 25 μL NaOH 10 N and 300 rpm, attaining conversion values over 80% after 3 h of reaction time. According to the results obtained, we can confirm that these biocatalytic systems are viable candidates to develop, optimize and improve a new methodology to achieve the integration of glycerol in different monoacylglycerol molecules together with fatty acid ethyl esters (FAEE) molecules to obtain Ecodiesel.

Keywords: biofuel; ecodiesel; biodiesel; commercial CALB lipase; ordered mesoporous materials (PMO); amorphous siliceous material MS3030

Table S1. Textural properties of the supports employed for the enzyme immobilization.

Support	S_{BET} (m^2/g)	Pore Volume (cm^3/g)	Pore Diameter (nm)
PMO	882	1.0	7.1
MS3030	305	2.9	27.9
Octyl-MS3030	254	2.2	25.0