

عنوان مقاله:

Lipase immobilization on aluminum-based periodic mesoporous organosilica (PMO) support as a biocatalyst for biodiesel production

محل انتشار:

بیستمین کنگره ملی و هشتمین کنگره بین‌المللی زیست‌شناسی ایران (سال: 1397)

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خلاصه مقاله:

Nowadays, a tendency towards immobilization of enzyme has been increased due to its advantages including retaining activity after each cycle, easy recovery and raising the stability. Furthermore, concerns around the use of fossil fuels and emission of toxic gases into the atmosphere have made a crisis for human being and environment. Diminishing fossil fuel resources, environmental hazards associated with fossil fuel combustion emissions and the increasing necessity for energy uses are the main reasons for researches to replace it with alternative fuels. Biodiesel production has attracted a considerable interest as sustainable fuels because of its low sulfur content, low hydrocarbon aroma, high octane number, high flash point, and low environmental impact. Biodiesel is a mixture of long-chain fatty acid methyl esters (FAME) produced from the transesterification of triglycerides. Here, porcine pancreatic lipase (PPL) was selected to immobilize inside the pore channels of aluminum-based PMO. Enzyme immobilization was confirmed by scanning electron microscopy (SEM), Transmission electron microscopy (TEM), low angled XRD, FTIR, EDAX, and BET. Lipase activity was determined spectrophotometrically using p-NPP as the substrate. One unit of lipase activity was defined as the amount of enzyme required to release 1 μmol of p-nitrophenol per milliliter per minute. Protein content was monitored by the Bradford method. In a normal laboratory condition, adding substrate (Triglyceride) to immobilized enzyme was done to testify the activity of the immobilized lipase in transesterification. All the analyses were in agreement with our predictions. We successfully reached the results where the biodiesel was produced very efficiently.

کلمات کلیدی:

Enzyme immobilization, Biodiesel, Fuel

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