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Investigation of catalytic activity of thermally treated waste mussel shells for biodiesel production from jojoba oil

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S ince the last few decades, a large amount of scientific investigations are focused on discovering a pathway for the production of value-added chemicals and fuels from renewable resources. The non-edible oils, such as jojoba oil is gaining consistent scientific and industrial considerations not only because of its applications in cosmetics and pharmaceutical industries but also due to the possibility of its transformation to biodiesel. An appropriate utilization of jojoba oil would avoid the usage of food-grade oil for biodiesel generation, and consequently, contribute in minimizing the capital cost of biofuel. In the present study, a considerable waste *M. galloprovincialis* shells were utilized as a precursor for the synthesis of an economically less-expensive calcium oxide catalyst. Moreover, butanol was selectedas a reagent for the alcoholysis process because it can be derived from a bacterial fermentation process; hence, every components used in biodiesel production process can possibly be generated from the natural resources. The efficacy of the waste shells, when calcined at 800°C for 6 h, to assist the butanolysis of jojoba oil was investigated. The progress in the butanolysis reaction was systematicallymonitored for 10 h using variable operating parameters, such as butanol-to-oil molar ratio (6:1-10:1-12:1) and catalyst amount (8-12-16 wt. %); while, keeping a constant reaction temperature (85°C). The obtained results suggested that the optimal reaction parameters (butanol-to-oil molar ratio: 10:1, catalyst amount: 12 wt%, temperature: 85°C, time: 10 h, stirring intensity: 350 RPM) resulted in 60% jojoba oil conversion.

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