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Synthesis and characterization of alumina-supported bimetallic oxide CuO-ZnO catalyst for transesterification of kapok seed oil (*Ceiba pentandra*)

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Statement of the Problem: At the present time, the researchers much attracted to developing renewable energy because the world's fossil oil reserves have decreased significantly. Biodiesel is one of the most promising alternative energies for substituting fossil fuels. However, the main obstacle faced at this time the cost of biodiesel production is too expensive, so the price of biodiesel can't compete against the price of diesel oil. There are two main causes, namely, first the production process using a homogeneous catalyst that has many weaknesses. The second, the raw material uses palm oil, which in fact besides the expensive price, also compete with the food industry. The use of the heterogeneous catalyst for substitution of the homogeneous catalyst and using low-cost oil as feedstock is a promising strategy for biodiesel production. Therefore, this study was to focus on developing of alumina supported CuO-ZnO heterogeneous catalyst (ZCA) for transesterification of kapok seed oil. The aim of this study is to synthesize and characterization of CuO-ZnO-/γ-Al_2O_3 (ZCA) catalyst.

Methodology & Theoretical Orientation: The synthesizing of the catalyst was done using a sol-gel method. Whereas, the characterizations of the synthesized catalyst were done by several methods which include: x-ray diffraction (X-RD), scanning electron microscopy (SEM) and Brunauer, Emmett and Teller (BET), respectively. The activity test of catalyst was done by introducing the CZA catalyst on transesterification of kapok seed oil with methanol in glass type batch reactor.

Findings: CuO- ZnO-/γ-Al_2O_3 (ZCA) was successfully synthesized and it was quite good and potential using as heterogeneous catalyst for transesterification of kapok seed oil.

Conclusion & Significance: The heterogeneous catalyst proved as an effective and friendly process for substituting a homogeneous catalyst for production of biodiesel from low grade or low cost oil.

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