

**SYNTHESIS OF SOLID HETEROGENEOUS CATALYST
FROM RUBBER SEED SHELL MODIFIED WITH CALCIUM
OXIDE FOR BIODIESEL PRODUCTION**

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JANUARY 2020

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ABSTRACT

SYNTHESIS OF SOLID HETEROGENEOUS CATALYST FROM RUBBER SEED SHELL MODIFIED WITH CALCIUM OXIDE FOR BIODIESEL PRODUCTION

Biomass can be manipulated as a promising heterogenous catalyst that provides greener synthesis route for sustainable production of biodiesel. A calcium oxide (CaO) supported on rubber seed shell (RSS) catalyst was synthesized, characterized and successfully used for transesterification of waste cooking oil (WCO) into biodiesel. The catalyst was prepared by impregnating calcium nitrate tetrahydrate, $(\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O})$ onto RSS carbon support with weight ratio of 1:4. The catalyst was characterized by using Thermogravimetric Analyzer (TGA), Fourier-Transform Infrared Spectroscopy (FTIR) and Scanning Electron Microscopy equipped with Energy-Dispersive X-ray (SEM-EDX) to examine their physicochemical properties. Transesterification of WCO was conducted for 3 hours with 1:12 oil to methanol molar ratio at temperature of 70°C by using various catalyst loading. In the present study, the highest biodiesel yield obtained was 68.6% by employing 10 wt% of catalyst loading. Qualitative analysis of Gas Chromatography equipped with Mass Spectroscopy (GC-MS) exhibited that six types of methyl ester were found in the collected upper layer thus confirmed that the free fatty acid (FFA) in WCO had been successfully converted to the desired biodiesel. Therefore, the present study verified that CaO/RSS catalyst was one of the suitable catalysts for biodiesel production.