

**THE EFFECT OF METHANOL TO OIL RATIO ON BIODIESEL
PRODUCTION VIA TRANSESTERIFICATION OF PALM OIL BY
USING CaO/Ni SUPPORTED WITH ALUMINA BEADS**

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ABSTRACT

THE EFFECT OF METHANOL TO OIL RATIO ON BIODIESEL PRODUCTION VIA TRANSESTERIFICATION OF PALM OIL BY USING CaO/Ni SUPPORTED WITH ALUMINA BEADS

A study for alternative fuels has gained importance due to the increase in price of petroleum and environmental concerns. Studies suggested that, the lower molar ratio of methanol causes an incomplete reaction, whereas its higher molar ratio decreases the efficiency of glycerol separation from the excess methanol and also incurs additional production cost. In this study, biodiesel production via transesterification of palm oil has been studied in a heterogeneous system using calcium oxide coated on alumina support ($\text{CaO}/\text{Al}_2\text{O}_3$) doped with Ni. The prepared catalysts were then characterized by using thermogravimetric analyzer (TGA). The aims of this study are to produce biodiesel from palm oil catalysed by alumina bead supported calcium oxide, $\text{CaO}/\text{Al}_2\text{O}_3$ doped with Ni and to determine the effect of methanol to oil ratio prepared on the production of fatty acid methyl ester (FAME). Various methanol to oil ratio were studied such as 1:15, 1:25, 1:35, 1:45 and 1:55. As a result, the optimum methanol to oil ratio is 1:55. The catalyst loading was fixed to 6%. The characterization of catalyst was analysed by using TGA before calcined at temperature of 700°C . GC-MS analysis result showed that methyl ester contains hexadecanoate methyl ester, heptadecanoic acid methyl ester as an internal standard and trans-13-Octadecenoic acid methyl ester. The biodiesel obtained was characterized by GC-MS. Concerning the importance of this vegetable oil, the contribution of palm oil towards reduction of fossil fuel, possible methods for the production of biodiesel and the opportunity for the futures is very much important.