

**THE PRODUCTION OF BIODIESEL FROM PALM OIL  
CATALYSED BY CALCIUM OXIDE (CaO) AND POTASSIUM  
IODIDE (KI) SUPPORTED ON ALUMINA BEADS**

**NUR AMIRAH BINTI AZMI**

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## ABSTRACT

### THE PRODUCTION OF BIODIESEL FROM PALM OIL CATALYZED BY CALCIUM OXIDE (CaO) AND POTASSIUM IODIDE (KI) SUPPORTED ON ALUMINA BEADS

Biodiesel is one of the green fuels and alternative to petroleum based fuel. It is environmental friendly and emits less pollutants into the air. In this research, the biodiesel was produced from the palm oil by the transesterification reaction catalyzed by calcium oxide (CaO) and potassium iodide (KI) supported on alumina beads (CaO/KI/Al<sub>2</sub>O<sub>3</sub>). The main objectives of this study were to determine the optimum loading of catalyst and the effect of nickel as dopant for CaO/KI/Al<sub>2</sub>O<sub>3</sub>. Two types of catalyst were prepared which are the nickel doped calcium oxide-potassium iodide-alumina (Ni-doped CaO/KI/Al<sub>2</sub>O<sub>3</sub>) and undoped calcium oxide-potassium iodide-alumina (CaO/KI/Al<sub>2</sub>O<sub>3</sub>). The transesterification reactions were carried out at 65°C for 5 hours using a mixture of palm oil and methanol with mass ratio 1:9 with different catalyst loadings between 1% to 6%. The biodiesel yield for all samples were determined by using the gas chromatography-mass spectrometry (GCMS). For the Ni-doped CaO/KI/Al<sub>2</sub>O<sub>3</sub>, the optimum catalyst loading was 2% which produced 5.55% biodiesel yield while for the undoped CaO/KI/Al<sub>2</sub>O<sub>3</sub>, the optimum catalyst loading was 6% with 3.34% biodiesel yield. The biodiesel yield for the sample loaded with undoped catalyst generally increased with the amount of catalyst added. While for the Ni-doped catalyst, the biodiesel yield increased until 2% catalyst loading but then decreased when added with 3% to 6% of catalyst, this was due to the leaching of catalyst had disrupt the catalytic activity. Overall, the biodiesel was successfully produced from palm oil by using both doped and undoped (CaO/KI/Al<sub>2</sub>O<sub>3</sub>) catalyst and it can be concluded that undoped catalyst had a better catalytic activity as it produced higher biodiesel compared to Ni-doped catalyst.

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