

# Assessment of KOH and NaOH Catalysed Biodiesel from Melon Seed Oil

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## ABSTRACT

In this study, the comparative analysis of KOH and NaOH catalysts (used separately and combined in equal proportion) during the trans-esterification of melon seed oil was investigated. The major effects and interactions of four variables (methanol/oil mole ratio, catalyst concentration, reaction temperature and reaction time) on the yield of biodiesel were studied. The results showed that, under the same experimental conditions, KOH catalyzed trans-esterification produced the highest biodiesel yield, followed by NaOH catalyzed process and then trans-esterification process involving a mixture of the two catalysts (in equal proportion). KOH catalysed process gave optimum conditions of 6.11 methanol/oil mole ratio, KOH concentration of 1.20 w/w% Oil, reaction temperature of 50 °C, reaction time of 83 minutes and optimum yield of 80.7%. NaOH catalysed process gave optimum conditions of 6.20 methanol/oil mole ratio, NaOH concentration of 1.19 w/w% Oil, reaction temperature of 52 °C, reaction time of 83 minutes and optimum yield of 77.9%. While the process involving the mixture of the two catalysts gave optimum conditions of 6.08 methanol/oil mole ratio, catalyst concentration of 1.05 w/w% Oil, reaction temperature of 56 °C, reaction time of 85 minutes and optimum yield of 76.2%. Material balance carried out on the three categories of analysis favoured KOH trans-esterification process and the suitability of the biodiesel yield models obtained in these three categories was justified by high  $R_2$  values of 0.9489, 0.9631 and 0.9605 respectively.

**KEYWORDS:** Biodiesel, Catalyst, KOH, NaOH, Melon Seed Oil, Yield.

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