

## **Using Response Surface Methodology in Optimisation of Biodiesel Production via Alkali Catalysed Transesterification of Waste Cooking Oil**

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### **Abstract**

The report focuses on optimisation of alkali catalysis as a process for producing biodiesel from waste cooking oils. Biodiesel production parameters that were optimised were methanol to oil ratio, catalyst concentration, reaction temperature, and reaction time. A statistical experimental design was conducted using the central composite design method and surface methodology, and the results obtained were analysed using a statistical software package to predict the optimal yields and parameters for the process. The predictions were analysed and the most suitable parameters for biodiesel production were selected. From the results the optimum parameters for biodiesel production were a reaction temperature of 68.4°C, a reaction time of 1.9 hours, a catalyst concentration of 0.75 wt % potassium hydroxide, and a 0.3:1 methanol to oil weight ratio. The optimum yield of biodiesel from these optimum parameters was predicted to be 98.5%. Thus, alkali catalysis was determined to be a suitable process for production of biodiesel from waste cooking oil.