**Production and Optimization of Biodiesel from Jathropha oil using response surface methodology**

**Abstract**

This paper presents an optimization of preparation variable for biodiesel production from locally sourced Jatropha oil. The optimization of alkali-catalyzed transesterification was aimed at converting fatty acid methyl ester (FAME). The optimization variables for the renewable biodiesel preparation were reaction temperature (25-65°C), catalyst concentration (0.5-1.5%) and methanol to oil ratio (4.5-7.5). The data was statistically analyzed using response surface methodology of the Design-Expert software to find the suitable model of percent fatty acid methyl ester purity (% FAME) and yield as a function of the factors. A full quadratic model was recommended by the program with an R2 and adjusted R2 of 51.53 and 81.53%, respectively. The optimum FAME content of 99.28% was obtained at 65°C for temperature, 0.5% for catalyst concentration, 7.5 for methanol-to-oil molar ratio. The conversion is satisfactory for biodiesel requirements.