

## Optimization of Bio-Diesel Production from Rubber Seed Oils

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**Abstract :** Rubber seed oil is an attractive alternative feedstock for biodiesel production because it is not related to food-chain plant. Rubber seed oil contains large amount of free fatty acids, which causes problem in biodiesel production. Free fatty acids can react with alkaline catalyst in biodiesel production. Acid esterification is used as pre-treatment to convert unwanted compound to desirable biodiesel. Phase separation of oil and methanol occurs at low ratio of methanol to oil and causes low reaction rate and conversion. Acid esterification requires large excess of methanol in order to increase the miscibility of methanol in oil and accordingly, it is a more expensive separation process. In this work, the kinetics of esterification of rubber seed oil with methanol is developed from available experimental results. Reactive distillation process was designed by using Aspen Plus program. The effects of operating parameters such as feed ratio, molar reflux ratio, feed temperature, and feed stage are investigated in order to find the optimum conditions. Results show that the reactive distillation process is proved to be better than conventional process. It consumes less feed methanol and less energy while yielding higher product purity than the conventional process. This work can be used as a guideline for further development to industrial scale of biodiesel production using reactive distillation.

**Keywords :** biodiesel, reactive distillation, rubber seed oil, transesterification

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