

STUDIES OF SOME OF THE FACTORS AFFECTING BASE-CATALYZED TRANSESTERIFICATION OF RUBBER SEED OIL

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Abstract

Some of the factors affecting base-catalyzed transesterification of rubber seed oil were investigated. The Rubber (*Hevea brasiliensis*) seed oil was extracted using hexane as solvent in a soxhlet extraction method. The Biodiesel (Fatty acid methyl ester) was prepared by transesterification of the crude rubber seed oil, RSO, with methanol in the presence of potassium hydroxide KOH (1 wt. %) as catalyst. A fatty acid methyl ester (FAME) yield of 85% was achieved at 60°C in 1hour of reaction time. The RSO and the produced Biodiesel were evaluated as fuel and compared with petroleum diesel according to their physical and chemical properties, such as specific gravity, viscosity, flash point, cetane number, cloud point, pour point, acid value, iodine value and saponification value. Some of the results obtained showed that the fatty acid methyl ester (FAME) had a specific gravity of 0.897, viscosity of 4.254mm²/s, flash point of 145°C, calculated cetane number of 57, acid value of 0.72mgKOH/g and free fatty acid FFA value of 0.362mgKOH/g. The values were well within the ASTM Biodiesel Standard limits. Comparison of these results with those of diesel fuel showed that the FAME has relatively similar fuel properties to diesel fuel. This is an indication that transmethylation improved the fuel properties of the RSO. The fatty acid methyl ester (FAME) yield was found to rise with an increase in the catalyst concentration, but decreased drastically as the KOH concentration increased beyond the optimum catalyst concentration of 1% by weight. The viscosity of reaction solution decreased with increase in the reaction time. Furthermore, FAME yield increased as the reaction temperature increased, but only up to a threshold value and then decreased as the temperature increased. It can be concluded that RSO is suitable for producing fatty acid methyl ester with similar properties to petroleum-based diesel.
