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Optimization of Biodiesel Production from Sunflower Oil Using Central Composite Design

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Abstract : The current study investigated the effect of catalyst ratio and methanol to oil ratio on biodiesel production by using central composite design. Biodiesel was produced by transesterification using sodium hydroxide as a homogeneous catalyst, a laboratory scale reactor consisting of flat bottom flask mounts with a reflux condenser and a heating plate was used to produce biodiesel. Key parameters, including, time, temperature and mixing rate were kept constant at 60 minutes, 60 ^oC and 600 RPM, respectively. From the results obtained, it was observed that the biodiesel yield depends on catalyst ratio and methanol to oil ratio. The highest yield of 50.65% was obtained at catalyst ratio of 0.5 wt.% and methanol to oil mole ratio 10.5. The analysis of variances of biodiesel yield showed the R Squared value of 0.8387. A quadratic mathematical model was developed to predict the biodiesel yield in the specified parameters ranges.

Keywords : ANOVA, biodiesel, catalyst, CCD, transesterification
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