Biodiesel from three microalgae transesterification processes using different homogenous catalysts

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Abstrak

Biodiesel was produced using three different alkali catalysts, namely KOH, NaOH and LiOH. The aim of the study was to determine which of these is the most effective as far as Fatty Acid Methyl Ester (FAME) yield is concerned in producing biodiesel from microalgae. Three different transesterification processes were considered; conventional, microwave-assisted and ultrasound-assisted. The study was able to show that NaOH and KOH generated far better FAME values compared to LiOH in all three transesterification processes. The introduction of microwave or ultrasound in the transesterification slightly increased the FAME yield by 5% and cut the reaction time by 50%. The best FAME yield was attained when the optimum process parameters were a methanol to oil ratio of 12:1; a catalyst load of 2% for NaOH and 3% for KOH; a reaction time of 12 minutes; and a microwave output power rate of 600 watts.