

Transesterification reaction optimization and evaluation of biodiesel produced from seed oil of *Colocynthis citrullus* L.

ABSTRACT

This work presents *Colocynthis citrullus* L. (egusi) seed oil as a potential feedstock for biodiesel production. The transesterification process was optimized using response surface methodology (RSM) with three-level-three-factors face-centered central composite design employed. Catalyst (NaOH) amount (0.25-1.8% (w/w), reaction temperature (45-65 °C) and oil-methanol molar ratio (4-10) were studied as important factors influencing the reaction. The optimum values (1:6.54 oil/methanol molar ratio, 1.22% (w/w) catalyst amount, and 65 °C reaction temperature) predicted by the mathematical model generated using RSM gave ester yield of 84.46%, under experimental conditions. The fuel properties of egusi oil methyl ester (EOME) measured satisfied both ASTM D6751 and EN 14214 biodiesel standards with a kinematic viscosity of 3.87 mm²/s. Fatty acid profile and fuel properties of EOME were found similar to those of soybean, safflower and sunflower biodiesel.

Keyword: Biodiesel; Fuel properties; Egusi seed oil; Optimization; Transesterification