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EVALUATION OF THE POTENTIAL OF *CANARIUM ZEYLANICUM* SEED OIL FOR BIODIESEL PRODUCTION

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Canarium zeylanicum, Sri Lankan Kekuna is an endemic plant in Sri Lanka with a high amount (around 51.80%) of oil in its seed kernel. The gas chromatography (GC) results showed that *C. zeylanicum* had a promising free fatty acid profile, suggesting that producing biodiesel with *C. zeylanicum* as feedstock was feasible. The acid value and the saponification value of the oil were found to be 1.0 ± 0.1 (mg KOH ⁄ g) and 178 ± 1 (mg KOH ⁄ g), respectively. As the acid value was ~1.0, *C. zeylanicum* oil can be directly converted to biodiesel by transesterification without performing any pre-treatments. Therefore, transesterification of *C. zeylanicum* oil with methanol using potassium hydroxide as the catalyst was performed to produce methyl esters, which can be used as biodiesel. The optimum conditions for the transesterification were investigated by varying the parameters: methanol: oil molar ratio (3:1 – 9:1), catalyst concentration (0.50 – 1.5%), and temperature (303 – 343 K). Periodic acid titrations were carried out to evaluate the free glycerol content. The methyl ester concentration was assessed by mass balancing. The optimal triglyceride conversion (94%) was achieved at room temperature in the presence of 1% potassium hydroxide as the catalyst when the methanol: oil ratio was kept at 6:1. Biodiesel properties including flash point, fire point, calorific value, density, cloud point, pour point and kinematic viscosity at 40 ^{o}C of *C. zeylanicum* biodiesel were characterized according to the ASTM standards, and the results obtained were 60.0 ^{o}C, 75.0 ^{o}C, 40.56 MJ kg^{-1}, 0.8370 g cm^{-3}, 10.0 ^{o}C, 6.3 ^{o}C, and 7.2 mm s^{-1}, respectively. As both the flash point and the fire point are lower than the minimum standard value, and the viscosity is slightly higher than the standard range of 1.9-6.0 mm s^{-1}, *C. zeylanicum* methyl esters exhibit unpromising biodiesel properties. However, blending with diesel could be employed to improve the properties of the final biodiesel blend.

Keywords: Acid value, Biodiesel, *Canarium zeylanicum*, Saponification value, Transesterification.