

Improvement of residual oil recovery from oil palm biomass using high pressure water steam system for biodiesel production

ABSTRACT

Various applications of oil palm empty fruit bunches (OPEFB) would be hindered by the presence of residual oil. This study aimed to remove and recover the residual oil from OPEFB using an integrated system, high pressure water spray system (HPWSS). The performance of the HPWSS was evaluated at different temperatures and water pressures, and the residual oil collected was recovered through water shaking method and tested for biodiesel application. A maximum of 84.9% of residual oil was removed by HPWSS at 60 °C and 8960 kPa and the highest residual oil recovery of 58.8% was observed at 95 °C, using power shaking 5 and 90% of dilution. The following ranges of deterioration of bleachability index (DOBI), free fatty acid (FFA), and peroxide value (PV) for the residual oil were 1.21 to 2.67, 7.11 to 10.4%, and 4.85 to 7.56, respectively. Biodiesel with different blends of recovered residual oil (5%, 10%, and 15%) showed lower values (9.87, 9.57, and 9.56 Nm) of brake torque as compared with diesel (10.89 Nm). Overall, this study showed the potential of HPWSS to obtain an acceptable quality of residual oil from OPEFB to be used in any value-added product generation.