

Analysis Of Blended Fuel Properties and Engine Performance With Palm Biodiesel–Diesel Blended Fuel

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ABSTRACT

Depleting fossil fuel sources accompanied by continuously growing energy demands lead to increased interest in alternative energy sources. Blended biodiesel–diesel fuel has been approved as a commercial fuel at a low blending ratio. However, problems related to fuel properties are persistent at high blending ratios. Hence, in this study, the feasibility of biodiesel produced from palm oil was investigated. Characterization of blended fuel properties with increasing palm biodiesel ratio is conducted to evaluate engine performance test results. The qualifying of blended fuel properties was used to indicate the maximum blending ratio suitable for use in unmodified diesel engines according to the blended fuel standard ASTM D7467. The property test results revealed that blended fuel properties meet blended fuel standard requirements at up to 30% palm oil biodiesel. Furthermore, blending is efficient for reduction of the pour point from 14 °C for unblended biodiesel to less than 0 °C at a 30% biodiesel blending ratio. However, the energy content reduces by about 1.42% for each 10% increment of biodiesel. Engine test results demonstrated that there was no statistically significant difference for engine brake thermal efficiency among tested blended fuels compared to mineral diesel, and the lowest engine cyclic variation was achieved with blended fuel B30.

KEYWORDS: Blending; Diesel; Diesel engine; Fuel properties; Palm oil biodiesel

DOI: 10.1016/j.renene.2015.07.103