

Duanpen Chaithongdee 2009: The Study on the Oxidation Stability of Biodiesel from Jatropha Oil. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Penjit Srinophakun, Ph.D. 149 pages.

Jatropha biodiesel was produced by transesterification reaction. Potassium hydroxide was a catalyst at 1.5 percent by weight of Jatropha oil. Mole ratio of methanol and Jatropha oil was 7:1. The condition namely temperature, speed of mixing and reaction time of this experiment were 45 °C, 600 rpm and 1.5 hrs respectively. Then, the various antioxidants and additives were added to Jatropha biodiesel. The range of antioxidant and additive concentration were 0-750 and 0-1,000 ppm respectively. Three antioxidants were PG (3,4,5-Trihydroxybenzoic acid propyl ester, Propyl gallate), TBHQ (T-Butyl hydroquinone) and BHA (Butylated hydroxyanisole). Three commercial additives were ZEP additive, NITROX and L-power. The induction time of biodiesel with either antioxidant or additive was measured according to EN14112 using the Rancimat machine.

The result showed that PG was the best antioxidant for Jatropha biodiesel at the concentration of 50, 150, 250, 350, 500, 650 and 750 ppm which could improve the induction time from 4.21 to 18.93, 26.35, 30.20 32.98, 34.04, 36.01 and 37.55 hrs respectively. For the storage of Jatropha biodiesel PG added at the concentration of 150 ppm for 20 weeks, the induction time of the first week storage was 26.35 and led to 23.59 in the final week (reduced 10.47% from the first week). The properties of Jatropha biodiesel PG added at the concentration of 150 ppm, were 4.40 cSt viscosity at 40 °C, 5 °C cloud point, -2 °C pour point, 190 °C flash point, 875.5 kg/m<sup>3</sup> density at 15 °C and 0.35 mg KOH/gm neutralization value.

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