

Sukanda Chiangkam 2012: Effect of Copper Metal, Water and TBHQ on Biodiesel Properties from Palm Olein, Jatropha and Sunflower Oils. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Assistant Professor Penjit Srinophakun, Ph.D. 126 pages.

The objective of this work was to study the factors that affected oxidation stability of biodiesel from palm olein, jatropha and sunflower oils. The copper metal and water were added to three types of biodiesels at the concentration range of 0-2 ppm and 0-1% by weight, respectively. Then, the samples were stored in the condition of fixed oxygen and dark room at room temperature for 22 weeks. It was found that the concentration at 2 ppm of copper and 1% of water were strongest effect to the properties of biodiesel from palm olein, jatropha and sunflower oils. The percentage, of methyl ester were decreased from 100 98.44 and 96.55 at starting to 93.61 91.07 89.00 and 94.21 92.5 90.2 after 22 week of storage, respectively. The iodine value decreased from 60.85 70.89 83.13 to 52.77 54.40 61.01 and 53.00 58.32 62.77 g I₂/100g, respectively. The kinematic viscosity at 40 °C were increased from 4.19 4.41 4.75 to 4.99 4.75 5.05 and 4.82 4.92 4.91 cSt, respectively. The acids value were increased from 0.18 0.28 0.23 to 0.38 0.42 0.42 and 0.38 0.40 0.47 mg KOH/g, respectively. The copper metal has dominated effect on oxidation stability of biodiesel. The antioxidant, TBHQ (tert-butylhydroquinone), was added at the concentration range of 0-2,000 ppm to investigate the effect of the antioxidant on biodiesels for long term storage. The result founded that while without adding the antioxidant, biodiesel from Palm olein and Jatropha oil were still qualified for commercial standard after 22 week storage. TBHQ at the concentration of 1,000 ppm were enough to control the kinematic viscosity of biodiesel of sunflower oil with containing copper at 2 ppm to meet the standard of commercial biodiesel after storage for 22 weeks.

Student's signature

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