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Home > Volume 13, Issue 4, December 2012 > **Kongkasawan**

Jatropha Oil Refining Process and Biodiesel Conversion: Mass and Energy Balance

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Abstract

Jatropha curcas L. is considered as an alternative energy source to help solve the energy crisis. The refining process is essential during the biodiesel making process because it can enhance the yield and quality of the product. Results revealed that the gross heating value of refined oil increased significantly from the crude oil with lower viscosity and lighter clearer color. The mass conversion efficiency and energy recovery of refined oil were obtained at 75% and 78%, respectively. NaOH was selected as a catalyst for the transesterification process of refined oil. For the mass conversion of the transesterification process, 83% of biodiesel and 13% of glycerin were obtained. Moreover, 99% of energy recovery was obtained from biodiesel and glycerin. According to the ASTM characterization of Jatropha biodiesel, only high viscosity problem was encountered. To solve this problem, blending Jatropha biodiesel with the commercial fuel was recommended to lower its viscosity. Furthermore, the gross heating value of biodiesel was obtained at 39.5 MJ/kg. Due to a high mass conversion efficiency and energy content of Jatropha products, Jatropha has the potential to serve as an alternative energy source.

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