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Title

Biodiesel Production from Jatropha Oil and Rice Bran Oil by Alkali-Catalyzed Transesterification, and Combustion Characteristics in DI Diesel Engines

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Abstract

This report describes the potential of industrial rice and *Jatropha curcas* as sustainable-energy crops for biodiesel fuel production. Reaction conditions suitable for ordinary alkali-catalyzed transesterification of rice bran oil and jatropha oil with free fatty acids are clarified, and diesel combustion characteristics were investigated. Experimental results showed that rice bran oil and jatropha oil with high free fatty acid content can be transesterified with excessive alkaline catalyst using the relation between amount of potassium hydroxide [KOH] (g/L of oil) and acid value [AV] (mg KOH/g) of the oil. In addition, good oxidation stability of rice bran oil methyl ester (RBOME) and jatropha oil methyl ester (JME) was demonstrated, with more than a seven-hour induction period as measured by the EN14112 Rancimat test, and better cold weather performance than palm oil methyl ester. The composition of the fatty acid methyl ester of JME is similar to that of RBOME, but is very different from that of rapeseed oil methyl ester (RME). However, few differences in engine performance and exhaust emission characteristics were found among RBOME, JME, and RME.