



A New Route of Biodiesel Production through Chemical Interesterification of Jatropha Oil using Ethyl Acetate

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Abstract : The classical methods of biodiesel production is transesterification of triglycerides and the esterification of free fatty acid (FFA) using alcohol. Those two routes have problem in terms of by-products resulted throughout the processes. Transesterification of triglyceride and FFA esterification generate glycerol and water, respectively, as side product. Those by-products are regarded as waste in the biodiesel production. Therefore, a series of separation process is essential to achieve high purity biodiesel product. On the other hand, purification steps usually require high capital, operation, and energy cost in industrial process. Thus, to reduce separation process, a new route of biodiesel production which eliminated generation of glycerol and water by-products was proposed in this work. In this research, biodiesel production was carried out via chemical interesterification of jatropha oil with ethyl acetate over potassium hydroxide catalyst. Through this new route of biodiesel production, triacetin was yielded rather than glycerol or water. Triacetin is acknowledged as additive which functions as an anti-knocking agent for biodiesel in diesel machine. Thus, the production of biodiesel through interesterification reaction of vegetable oil with ethyl acetate would not need a further separation of by-product. In this work, the influence of main parameters on the interesterification reaction was evaluated. The effect of catalyst concentration was studied in the range of 0.5 – 1.25% w/w oil. The reaction temperature and molar ratio of oil to ethyl acetate were varied at 60 and 70°C, and 1:6, 1:9, 1:15, 1:30, and 1:60, respectively. The influence of the reaction time was tested from 0 to 8 hours. The highest reaction conversion was attained at reaction temperature of 70°C, molar ratio of oil to ethyl acetate at 1:6, 6 hours reaction time, and catalyst concentration of 0.5%.

Keywords : Biodiesel, interesterification, triacetin, jatropha oil, ethyl acetate.