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(G-07)-LIQUID SMOKE FROM JATROPHA SOLID WASTE OF BIODIESEL MANUFACTURING INDUSTRY

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ABSTRACT

Alternative energy development is widely encouraged to overcome the global energy crisis problems. Such development includes manufacture of biodiesel from *Jatropha curcas*. The process is performed by extracting product of jatropha seed compression and consequently produces its solid waste, including jatropha oil-cake. This oil-cake has been used as fodder and also a solid fuel in the form of briquettes. This research proposed another alternative use by converting it into liquid smoke. Economically, liquid smoke is a potential commodity in the last decade and markets of Japanese, United States, etc.

Production of liquid smoke was conducted by pyrolysis of jatropha oil-cake for 60 minutes and therefore cooling the liquid smoke obtained at varied temperatures of 0, (-5) and (-10)°C. Experimental variables varied included mass of jatropha oil-cake (200, 150, 250, 300, and 350 grams) and temperature of pyrolysis (300, 350, 400, 450, and 500°C). The optimum pyrolysis process conditions were achieved on 200 grams oil-cake at temperature of 450°C for 60 minutes and the temperature of cooling the smoke of (-10)°C. Such conditions yielded the liquid smoke of 60 ml and tar of 170 ml.

INTRODUCTION

Industrial development of biodiesel from *Jatropha curcas* so increasingly grows up that its solid waste (including the jatropha oil-cake) also increases. Such waste is potentially used as liquid smoke. Nowadays liquid smoke has a worldwide market. Therefore, increased production of liquid smoke is considered feasible and profitable to develop.

RESULTS AND DISCUSSION

Liquid smoke was made by pyrolysis of dry solid waste from the manufacture of jatropha biodiesel industry. Pyrolysis process was conducted for 60 minutes at temperature of 300-500°C, with raw materials (jatropha oil-cake) varied from 150-350 grams. The pyrolysis process of 350 grams of solid waste at a temperature of 450°C produced liquid smoke as much as 60 ml. Coolant temperature of the liquid smoke strongly influenced the yield of liquid smoke produced. The lower temperature resulted in the better yield. Coolant temperature applied in this study on above conditions was -10°C. The following figures showed the results.

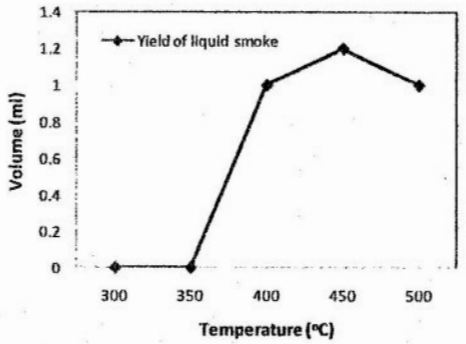

Fig. 1. The effect of pyrolysis temperature on yield of liquid smoke

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Fig. 2. The effect of mass of jatropha oil-cake on yield of liquid smoke

This research should be continued to determine the best conditions of pyrolysis system and components contained in the liquid smoke produced.

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