

Phannapa Somchuewiang 2012: Bio - oil Production from Jatropha Cake via Two - stage Screw Pyrolyzer. Master of Science (Environmental Science), Major Field: Environmental Science, Department of Environmental Science. Thesis Advisor: Associate Professor Apinya Duangchan, Ph.D. 101 pages.

Fast pyrolysis experiments have been conducted on jatropha cake for producing bio - oil. The purpose of the study was to determine thermochemical characteristics and pyrolysis behaviour of solid wastes obtained from jatropha oil extraction. The investigation of optimum process conditions for maximising bio - oil yield was included. A Two - stage Screw Pyrolyzer has been set up in order to investigate pyrolysis temperature and speed (round per minute) of drying stage and pyrolysis stage. The temperature of drying stage was varied between 250°C - 550°C and speed was varied between 350 – 650 rpm. Moreover the speed of pyrolysis stage was varied between 800 - 1400 rpm. Temperatures applied for both stages would no higher than 650°C due to the limitation of the screw pyrolyzer. Results obtained indicated that the maximum bio - oil yield of 19.537 % with 21.638 MJ/kg heating value could be reached via 450°C, 550 rpm and 650°C, 800 rpm configurations of drying and pyrolysis stages respectively. The 16.126 % yield of bio - oil with 24.878 MJ/kg heating value could also be reached via the second test when 350°C, 550 rpm and 650°C, 1000 rpm, configurations of drying and pyrolysis stages were set. By - product gases e.g. hydrogen, carbon monoxide, carbon dioxide, methane, acetylene and ethane. In addition bio - chars with 23 - 25 MJ/kg heating value, were also produced and could be utilized either for energy purposes or modified as value - added products.

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Thesis Advisor's signature

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