THERMAL DEGRADATION AND KINETIC ANALYSIS OF *MELALEUCA CAJUPUTI* POWELL'S BRANCH BIOMASS

SITI HIDAYAH BINTI ZAINUDDIN

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TABLE OF CONTENTS

ABSTRACT

THERMAL DEGRADATION AND KINETIC ANALYSIS OF *Melaleuca cajuputi* Powell's BRANCH BIOMASS

Renewable fuel that derived from the plant biomass was one of the good alternatives to replace the limited and non environment-friendly fossil fuel. The research presents the physical characteristics of Gelam's branch biomass (*Melaleuca cajuputi* Powell) using TGA and ATR-FTIR instrument. In TGA, the degradation of biomass component such hemicellulose, cellulose and lignin occur in three stages that release volatile components. By ATR-FTIR, volatile components such as water (H_2O), methane (CH_4), carbon dioxide (CO_2), alcohols, aldehydes, ketones, organic acids, alkanes and carbon monoxide (CO) can be determine by interpreting the spectrum peak produced. In the proximate analysis, the moisture content, ash, fixed carbon and volatile matter were calculated as 9.71, 14.00, 7.10 and 78.90 weight % respectively after heated in oven and burned in furnace. While, the result that obtained from TG/DTG curve were used for the kinetic analysis of Gelam's branch biomass (*Melaleuca cajuputi* Powell). In this analysis two kinetic models that were Kissinger-Akahira-Sonuse (KAS) and Flynn-Wall-Ozawa (FWO) model were used to obtain the activation energy, E_a. From the result, the average activation energy for FWO model was 94.26 kJ/mol while for KAS was 78.05 kJ/mol were obtained. This result can be compared with the previous research to know the potential of Gelam's branch biomass (*Melaleuca cajuputi* Powell) as a renewable fuel.