UNIVERSITI TEKNOLOGI MARA

CHARACTERIZATION OF SOLID FUEL BY PALM OIL MILL EFFLUENT (POME)

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ABSTRACT

Palm oil industry is recognized as one the major agriculture contributions to the abundant production of oil palm solid wastes. Hence, this study is aimed at investigating the solid fuel characterization of Palm Oil Mill Effluent (POME) using Thermogravimetric analysis (TGA). The heating value (HHV), ultimate and proximate analysis was determined using standard ASTM techniques. Consequently, the thermal decomposition behaviour of the fuel was determined by heating the sample from 50°C to 900°C in a thermogravimetric analyser (TGA) at 10°C per min heating rate. The ultimate and proximate analysis revealed that POME powder contains low moisture content, ash content and high fixed carbon, volatile matter content while the HHV was 17.57 MJ/kg. In addition, TGA results indicated thermal decomposition of the fuel occurs in four stages. Devitalization commenced at 206°C with a peak devitalization temperature (Tmax) of 325°C resulting in 70% weight loss.

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INTRODUCTION

1.1 Research Background

1.1.1 Palm Oil Industry in Malaysia

The production of palm oil increase is dramatically due to advance technology production, good system management and market demand of palm oil industry in 2010. The number of demands in Malaysia had reached up to 17 million tonnes of palm oil and more than 2 million tonnes of palm kernel oil, which made Malaysia becomes the 27% of world's export trade of oils and fats and also 12% of world's oil and fat production (Cheng Hai 2002). The production of abundances biomass wastes was generated mainly by milling and plantation activities (Sukiran et al. 2017).

There are some improvements in order to make it more economical and environmentally friendly by introducing a National Biomass Strategy 0202 that focusing on oil palm biomass as a starting point. Reducing the cost of disposal of unused material is a good strategy in order to gain more profit from biomass wastes. Malaysia already used biomass wastes as an alternative source for generating steam and producing electricity by combusting mesocarp fiber (MF) and palm kernel shell (PKS) (Sukiran et al. 2017).

The new renewable energy technology has been developed in order to tackle the energy crisis. These technologies are very useful in order to make it as backup energy since the energy sources from other renewable petroleum-derived limited and cannot sustain for the next 100 years (Mekhilef et al. 2012).