UNIVERSITI TEKNOLOGI MARA

PYROLYSIS BEHAVIOR OF SEWAGE SLUDGE PRODUCED AT JASIN CENTRAL SEWAGE TREATMENT PLANT

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ABSTRACT

Thermochemical conversion of solid fuel is not a new technology today. Pyrolysis is one of the most famous technique that have been widely used in thermochemical conversion process. Pyrolysis of sewage sludge is an economical method where it can manage the volume and the impacts regarding its disposal, thus enabling it into valuable energy and fuel. Sewage sludge can also be defined as semi biomass, but somehow it might complicated than other biomass when it comes to thermochemical conversion. The thermogravimetric analyzer is being used to characterize the pyrolysis behaviour of the sewage sludge from Jasin. The proximate and ultimate analysis of the sewage sludge are being compared from the previous researched. Although the pyrolysis of sewage sludge had been studied years ago, but it requires a lot of understanding of its thermal properties.

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CHAPTER ONE
INTRODUCTION

1.1 Research Background

With the increase of world population nowadays, the more the consumption of energy are needed to sustain the development of the world. The fast rate of urbanisation and the rapid grow of the world population also have increase the volume of wastewater produced from the ongoing daily routine. This have led to the stringent requirement of the sewage sludge treatment as well as the increase of the sewage sludge volume from the process treatment. The production of sewage sludge is estimated produced at the rate of 0.1 – 30.8 kg per population over a year (Syed-Hassan et al. 2017) and China is the highest producer of sewage sludge around 20 million tons annually (Fan, Zhou, and Wang 2014). The sewage sludge volume was forecast that it will continue increases through the years based on the growth development population and urbanisation.

There are some methods were used in order to handle the disposal of the sewage sludge such as for agriculture as a fertilizer for the plants and landfill disposal. However, despite these methods have been applied, the amount of sewage sludge remained still high. According to Thipkhunthod (2006), the problem will not solved as it will cause subsequent problems and also need a secondary treatment. For instance, the untreated sewage water in certain areas can be contaminated and cause a serious disease such as diarrhoea and make the environment unhealthy.

Pyrolysis of sewage sludge is a promising way to handle sewage sludge disposal as an alternative way for the thermal processing pollution and high consumption of energy. Pyrolysis is one of the thermochemical process that converting biomass into various types of energy and chemical products including liquid bio-oil, solid biochar and pyrolytic gas (Kan, Strezov, and Evans 2016). Pyrolysis is the thermal decomposition of biomass at certain temperature in the absence of oxygen. Basically, this pyrolysis can be classified