

Municipal solid waste msw environmental sciences essay



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CHAPTER 1

Municipal solid waste (MSW) is defined as household waste, commercial solid waste, non-hazardous sludge, conditionally exempt, small quantity hazardous waste and industrial solid waste. MSW includes food waste, rubbish from residential areas, commercial and industrial wastes and construction and demolition debris (Valkenburg et al., 2008). Waste can be group into two which are organic and inorganic waste such as food waste, mixed paper, diapers, fruit waste, batteries, construction waste and glass and others (Kalanatarifard et al., 2012). Malaysian population are rapidly growth because of the urbanisation, economic levels and living standard which then cause a huge rate of municipal waste solid in Malaysian municipalities. In early year of 2020, Malaysian is expected to be one of the developed country as a middle-income economy and located in the middle of South-east Asia. Therefore, with the increasing number of Malaysian population, the issues regarding the solid waste disposal is the biggest challenges that need to be controlled. The problems with the solid waste are because it leads to environmental and health issues that resulting from inadequate waste management system (Zamali, 2009). In Malaysia, land <https://assignbuster.com/municipal-solid-waste-msw-environmental-sciences-essay/>

filling is the main area for MSW disposal which is about 80% to 90% and mostly open dumping. Less than 10% of the land filled is sanitized and properly managed by capturing the methane to generate electricity onsite or channelled to industries. If the gas is being escaped to the atmosphere, thus it will become a threat to the environment (Anwar, 2012). Hydrogen is expected to be the most important energy carrier in sustainable energy system for future demands. However, biomass fuel like plants, residual products and others biomass are abundant and impact on environment towards the renewable energy resource with the neutral released of CO₂ to the environment (Ruoppolo, 2012). Nowadays, biomass has become the fourth largest energy source in the world and 14 percent of today's energy supply are comes from biomass. Biomass gasification is technically feasible for syngas production. Biomass can be converted into gas thermochemically (Garcia, 2000). Syngas production from biomass gasification has received many attentions because of the potential to alleviate environmental pollution, slow down global warming and reduce the dependency on fossil fuel (Longzhi, 2008).

OBJECTIVES

" Gasifier" is a device used to convert dry biomass into a synthesis gas (syngas) through the process of gasification. The purposes of this study are: To investigate the effect of biomass to fuel ratio. To identify the effect of biomass feeding rate to composition in the synthesis gas. To determine the effect of temperature to the syngas production.

1. 3PROBLEM STATEMENT

In Malaysia, about 70 percent to 80 percent of MSW is disposed into landfill which it is seem to be the main problem because it is the common technique for disposed the solid waste. From the study, it is stated that the consumption-oriented urban middle-class is generated about 1. 9kg/cap/day while rural population produced only 0. 8kg/cap/day which when combined it will introduce into large amount of MSW that need to be disposed into landfill every day (Kalanatarifard, 2012). MSW is a major responsibility for government in developing countries which consuming between 20 to 50 percent of municipal budget (Yang, 2012). Paper represents approximately 1/3 of the waste composition in the MSW, followed by food waste. Another 1/3 is represent waste that includes inorganic materials, glass, metals, plastic and other material (Ahmed, 2009). Gasification is a method for thermo-chemical conversion of several solid fuels such as fossil carbon, biomass or waste into a gaseous energy carrier like syngas. The hydrogen-rich syngas can be used as fuel in fuel gas turbines and engine, power generation and others (Ruoppolo, 2012). The Syngas Chief Executive Officer, Shamsul Bahar Mohd Nor told that syngas had a patent technology that can convert plastic waste into diesel fuel at low cost since they already had their own technology. He also added that the idea for producing syngas from plastic waste is not just for producing fuel, but also to reduce plastic waste (Bernama, 2011).

SCOPE OF RESEARCH

Research methodology consists of sampling selection method, sorting procedures and laboratory analysis to determine the properties of MSW that

has been selected and the formation of syngas. The MSW samples are collected from landfill which is located at Jeran Sanitary Landfill, Jeram, Kuala Selangor, Selangor (the location might be change). The waste of the landfill is typically from the household waste. The selected MSW used for sampling is a combination of plastic and paper. The objectives were achieved by using an experimental work. The experiment will be carried out at UPM and UiTM by using different equipment. The equipments used in UiTM are thermogravimetry analyser (TGA), bomb calorimeter and CHNSO analyser. Then, experimental work using gas chromatography (GC) and thermal reactor are done in UPM.