ACID TREATMENT ON RICE HUSK IN POME TREATMENT

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ABSTRACT

Palm oil industry is an important industry in Malaysia as it is one of the biggest contributors to Malaysia's economy. With the expansion of palm oil industry, the pollution caused by the industry also increase. The main problem with palm oil plantation is its mill effluent known as POME. There are many treatments available to treat the effluent but the problem is it is not environmental friendly. The most efficient way available to treat the effluent is by adsorption treatment. Adsorption treatment usually uses activated carbon as its adsorbent. However, usage of activated carbon has many drawbacks such as regeneration problem. Thus, this research is focusing on environmental friendly alternative to the usage of activated carbon which is agricultural waste, rice husk. Rice husk exists abundantly throughout the world at low price. It can be used as replacement to activated carbon but it needs to be treated first to overcome its drawback such as low adsorption capacity and low hydrophobicity. The fibre is treated with strong acid, sulphuric acid to increase its hydrophobicity and sorption capacity. The mass of rice husk used for modification was varied from 5g, 10g and 15g. The rice husk was modified by using 0.5M, 1.0M, 1.5M, and 2.0M of sulphuric acid. The oil adsorption capacity of the rice husk was determined by using n-hexane extraction method. The optimum condition of oil adsorption capacity was obtained when 5g of rice husk was modified with 0.5M sulphuric acid. The percentage of oil removed by 5g unmodified adsorbent was 42.67% while for 5g adsorbent modified with 0.5M was 72.91%. Thus, it can be concluded that the sorption capacity can be improved when the adsorbent undergo acid treatment.

LIST OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

In year 2013, Malaysia had accounts for 39% of world palm oil production and 44% world export. There had been 3.0% increment in year 2011 in oil palm planted area which is from 4.85 million hectares to 5 million hectares comparing to year 2010 (Mohammed & Mei., 2014). Increasing palm oil production is good for economy but it also means increasing of environmental pollution. Crude palm oil production process will generate large amount of waste in the forms of empty fruit bunch, mesocarp fibre, shell and palm oil mill effluent (POME). POME can be described as a highly viscous liquid, discharge at temperature between 80° to 90°C and appear as brownish colour liquid. It causes a major environmental problem because it is extremely poisonous with very low pH, high chemical and biological oxygen demand, high suspended solids and high salt content (Alhaji et al., 2016). POME if discharge directly into rivers without prior treatment will pollutes the environment as it is a highly polluted wastewater.

Due to the dangerous nature of POME there had been extensive research conducted on its treatment to reduce water pollution. According to Mohammed & Mei (2014), the most suitable treatment for POME is anaerobic process because it contains high organic content that consist mainly of oil and fatty acids causing it to be able to support bacterial growth which in turn will reduce its polluting strength. There are other treatments technology available which includes biological digestion, membrane technology, coagulation and flocculation, evaporation and adsorption.