Removal of Methylene Blue from Aqueous Solutions using Chemical Activated Carbon Prepared from Jackfruit (*Artocarpus heterophyllus*) Peel Waste

T.N.A.Tengku Hasbullah, O.S.Selaman and N.A.Rosli

***Abstract* — Dye wastewater generated is rated as the most polluting wastewater among all the industrial sectors. Adsorption using activated carbon (AC) has been proven to be effective to treat dye wastewater. In this study, jackfruit (*Artocarpus heterophyllus*) peel waste has been utilized for activated carbon (AC) preparation using chemical activation. This research attempts to study the factors affecting its adsorption performance. Series of experiments conducted consisted of the experiments studying the effect of initial dye concentration and also effect of adsorbent dosage. In the study, CAC showed adsorption capacity of 10.43 mg/g.**

***Keywords*:** dye wastewater, methylene blue, chemical activated carbon, jackfruit peel waste

I. INTRODUCTION

MALAYSIA is moving towards a developed nation in line with Vision 2020. In conjunction with that, Malaysia's rapid development also gives negative impact on the environment. In these recent years, water pollution has become a bad growing phenomenon. One of the major sources of this water pollution is wastewater. In Malaysia, textile industry contributes the most to the dye wastewater. Textile dye wastewater is wastewater produced during the dying process. The effluent from the textile dying process is commonly untreated and in a large quantity. Wastewater from textile industry contains high concentration of chemical and colour. The improper treatment of textile wastewater would cause environmental problems.

Several methods have been used for the removal of dyes from the environment including physical, chemical, and biological processes. Adsorption is a physcochemical wastewater treatment method [12]. If an AC for a specific purpose such as for wastewater treatment can be produced from low-cost or waste materials, then its use as an adsorbent should be economical [11]. Therefore, if an agro wasted can be used effectively to treat dye wastewater, it is not only solving the high cost problem but also manage our waste properly. The aim of this research is to remove Methylene Blue (a type of dye being used in textile industry) from aqueous solutions using Chemical Activated Carbon prepared from Jackfruit (*Artpcarpus heterophyllus*) peel waste.

There are basically two methods for preparing AC: physical and chemical activation. Physical activation consists of two steps: the carbonization of the starting material and the activation of the char by using carbon dioxide or steam. In chemical activation both the carbonization and the activation step proceed simultaneously [4].According to [2], activated carbon, also called activated charcoal or activated coal, is a general term that includes a carbon material mostly derived from charcoal. Adsorption is defined as mass transfer process by which a substance is transferred from the liquid phase to the surface of a solid, and becomes bound by physical or chemical interactions [10].

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