PREPARATION AND CHARACTERISATION OF ACTIVATED CARBON FROM WASTE TEA BY USING SODIUM HYDROXIDE FOR ADSORPTION OF METHYLENE BLUE

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ABSTRACT

The adsorption performance of activated carbon prepared from treated waste tea by using NaOH for removal of methylene blue (MB) dye from aqueous solution was investigated. A batch adsorption study was conducted to observe the effect of different adsorption parameters on the adsorption capacity. This experiment was performed under operating condition of adsorbent dosage: 0.225g, pH 8 at room temperature. Based on the result, the equilibrium of adsorption increased with the increasing of initial concentration of MB. The yield percentage was 74.35% and the pH_{pzc} surface value is 6.2. The optimum initial pH and MB concentration were pH 8 and 20 mg/L, respectively. The percentage removal of MB increased by decreasing the initial concentration of MB at constant dosage and the effect of temperature showed that the adsorption capacity increase with the increase of these parameters. The optimum temperature was obtained at 500°C. Thus, it is approved that this cost-effective adsorbent has a great potential for the removal of MB dye in the aqueous solution.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 Background of study

Researchers have made a lot of effort to make activated carbon that is cheaper, more effective, and better for the environment than the kind that is sold in stores. This has taken on many different forms, such as using materials like agricultural waste, clays, polyethene, and so on as the precursors. Since it has been employed in adsorption procedures for so long, activated carbon has a very good record of success. Adsorption techniques have been employed to remove metals, dyes, pesticides, and other contaminants, and prevent oil spills in a variety of industries, including medicine, the environment, oil and gas, and so forth. (De Gisi, 2016).

According to a review by Hussain et al. (2018), waste from the tea industry could be a good, cheap, and effective adsorbent for taking different pollutants from water. Carbon-based adsorbents include old tea leaves and tea waste that is made in factories, chemically, they have a lot of surface area and can be used to remove waste from water. This makes them a good low-cost adsorbent to remove waste, as well as a cheap precursor material for making activated carbon.