A REVIEW ON CONTINUOUS FLOW ADSORPTION OF METHYLENE BLUE BY ACTIVATED CARBON IN FIXED-BED COLUMN

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ABSTRACT

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Malaysia's industrialization has resulted in water contamination, producing wastewater. In the foreseeable future, this issue is projected to get worse. Continuous adsorption by activated carbon (AC) in fixed-bed column offers an approach for resolving access to care challenges since it utilizes a low-cost adsorbent, generates minimal sludge, and is simple to deploy. This review paper focused on the influence of several factors on the continuous adsorption process in the fixed-bed column, such as the flow rate of methylene blue, initial methylene blue concentration, and the bed height of the column (BHC). The discussion of Thomas, Adam-Bohart, and Yoon-Nelson's models helps in the prediction of the breakthrough curve with the analysis of the R^2 values. With this, the factors that can help in the efficiency of continuous adsorption in a fixed-bed column can be determined. This review can aid in the wastewater treatment industries, particularly with the environmental-friendly adsorbents, and implement it in a large-scale application.

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CHAPTER 1

INTRODUCTION

1.1   Background of study

Living organisms on Earth rely upon three essential resources: air, water, and soil. Encompassed by these, water is the most needed component because it is the primary channel for the emergence of life. However, in recent years, increased urbanization and industrial expansion have posed a danger to the environment, particularly to water pollution. This is due to the discharge of agriculture and industrial materials into the surface water and groundwater. Wastewater contamination can lead to depreciation of property values, raises municipal costs, and has a variety of negative biological and human health repercussions (Mashkoor et al., 2018). Several factors lead to contamination in water, such as rapid industrial extension, manufacturing industry, wastewater (sewage), and agricultural pollution.

In this review, the uses of dyes in manufacturing industries are highlighted. Example industries that use dye in their products are plastic, paper, printing, textile, and ceramic industries. The dyeing industry consumes large amounts of water and produces large volumes of wastewater (Yaseen & Scholz, 2019). The presence of dye in wastewater pollution prevents ecosystems from providing the services that society requires and puts the environment's sustainability at risk of the environment's long-term viability. They also use large amounts of dyes and produce dye-laden effluent, which is then released directly into the ecosystem (Mashkoor et al., 2018). As an effect, dye-laden wastewater causes major environmental hazards.

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