A REVIEW OF BAMBOO BIOCHAR AS AN ADSORBENT FOR CONTAMINANTS REMOVAL TECHNOLOGY IN WASTEWATER TREATMENT

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ABSTRACT

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Bamboo biochar is a stable carbon-rich material, that encompasses enormous promise for dealing with wastewater pollutants. Its purpose is in developing recognition due to the ease of production, the availability of feedstock, and the improved physicochemical qualities. Biochar's ability to depollute organic and inorganic pollutants is determined by its surface area, pore size distribution, surface functional groups, and the size of the molecules to be removed, whereas its physical architecture and surface properties are ascertained by the nature of the feedstock and the preparation method or conditions. Biochar has a wide range of potential applications in the realm of wastewater treatment. Biochar is utilized as a filter media for the removal of heavy metals and other contaminants. This paper discusses several approaches to the modification of bamboo as excellent biochar, as well as the effectiveness of bamboo-based adsorbents. Finally, this research review also investigates the points of view of biochar technology and a few recommendations for future development possibilities in wastewater treatment.

(Nur Ainiah Binti Haron)

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INTRODUCTION

1.1 Research Background

Biochar is a porous structure material (Zhang et al., 2014) with extensive surface area and a relatively high degree of carbon content in its matrix (Oliveira et al., 2017). The nature of the feedstock and the technique of preparation determine the physical properties and surface qualities of biochar (Enaime et al., 2020). These properties of biochar along with relatively low-cost production make the biochar one of the best surface sorbents for removing hazardous contaminants from an aquatic environment (Delagah et al., 2020; Ye et al., 2015).

Biochar can be used at several degrees of wastewater treatment to enhance treatment efficiency and by-product recovery such as sewage sludge. Biochar reduces the mobility in activated sludge by adsorbing inhibitory compounds of biomass degradation and hazardous chemicals or providing a surface for microbial immobilization (Foereid, 2015). This makes biochar a promising method of achieving controlling contaminants in the environment (Pokharel et al., 2020).

The biochar from bamboo is preferred as one of the best sources of making biochar due to its capability to produce up to 25 times biochar yield as compared to forest crops under the same growth conditions as well as it is rapidly harvestable (Amen et al., 2020). This component has become the most remarkable among easily and renewable biomass resources since bamboo are the fastest-growing plant in a short period of time (Isa et al., 2016; Koo et al., 2015). There is a four-fold increase in carbon sequestration by bamboo versus timber forests alone, with a 35% increase in oxygen release. Bamboo can sequester four times more carbon than timber forests