Magnetic and Non-magnetic Zea mays L. Stalk Biochar Composites: Its Adsorptive Capability in the Treatment of Phosphate Contaminated Aquaculture Ponds

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Harmful algal blooms (HAB) is a catastrophic phenomenon brought by high phosphate levels affecting bodies of water causing negative impacts to the environment, economic and public health concerns which needs an immediate solution. Technologies such as biosorbent to address HAB has been developed. Locally available materials such as Zea mays L. (corn) stalks can be used to produce biosorbent to reduce the amount of phosphate level and improve the quality of water in aquaculture ponds. The study aimed to produce biochar from Zea mays L. (corn) stalks through the process of impregnation and pyrolysis. Magnetic biochar has been produced through impregnation with ferric chloride and was pyrolyzed to obtain magnetic properties. Phosphate level was evaluated using API Fishcare phosphate testing kit. Turbidity and conductivity level of water from aquaculture pond were analyzed using turbidity and conductivity sensors. With the use of magnetic biochar, results showed a complete reduction in the phosphate level of water samples (100%), reduced conductivity by 16.29%, and turbidity by 92.46%. While the non-magnetic biochar resulted to 50% decrease in phosphate level, 8.94% reduction in conductivity, and reduced turbidity by 84.43%. These values were comparable to activated carbon which elevated phosphate levels by 166.67%, reduced conductivity by 4.27%, and turbidity by 22.67%. Thus, magnetic biochar is more effective biosorbent than its non-magnetic counterpart in reducing phosphate, conductivity, and turbidity levels of the water sample, furthermore it has the potential in the treatment of aquaculture ponds and the prevention of harmful algal bloom causing fish kills. Keywords: Harmful Algal Blooms, Magnetic Biochar, Phosphate, Zea mays L. (corn) stalk, Aquaculture Ponds