AMMONIUM REMOVAL FROM AQUEOUS SOLUTIONS USING BANANA LEAVES MODIFIED BIOCHAR

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Abstract
Citizens worldwide are concerned about rampant water pollution as well as the application of the bioeconomy regarding reusing residual biomass from large-scale agricultural crops.
An approximate 128.78 million tons of banana were produced globally in 2019 according to data by the Food and Agriculture Organization of the United Nations. The banana's crop constitutes a significant source of economic growth, income, food security and nutrition of many developing countries, is consumed worldwide because of its availability throughout the year.
Biochar is a bioproduct of the pyrolysis of residual biomass and also is a low cost and environmental-friendly material that has a huge potential for removing pollutants from wastewater. This present work focuses on ammonium removal from water using biochar produced from banana leaves. First, the temperature to reach the maximum performance of the biochar concerning biomass through weight difference between the initial biomass and the obtained biochar was determined. After that, the ammonium efficiency removal was analysed through the batch studies with modification of pH, initial concentration of ammonium, the dose of biochar and contact time. The kinetic studies showed the adsorption isotherm data fitted well with Langmuir model. Meanwhile, the kinetics followed pseudo-second order model.
The results obtained in this study show biochar from banana leaves as an excellent material to remove ammonium from aqueous solutions.

Keywords: biochar, wastewater treatment, adsorption, ammonium removal, sustainability.