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Ammonium removal from aqueous solution by using biochar produced from banana leaves

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Nowadays, concern has grown about the contamination of water as well as the amount of agricultural waste that is generated and that cannot be disposed of in landfills whose storage capacity is limited. In this sense, it is possible to establish actions that contribute to solving the aforementioned environmental issues, which is why in recent years research focused on water treatment with methods in which agricultural waste intervenes as an adsorbent material for water pollutant elements has increased. 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. This tropical crop produces one huge flower cluster and then dies. The plant is cut to bring the crop down, thus the stem and leaves turn into lignocellulosic biomass. 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 results obtained in this study show biochar from banana leaves as an excellent material to remove ammonium from aqueous solutions.