Finding an Accessible, Environmentally Friendly Solution to Water Purification II: Testing the Effectiveness of Aloidendron barberae and Bambusa dolichomerithalla as Natural Coagulants on Heavy Metal and SOC Concentration Using Spectrophotometry / AAS

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As a result of aggressive agrochemical use, urban sprawl, and industrialization, heavy metal and Synthetic Organic Compounds (SOC) pollution is predicted to increase at unprecedented rates, complicating water treatment processes. However, the most common removal approach is chemical coagulation with iron or aluminum salts, a process that is time-consuming, inconsistent at a rate of approximately 15-85%, and environmentally toxic, resulting in fatal impacts on neighboring low-income communities. Thus, an alternative approach must be more accessible, effective, consistent, and environmentally friendly. It was thus hypothesized that using Aloidendron barberae and Bambusa dolichomerithalla as natural coagulants would meet such requirements, as both variables were chosen from previous literature detailing adsorption of a cationic dye and functional group activity respectively. To quantify results, spectrophotometry and atomic absorption spectroscopy (AAS) was used to measure the absorbance of Cu2+, Fe3+, and other SOCs, calculating concentration from a calibration curve. Varying masses of both natural coagulants were tested for two hours using the Jar Testing method, and results demonstrated a maximum percentage decrease of 86.6% in Cu2+ and 98.3% in Fe3+. Overall, future studies include the expansion of dependent variables to other heavy metals and other inorganic/organic pollutants. Ultimately, the effectiveness and potential of both natural coagulants as an accessible, environmentally friendly solution to heavy metal / SOC removal was confirmed.

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