Finding an Accessible, Environmentally Friendly Solution to Water Purification: Testing the Effectiveness of Aloidendron barberae and Bambusa dolichomerithalla as Natural Coagulants on Copper Ion Concentration Using UV-vis Spectrophotometry

Lee, Katherine (School: Jasper High School)

As a result of Cu-based agrochemicals and the progression of industrialization, the toxic ion Cu2+'s concentration is predicted to increase by more than 50% by the end of this century (Rehmen, 2019). To date, the most common solution is chemical coagulation, which is environmentally toxic at an inconsistent rate of 14.05%-85.5% (Khor 2020). Considering that the human cost of chemical pollution has disproportionate impacts to disadvantaged populations, two parameters of accessibility and environmental friendliness were set. These parameters were met in the tested variables of Aloidendron barberae and activated charcoal Bambusa dolichomerithalla through natural coagulation, which uses adsorption to remove heavy metals. To quantify efficacy, spectrophotometry was used through the direct relationship between an 0.033M Cu2+ concentration and its absorption of light. It was thus hypothesized that both natural coagulants would be effective and that there would be a positive correlation between increased mass and adsorption efficacy. This was validated as most samples decreased copper ion concentration by more than fifty percent with the maximum at 86.62526996%, clearly demonstrating better consistency and efficacy than chemical coagulation. Throughout experimentation, qualitative observations of lighter color correlated with quantitative measurements of decreased concentration. Further experimentation was completed on the dependent variables of iron and lead concentration. Overall, future applications include experimenting with factors such as surface area and eventual real-world application. This project confirms the potential of both independent variables as an accessible, environmentally friendly, more effective solution to copper reduction.

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