The Longevity of Plant-Based Bioremediation in Water: An Investigation on the Longevity of the Flocculating Capabilities of Moringa oleifera Lam. Seed Extracts in Water Purification

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Microbially-unsafe water is a major concern particularly in developing countries. After three years of testing natural water purification systems for these underprivileged areas, the objective this year was to test the Moringa oleifera seed's longevity in purification abilities over five hours and 20 pond water samples. Ten trials were conducted following the application of the Moringa oleifera plant seed's powder, while the remaining were left as control. Both groups were tested hourly for turbidity and pH levels. In the Moringa oleifera application group, the turbidity levels experience a large drop one hour after application. Following this, the turbidity levels experienced a relatively steadily, less steep decline. The control group experienced a relatively similar phenomenon, though the drop wasn't as drastic. After the pH reached its optimum level of 6.9 in the Moringa oleifera group, the water became more basic after hour 1. By contrast, the control group's pH remained acidic. The data was processed using mean, variance, t-tests, and TensorFlow AI prediction models to reflect the diverging results in turbidity and pH. The sharp decline in turbidity was attributed to the Moringa oleifera cationic protein, which coagulates negatively-charged pollutants. The gradual degradation in pH over time was attributed to the bacterial regrowth due to the influx of plant material, which raised CO_2 concentrations in the water. Overall, the plant effectively purified the water within the first hour of testing, but, in the hours following the initial purification, the longevity of the purification became inconclusive due to varying trends.

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