Natural Aqua Purifier: A Novel and Sustainable Water Purification Approach Utilizing Natural Coagulants for Easy Implementation in Rural Regions

Shroff, Iraj (School: BASIS Chandler)

Access to clean water is one of our most basic human needs, and unsafe drinking water is one of the world's largest health and environmental problems. In 2022, 2.2 billion people globally still lacked pure drinking water. Unsafe water sources are responsible for over 1 million deaths each year. The UN Sustainable Development Goal Target 6.1 is to "achieve universal and equitable access to safe and affordable drinking water for all" by 2030. Several natural coagulants have revealed incredible potential for water quality improvement in rural areas. However, the purification potential of a combined set of natural coagulants, i.e., moringa seed powder (M), neem leaf powder (N), and peanut husk powder (P), remains unexplored. This study investigated the results of combining three coagulants to purify raw water from the SRP canal. The ICP-MS and turbidimeter were used to analyze the concentrations of heavy metals and the turbidity level in raw water. Experimental findings showed that the M+P was successful by significantly reducing heavy metal concentrations. With the M+P mixture, the concentration of lead ions was reduced by 91%, zinc ions by 64%, copper ions by 62%, and manganese ions by 16%. Additionally, the results demonstrated that the combined mixture was more effective than the usage of individual coagulants. This research paves the way for providing safe water to the 2.2 billion globally who lack access to clean water by developing a novel water purification mixture consisting of Moringa and Peanut Husk. This mixture is developed of natural ingredients that can be grown anywhere in the world, creating a sustainable and inexpensive solution for rural regions. NAP has the potential to save lives and clean water for all across the world.

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