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A COMPARATIVE STUDY OF THE EFFECTIVENESS OF CHITOSAN FLAKES, CHITOSAN BEADS AND RAW SHRIMP SHELLS AS A METHOD TO REDUCE ARSENIC CONCENTRATIONS IN DRINKING WATER

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Blood may be "in you to give" but, water certainly is not. It is a necessity for life and yet, the only place we can get it is from the natural environment around us. With the existing climate change scenario, and an ever-increasing global population, water research is more important now than ever. One issue, currently, is arsenic contamination. When clean surface water is scarce, many will rely on groundwater for consumption. Unfortunately, groundwater can be prone to arsenic contamination and this can be seen around the world in various places. Therefore, there is a need for economical and sustainable methods for reducing arsenic concentrations in drinking water. Previous research has shown seafood by-products can be effective at filtering out arsenic from drinking water but, such research has not been done to compare the effectiveness of each type of by-product, nor the applicability of these methods in small communities. This technical project is to provide an economical method of arsenic reduction to individuals in areas characterized as having elevated levels of arsenic in their water sources. The study included comparing the effectiveness of raw shrimp shells, chitosan beads and chitosan flakes as potential filtration methods. Solutions with arsenic concentrations (ppb) of 15 ppb, 30 ppb, and 70 ppb, were made-up in the laboratory and then filtered using the three types of seafood by-products. The shrimp shells were found to be the most effective at reducing arsenic concentrations, with an average removal efficiency of 85.75%. The chitosan flakes were the least effective at reducing arsenic concentrations, with an average removal efficiency of 54.92%. According to this study, raw shrimp shells are the most suitable method for filtering arsenic concentrations but, its applicability depends on site-specific parameters, such as initial arsenic concentrations and arsenic species prevalence.

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