

Development of a water filter based on plant materials for the remediation of arsenic and cadmium in drinking water

A.T.L. Geeganage and Migelhewa N. Kaumal

Department of Chemistry, University of Colombo, Colombo 03

In recent days, chronic kidney disease due to the renal failure commonly reported in the North Central province of Sri Lanka may have a connection with the consumption of water contaminated with arsenic and cadmium in the natural drinking water supply. This study reports a potential bio-filter built using commonly available plant materials to filter water to remediate arsenic and cadmium in drinking water. This proposed water filter is based on the phytoremediation technique to remove harmful metal ions in drinking water and is built using bulbs and leaves of *Lasia spinosa* (Sinhala: Kohila), roots of *Eichhornia crassipes* (Sinhala: Japan jabara), and leaves and bulbs of *Nelumbo nucifera* (Sinhala: Nelum) that are proved to be the most effective plant-parts tested to remediate targeted metal ions. The effectiveness of this bio-filter was tested with water samples sprinkled with selected heavy metal ions and analyzed the filtrate using Atomic Absorption Spectrophotometer. Results revealed that the proposed filter is capable of reducing these targeted metal ion levels in water to less than the permitted levels by the World Health Organization. A layer of activated carbon was introduced at the bottom of the bio-filter to remove color and odor that may develop during the remediation process due to the selected plant materials.

Keywords: Arsenic, cadmium, phytoremediation, drinking water, chronic kidney disease