

## INEXPENSIVE FILTER TO REMOVE TOXIC HEAVY METALS FROM WASTEWATER USING SRI LANKAN RED EARTH

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Bioaccumulation of heavy metals and metalloids poses both acute and chronic health issues in humans and animals. Hence, removing these toxic heavy metals from contaminated water is essential. The currently available treatment methods are costly and sometimes not appropriate for the current needs. Considering the high cost associated with advanced water purification technologies, developing low-cost and site-specific methods to remove heavy metals is an urgent need. Natural red earth (RE), mainly composed of iron-aluminium oxide-coated quartz sand, is found in the north-northwestern coastal belt of Sri Lanka. The size fraction <180 µm of RE is well-known for its metal adsorption ability. However, the use of the fine fraction of RE in water filtration may lead to certain practical issues, such as clogging the filter media and contamination of purified water with particles. Hence, this study examined the use of RE as a water filter media to overcome the aforementioned difficulties. Column adsorption experiments were performed using the medium-sized sand fraction (125 - 500 µm) of RE. Cylindrical, plastic columns (width =5.5.cm, length=30 cm) were filled alternatively with 125-250 µm, and 250-500 µm size RE fractions as layers. Synthetic wastewater (arsenic ~ 3 mg/l, chromium ~ 3 mg/l) was passed through the column against gravity at a rate of 15 ml/min for 10 h. Filtered samples were collected at every 15 min intervals and analyzed for As and Cr by inductively coupled plasma mass spectrometry (ICP-MS). Almost complete removal of both As (III/V) (from 3 to 0.0031 mg/l) and Cr (III/VI) (3 to 0.0060 mg/l) was confirmed by ICP-MS data. Hence, the medium-sized sand fraction of RE can be used as an effective filtering medium to remove As and Cr from contaminated water. Experiments are underway to determine the lifespan of the RE column.

*Financial assistance from the Accelerating Higher Education Expansion and Development (AHEAD) Operation of the Ministry of Higher Education funded by the World Bank (Grant No. AHEAD/RA3/DOR/PDN/SCI/GEOLOGY/13) is acknowledged.*

**Keywords:** Column experiment, Filter media, Heavy metals, Red earth, Sand fraction