Unleading the Way! Remediation of Lead Contaminated Water with Coriandrum sativum (Cilantro) Biochar

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Due to the recent Flint Water Crisis, much attention has been directed again towards the presence of heavy metals in water and its health and environmental implications. There also remains a continued need for inexpensive techniques for filtering out heavy metals from contaminated water in many third-world countries. There is evidence to suggest that herbs such as Coriandrum Sativum (cilantro) can act as bio-sorbents and remove lead and other toxic metals from water. There have also been several studies showing efficacy of biochar (pyrolyzed organic matter) for heavy metal removal. The purpose of this research was to assess the effectiveness of biochar, made from cilantro, for remediating lead contaminated water. It was hypothesized that the cilantro biochar, with its high surface area and porosity, will be more effective in reduction of lead content compared to cilantro leaves. The effectiveness of lead removal from a 1 ppm lead solution was studied for cilantro leaves, cilantro biochar, bamboo biochar, and commercial BritaTM filter material. The amount of lead was quantified using ICP Spectroscopy. Samples were taken at multiple time intervals. Results showed that at 2 hours the Cilantro leaves reduced the lead content only by 3.8%, while Bamboo biochar, BritaTM and Cilantro biochar were able to decrease the lead content by 54.8%, 74.1% and 99.9% respectively. Cilantro biochar was able to reduce the lead content to undetectable levels in 30 minutes. These findings are very important for the development of a more cost effective means for lead removal from contaminated drinking water.

Awards Won:
First Award of $5,000
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