Proceedings International
Platinum Open Access Journal (ISSN 2668-6384)

Proceedings, Abstract
Volume 3, Issue 6, 2021, 39
https://doi.org/10.33263/Proceedings36.039

Removal of Heavy Metals from Wastewater Using Pomegranate Peels †

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† Presented at Environmental Toxicology: Impact on Human Health (Environ Tox 2021)

Received: 5.11.2021; Revised: 18.11.2021; Accepted: 20.11.2021; Published: 30.11.2021

Abstract: Studies have been conducted to assess the ability of pomegranate husks to remove 4,444 heavy metal cations Zn $^{+2}$, Cu $^{+2}$ & Cd^{+2} from wastewater. In this study, simulated artificial water was used via a batch adsorption approach. The pomegranate skin completely removed dust and dirt before it dried. The shell was then ground (less than about 1 mm in size) and was used directly at various adsorbent/metal ion ratios. The metal ion concentration starts at 1000ppm. We investigated the effects of contact time, initial metal ion concentration, and adsorbent load weight on heavy metal removal rates. The experiment was performed at room temperature of 25° C, and the pH was kept in the range of 5-6. Observation and analysis showed that pomegranate skin successfully removed heavy metals. The observed removal rates were 80% for Cu + 2 ions, 50.5% for Cd + 2 ions, and 32.5% for Zn + 2 ions. Removal rates were achieved within 1 hour of exposure to a 30 g / L adsorbent load factor. However, the rate of mixed ion removal was relatively low, due to competition and interaction between ions. Pomegranate skins are available in large quantities and are an inexpensive and efficient metal ion adsorbent.

Keywords: pomegranate peel; adsorption; wastewater; cations; heavy metals.

Funding

This review received no external funding.

Acknowledgments

This review has no acknowledgment.

Conflicts of Interest

The authors declare no conflict of interest.