

Adsorption of Lead (II) in Wastewater Using *Citrus Sinensis* sp. (Orange Peels)

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Structured Abstract

Background: Lead (II) contamination have serious adverse impacts to both human and the environment. Due to this, there have been multiples researches being conducted in order to find the perfect treatment in treating lead (II) contamination in wastewater. Orange peels is one of the focus due to its high content of cellulose, pectin, hemicellulose and lignin, which helps in the adsorption of heavy metals like lead (II) and copper (II) in wastewater.

Methods: The methodology involved in this research includes the preparation of adsorbent, lead (II) ion stock solution, batch adsorption studies, involving adsorbent dosage, pH, contact time and initial lead (II) concentration, and the characterization of the adsorbent. The characterization of the adsorbent was observed by using the Fourier Transform Infrared Spectrophotometer (FTIR). Meanwhile, the batch adsorption studies were analysed by using Atomic Absorption Spectrophotometer (AAS).

Results: According to the research, the optimum conditions for the adsorption of lead (II) needed 0.5 g of adsorbent at pH 5 with contact time of 120 minutes and the initial lead (II) ion concentration at 3 ppm. Plus, the FTIR analysis confirmed that there are interactions between the metal ions with the surface functional groups and it also altered the surface morphology of the orange peels. Lastly, the suitable isotherm model for the adsorption data collected in the research was the Freundlich isotherm model.

Conclusion: In conclusion, the findings of this study indicated that *Citrus Sinensis* sp. peels can act as an adsorbent for lead (II) removal from the synthetic wastewater. According to the research, orange peels proven to be an effective, low-cost biosorbent in removing lead (II) from the synthetic wastewater.

Keywords: Orange peel, adsorption, natural organic adsorbents, lead, wastewater

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