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PROCESS OPTIMIZATION FOR PB (II) REMOVAL FROM ALCOHOLIC BEVERAGE BY CLAY: USING BOX–BEHNKEN EXPERIMENTAL DESIGN

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Environmental pollution which is a result of rapid technological development is a serious apprehension for ecosystem. Heavy metals are harmful for all living creatures and considered as the most toxic environment pollutants due to toxic effects on human health in concentrations above the permissible limits, cause widespread concerns. Among the contaminants present in environment, heavy metals receive considerable attention from scientists and engineers because they can indefinitely persist in nature and accumulate through the food chain causing a serious risk. Lead is deposited mostly in bones along with liver and kidney. The presence of high levels of lead may cause long-term health risks to humans and ecosystems because of bioaccumulation characteristics. A three-level four-factor Box–Behnken experimental design (BBD) combining with response surface modelling (RSM) was performed to optimize lead removal from alcoholic beverage on natural clay in the present case. The BBD method was selected as the statistical prediction method with the aim of reducing the number of experimental runs which will directly save time and chemicals and thereby reducing the overall cost. Various independent process variables including solution pH (X_1: 3.0–7.0), contact time (X_2: 2–60 min), adsorbent dosage (X_3: 0.01-0.1 g) and agitation speed (X_4: 50–150 rpm) were chosen for optimization. The optimal conditions for the lead removal were found to be 5, 31 min, 0.075 g, and 100 rpm, for the solution pH, contact time, adsorbent dosage and the agitation speed, respectively. Under these conditions, maximum lead removal efficiency was obtained to 120 mg g-1. The significance of independent variables and their interactions were tested by means of the analysis of variance (ANOVA) with 95% confidence limits and based on the ANOVA statistical value, the adsorption of lead onto clay has been found to be highly significant, with very low probability (p) values (<0.001).

Recent Publications

1. **Ince M, Kaplan Ince O (2017) Box–Behnken Design approach for optimizing removal of copper from wastewater using a novel and green adsorbent. Atomic Spectroscopy 38(6):200-207.**
2. **Ince M, Kaplan Ince O, Asam E and Önal A (2017) Using food wastes biomass as effective adsorbents in water and wastewater treatment for Cu(II) removal. Atomic Spectroscopy 38(5):142-148.**
3. **Ince M, Kaplan Ince O and Yaman M (2017) Optimization of an analytical method for determination of pyrene in smoked meat products. Food Analytical Methods 10(6):2060-2067.**
4. **Kaplan Ince O, Ince M, Yonten V and Goksu A (2017) A food waste utilization study for removing lead (ii) from drinks. Food Chemistry (214):637–643.**
5. **Yonten V, Ince M, Tanyol M, Yildirim N (2016) Adsorption of Bisphenol A from aqueous solutions by *Pleurotus eryngii* immobilized on Amberlite XAD-4 using as a new adsorbent, Desalination and Water Treatment 57(2016):22362–22369**

Biography

Ince M has received his PhD degree in Analytical Chemistry at Firat University, Turkey in 2008. He worked as a Research Analytical Chemist in Science Education Department at Mus Alparslan University, Turkey from 2009-2012 as Assistant Professor. He has been working at Munzur University since 2012. From 2013-2016, he served as a Head of Department of Chemical Engineering at the Munzur University, Turkey. He became Editorial Board Member of the *International Journal of Food and Nutrition Sciences, International Journal of Toxicology and Environmental Health, Journal of Environment and Waste Management, International Journal of Pure and Applied Sciences, International Research Journal of Chemistry and Chemical Sciences and Science Journal of Analytical Chemistry.* Currently, he is working as an Associate Professor at Munzur University, Turkey. He is an author and co-author of more than 22 papers that published in journals with good impact factors.

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