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REMOVAL OF As(III) AND As(V) FROM AQUEOUS SOLUTION USING MODIFIED SOLID WASTE VEGETABLE OIL INDUSTRY AS A NATURAL ADSORBENT

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Abstract

This paper presents the results of the removal of arsenite and arsenate ions from an aqueous solution using Fenton modified solid waste vegetable oil industry (SWVOI). Several factors (such as pH, contact time and $\text{Fe}^{2+}/\text{H}_2\text{O}_2$ ratio, initial arsenic ion concentration and adsorbent concentration) that affect the arsenic ion adsorption on the SWVOI adsorbent material were investigated. The sorption characteristics of the adsorbent material before modification were also studied and compared with those after sorbent modification. Additionally, the influence of experimental conditions on equilibrium Isotherms were observed. The equilibrium adsorption data were fitted to Langmuir and Freundlich adsorption models, and model parameters were evaluated. The adsorption capacity of the adsorbent and arsenic removal efficiency decreased with increasing pH values up to 7. Maximum removal of 84% for As(III) at pH 7 and 78% for As(V) at pH 4 were obtained from arsenical aqueous solutions of $150 \mu\text{g L}^{-1}$ using one gram of modified SWVOI.

Key words: As(III), As(V), Fenton, natural adsorbent, solid waste

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