



Sequestration of Amoxicillin from Wastewater using $\text{Al}_2\text{O}_3\text{-Fe}_2\text{O}_3$ Biomass-Based Nanosorbent: Comparative and Antimicrobial Studies



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Background & Objectives

Pharmaceutical contamination, particularly amoxicillin, is a significant environmental threat. Traditional wastewater treatment methods often fail to remove these persistent pollutants.

Aim: This study explores a novel solution using a biomass-based nanosorbent.

Materials & Methods



Preparation of snail shell doped with Al_2Cl_3 and Fe_2Cl_3

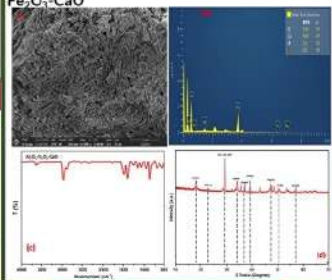
Reference

A. Bamisaye, S.M. Abati, A.R. Ige, N.O. Etafo, Y.A. Ali, M.O. Bamidele, O.A. Okon-Akan, K.A. Adegoke, O.T. Abiola-Kuforiji, M.A. Idowu, O.S. Bello, Metal-oxide nanocatalysts for spontaneous sequestration of endocrine-disrupting compounds from wastewater, *Chemosphere* 367 (2024).

Results

Characterization

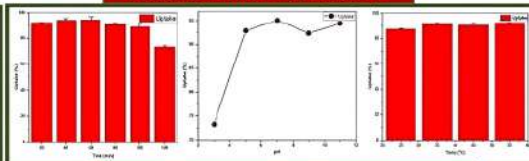
(a) SEM Microgram, (b) EDX Spectra, (c) FTIR Spectra and (d) XRD Diffractogram of $\text{Al}_2\text{O}_3\text{-Fe}_2\text{O}_3\text{-CaO}$



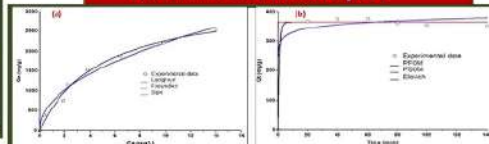
Conclusion

The study presents a novel and sustainable approach for amoxicillin removal from wastewater using $\text{Al}_2\text{O}_3\text{-Fe}_2\text{O}_3\text{-CaO}$ nanosorbent. It demonstrates high efficiency in both adsorption and antimicrobial activity, marking it as a promising material for environmental remediation.

Adsorption Performance



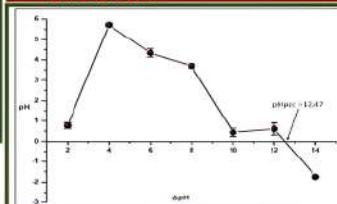
Isotherm and kinetic plot



Thermodynamic Studies

Al ₂ O ₃ -Fe ₂ O ₃ -CaO Nanosorbent			
Temp (K)	ΔG (KJ/mol)	ΔH (KJ/mol)	ΔS (J/mol)
298	-3487.6	1.3306	193.1010
308	-5414.87		
318	-7342.13		
328	-9269.4		
338	-11196.7		

pH_{pzc} of $\text{Al}_2\text{O}_3\text{-Fe}_2\text{O}_3\text{-CaO}$ Adsorbent



Zone of Inhibition Plates of the Adsorbents against the Selected Organism

