Giwa A A et al., Pollut Eff Cont 2016, 4:2(Suppl)
http://dx.doi.org/10.4172/2375-4397.C1.003

Adsorption characteristics of sawdust of *Parkia biglobosa* for methylene blue biosorption from multi-dye systems

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This study investigated the kinetics and thermodynamics of the biosorptive removal of methylene blue by sawdust of *Parkia biglobosa* from aqueous solutions of binary and ternary dye mixtures. The adsorbent was characterized by employing Fourier Transformed Infrared (FTIR) spectrophotometry, Scanning Electron Microscopy (SEM), X-Ray diffraction analysis and pH point of zero charge. Adsorption experiments were conducted in batch mode to determine the effects of sawdust dose, initial concentration of Methylene blue, solution pH, temperature and contact time on the adsorption processes. Equilibrium data obtained were subjected to Langmuir, Freudlich, Temkin and Harkin-Jura isotherm equations for interpretation while data on contact time were tested with pseudo-first order and pseudo-second order kinetics models. Langmuir maximum monolayer adsorption capacity of the adsorbent for methylene blue is higher in the single dye (40.0 mg/g) system than in multi-component systems (33.3 and 5.4 mg/g for binary and ternary systems, respectively). The kinetics of adsorption in single, binary and ternary systems was better described by pseudo-second order model. Biosorption processes in all the systems studied were thermodynamically feasible and became more spontaneous with increasing temperature as ΔG values are -9.33, -10.68, -11.17 and -11.87 kJ/mol at 303, 313, 323 and 333 K respectively.

Biography

Giwa A A completed his PhD from Ladoke Akintola University of Technology, Nigeria. He is presently pursuing Post-doctoral studies at Cape Peninsola University of Technology, South Africa. He has published more than 20 papers in reputed journals. His research interest is in wastewater remediation by the methods of adsorption.

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