Abstract

The biosorption of the anionic dye Congo red from aqueous solution onto the novel biosorbents *Aspergillus carbonarius* and *Penicillium glabrum* was studied. Optimum sorption conditions were identified by varying solution pH, initial dye concentration, contact time and temperature. The obtained results showed that BET surface area of *Penicillium glabrum*biosorbent (6.31 m^2/g) was larger than that of *Aspergillus carbonarius* biomass (5.07 m^2/g). The microstructures of the fungi were observed with scanning electron micrographs. Chemical characterization of both micro-fungi was carried out by Fourier Transform Infrared Spectroscopy (FT-IR). The biosorption data have been analyzed using Langmuir, Freundlich, Temkin, Dubinin-Radushkevich and Sips isotherms. Based on R^2, the equilibrium sorption data was better fitted to Langmuir isotherm model than any other model. The biosorption processes conformed to the pseudo-second-order rate kinetics. Maximum biosorption capacity was found to be 99.01 mg/g for *Aspergillus carbonarius* and 101.01 mg/g for *Penicillium glabrum* at pH 4.5, 0.33 g/L sorbent dosage, 180 min contact time and 303 K for dye initial concentration of 50 mg/L. Thermodynamic parameters of the biosorption (ΔG°, ΔH° and ΔS°) were also determined and it was found that the biosorption of dye by *Aspergillus carbonarius* and *Penicillium glabrum* was a spontaneous process and endothermic in nature.