Removal of 2,6-dichlorophenol by adsorption with activated polypropylene nanofiber

ABSTRACT

2,6-Dichlorophenol is an organochloride of phenol and it is considered one of the emerging pollutants in wastewater due to its extreme corrosive nature and toxicity even at low concentrations. Melt-blown activated polypropylene (PP) nanofiber is a polymeric adsorbent and it is used to investigate the removal of 2,6-dichlorophenol. The high surface-to-volume ratio, high porosity, low surface energy, low density, and excellent mechanical characteristics of melt-blown PP nanofiber make it a suitable adsorbent. On the removal efficiency of 2,6-dichlorphenol, the influence of the initial concentration of 2,6-dichlorphenol, the weight of PP nanofiber utilized, temperature, and pH of solution were examined. The Langmuir model, with a maximum adsorption capacity of 44.44 mg/g, was found to be the best match for the adsorption isotherm. Scanning Electron Microscopy (SEM) and Fourier-Transform Infrared Spectroscopy were used to examine melt-blown PP nanofiber before and after adsorption (FTIR). Through SEM images, it was proven that the average diameter of PP nanofiber after adsorption had increased up to 7.93 lm: Furthermore, the existence of phenolic chemicals on the surface of PP nanofiber is confirmed by FTIR analysis spectra. The pseudo-first-order model matched the kinetic data nicely.