REMOVAL OF BENZENE FROM AQUEOUS SOLUTION USING SURFACTANT COATED ETHERIFIED BANANA TRUNK

TEE PEI NEE

UNIVERSITI TEKNOLOGI MALAYSIA
ABSTRACT

Recently, benzene contamination in water bodies has become a severe environmental issue because it is detrimental to human health and biodiversity. The main sources of benzene are crude oil and gasoline. Many treatments such as advanced oxidation process, bioremediation and adsorption are used to remove benzene from aqueous solution. This research was conducted to study the potential use of banana trunk (BT) as low-cost agrowaste adsorbents for removal of benzene from aqueous solution. The BT adsorbent has undergone some modifications including mercerization, etherification with 3-chloro-2-hydroxylpropyl trimethylammonium chloride (CTA) and surfactant coating with sodium dodecyl sulfate (SDS). The M-1CTA-SDS-BT was successfully synthesized from raw BT. The characteristics of raw and modified BT are characterized with Fourier transform infrared (FTIR) spectroscopy and scanning electron microscope (SEM). The M-1CTA-SDS-BT was used to evaluate benzene batch adsorption performance by varying parameters such as benzene initial concentration, adsorbent dosage, contact time and temperature. The benzene adsorption capacity increased when benzene initial concentration, contact time and temperature increased. In contrast, the increment of adsorbent dosage has decreased benzene adsorption capacity. Experimental data shows that the benzene isotherm adsorption data was best fitted with the Langmuir isotherm model, while kinetic adsorption data obeyed the pseudo-second order model. These finding indicates that the M-1CTA-SDS-BT could be an alternative adsorbent for benzene removal process from aqueous solution.
ABSTRAK

REFERENCES


