

Deep Eutectic Solvent-Assisted Synthesis of Nanocrystalline Cellulose Adsorbent for Silver Nitrate Removal

Abstract

This study introduces application of deep eutectic solvent-assisted of nanocrystalline cellulose adsorbent for silver nitrate removal. The study aims to offer new green and low energy method in producing nano crystalline cellulose (NCC). NCC from microcrystalline cellulose (MCC) was extracted by using synthesized acidic DES. NCC fabricated was found to have a capability to act as a biosorbent for removal of silver nitrate (AgNO_3). The adsorption kinetics and isotherm of silver nitrate on NCC were studied by varies initial concentration of silver nitrate and contact time. The experimental data were analyzed by using Langmuir and Freundlich models of adsorption. The adsorption isotherm data were fitted well to Freundlich adsorption isotherm. The biosorption kinetics data obtained at different time have been analyzed using pseudo-first order and pseudo-second order equation. The experimental data fitted well to pseudo-second order kinetics model. Application of novel and green acidic DES for production of NCC from lignocellulose will contribute to a new paradigm in a green adsorption study.

Keywords

Adsorbent; Adsorption; Biosorption; Deep Eutectic Solvent; Nanocellulose; Silver Nitrate