

Synthesis and characterization of a molecularly imprinted polymer for 2,4-Dinitrophenol uptake using 4-Vinylbenzoic acid as the complexing monomer.

Abstract

A new technique for analysis of 2,4-dinitrophenol in water at low concentration is proposed based on a molecular imprinted polymer. Molecular imprinted polymer (MIP) is cross linked polymeric materials that exhibit high binding capacity and selectivity towards target molecules (template) purposely present during the synthesis process. The molecular imprinted polymer was prepared in bulk, radical polymerization method using 2,4-dinitrophenol, 4-vinylbenzoic acid, ethylene glycol dimethacrylate and benzoyl peroxide as template, functional monomer, cross-linker and initiator, respectively. Adsorption process for removal of nitrophenol by molecular imprinted polymer was evaluated under various conditions to determine the effect of pH, adsorption kinetics, the isotherm and its selectivity. The maximum adsorption of 2,4- dinitrophenol was 2.50 mg/g. The adsorption of 2,4-dinitrophenol by 4-vinylbenzoic acid was found most effective at pH 5.0. Kinetics study showed that 2,4-dinitrophenol adsorption was modeled by second order kinetic. Adsorption isotherm data could be interpreted using the Langmuir equation.

Keyword: Molecular imprinted polymer; 2,4-Dinitrophenol.