

Preparation and characterization of molecularly imprinted polymer as SPE sorbent for melamine isolation

Abstract

In this paper, a separation procedure combining molecularly imprinted-solid phase extraction (MI-SPE) was developed for the isolation of melamine. The molecularly imprinted polymer (MIP) was prepared using precipitation polymerization method where melamine as template, 9-vinylcarbazole as functional monomer, ethylene glycol dimethacrylate as a cross-linker and benzoyl peroxide as initiator. An off-line MI-SPE method followed by ultra-performance liquid chromatography detection of melamine was established. MIP showed a better affinity toward melamine compared to non imprinted polymer (NIP) with a maximum binding capacity of 53.01 mg/g MIP. Based on the correlation coefficients, the kinetic study indicated that the adsorption of melamine by MIP fit a pseudo-second order model. From isotherm study, adsorption of melamine by MIP increased when the concentration of melamine increased and followed a Freundlich isotherm model, which indicates the sorption can be described by multilayer sorption. The interference study proved that MIP has better binding capacity towards melamine if compared to NIP due to specific sites of melamine occurred in MIP particles.

Keyword: 9-vinylcarbazole; Melamine; Molecularly imprinted polymer.