# Use of Magnetically Separable Molecular Imprinted Polymers for Determination of Pesticides in Food Samples

**Authors :** Sabir Khan, Sajjad Hussain, Ademar Wong, Maria Del Pilar Taboada Sotomayor

**Abstract :** The present work aims to develop magnetic molecularly imprinted polymers (MMIPs) for determination of a selected pesticide (ametryne) using high-performance liquid chromatography (HPLC). Computational simulation can assist the choice of the most suitable monomer for the synthesis of polymers. The (MMIPs) were polymerized at the surface of Fe3O4@SiO2 magnetic nanoparticles (MNPs) using 2-vinylpyradine as functional monomer, ethylene-glycol-dimethacrylate (EGDMA) is a cross-linking agent and 2,2-Azobisisobutyronitrile (AIBN) used as radical initiator. Magnetic non-molecularly imprinted polymer (MNIPs) was also prepared under the same conditions without analyte. The MMIPs were characterized by scanning electron microscopy (SEM), Brunauer, Emmett and Teller (BET) and Fourier transform infrared spectroscopy (FTIR). Pseudo first-order and pseudo second order model were applied to study kinetics of adsorption and it was found that adsorption process followed the pseudo-first-order kinetic model. Adsorption equilibrium data was fitted to Freundlich and Langmuir isotherms and the sorption equilibrium process was well described by Langmuir isotherm mode. The selectivity coefficients ($\alpha$) of MMIPs for ametryne with respect to atrazine, ciprofloxacin and folic acid were 4.28, 12.32 and 14.53 respectively. The spiked recoveries ranged between 91.33 and 106.80% were obtained. The results showed high affinity and selectivity of MMIPs for pesticide ametryne in the food samples.

**Keywords :** molecularly imprinted polymer, pesticides, magnetic nanoparticles, adsorption