

Micro-extraction of xenobiotics and biomolecules from different matrices on nanostructures

ABSTRACT

Sample preparation is the backbone of any analytical procedure; it involves extraction and pre-concentration of the desired analytes; often at trace levels. The present article describes the applications of nanomaterials (carbon-based inorganic and polymeric materials) in miniaturized extraction such as solid phase micro-extraction, stir-bar sorptive extraction, liquid phase micro-extraction, and dispersive liquid phase micro-extraction in the analyses of aqueous samples. The nanoparticles used for micro-extractions are discussed on the basis of their chemical natures. The synthetic route and the preparation of nanomaterials are described along with the optimization strategies for micro-extraction. A comparison between the conventional materials and nanomaterials for micro-extraction is proposed. The key roles of the nanomaterials for the micro-extraction of different analytes such as drugs, pesticides, polycyclic aromatic hydrocarbons, proteins and peptides from aqueous samples are reported. The use of nanomaterials, combined with miniaturized micro-extraction techniques, proved to be highly promising for sample preparation of various matrices with analytes at trace levels.

Keyword: Drugs; Environmental pollutants; Micro-extraction; Nanomaterials; Pesticides; Sample preparation