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Abstract

In this work, the magnetic multiwalled carbon nanotubes (Mag-MWCNTs) were prepared by self-assembly method and characterized by scanning electron microscopy, X-ray powder diffraction, energy dispersive X-ray and vibrating sample magnetometer. Then, these synthetic Mag-MWCNTs were used as sorbents to extract five β-blockers (atenolol, metoprolol, esmolol, pindolol and arotinolol) by magnetic solid-phase extraction. The target analytes adsorbed on Mag-MWCNTs were eluted and determined on a chiral α-acid glycoprotein column coupled with a triple quadrupole mass spectrometry. Eventually, the proposed method was applied to the analysis of the enantiomeric composition of the studied β-blockers in three environmental samples, including river water, influent wastewater and effluent wastewater. Method detection and quantification limits for all enantiomers were in the range of 0.50-1.45 and 1.63-3.75 ng/L, respectively. Satisfactory recovery (82.9-95.6%), good intra-day precision (RSD 0.4-10.4%) and inter-day precision (RSD 2.9-7.4%) were also obtained. With numerous advantages such as simplicity of operation, rapidity and high enrichment factor, the newly developed method has potential to assess the enantioselectivity of chiral drugs in ecotoxicity and biodegradation processes, which is also a new expanded application of Mag-MWCNTs in the environmental analysis.