

Pre-concentration of rosuvastatin using solid-phase extraction in a molecularly imprinted polymer and analytical application in water supply

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Abstract

In this work, it is shown the development and validation of innovative analytical methodology based on solid-phase extraction (SPE) with molecularly imprinted polymers (MIP) as a sorbent associated to UV–Vis spectroscopy to isolate and quantify, respectively, rosuvastatin (RSV) in water samples. For this purpose, porogenic solvent in MIP synthesis and SPE extraction parameters for MIP and non-imprinted polymers (NIP) were evaluated univariately for comparison purposes. The sorptive capacity and characterization studies by infrared spectroscopy and atomic force microscopy showed difference between MIP and NIP. The selectivity study of the MIP–RSV against other statins (simvastatin and atorvastatin) showed that the synthesized MIP can also be applied as a solid phase for isolation and quantitative pre-concentration of RSV and atorvastatin. The conjugation of SPE and UV–Vis spectroscopy in the determination of RSV in aqueous matrices led to large factor of pre-concentration (125 times), limit of detection (LOD) of $3 \mu\text{g L}^{-1}$, limit of quantification (LOQ) of $10 \mu\text{g L}^{-1}$, precision of 2.87% ($n = 10$), and accuracy of 83.1% ($n = 4$).

Keywords Rosuvastatin . Statins . Emerging pollutants . Molecularly imprinted polymer . Solid-phase extraction . Water supply