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Solid-Phase Extraction of Tramadol from Plasma and Urine Samples Using a Novel Water-Compatible Molecularly Imprinted Polymer

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In this study, a novel method is described for the determination of tramadol in biological fluids using molecularly imprinted solid-phase extraction (MISPE) as the sample clean-up technique combined with high-performance liquid chromatography (HPLC). The water-compatible molecularly imprinted polymers (MIPs) were prepared using methacrylic acid as functional monomer, ethylene glycol dimethacrylate as cross-linker, chloroform as porogen and tramadol as template molecule. The novel imprinted polymer was used as a solid-phase extraction (SPE) sorbent for the extraction of tramadol from human plasma and urine. Various parameters affecting the extraction efficiency of the polymer have been evaluated. The optimal conditions for the MIP cartridges were studied. The MIP selectivity was evaluated by checking several substances with similar molecular structures to that of tramadol. The limit of detection (LOD) and limit of quantification (LOQ) for tramadol in urine samples were 1.2 and 3.5 μg L^{-1}, respectively. These limits for tramadol in plasma samples were 3.0 and 8.5 μg L^{-1}, respectively. The recoveries for plasma and urine samples were higher than 91%.