A simple microextraction and preconcentration approach based on a mixed matrix membrane

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A simple adsorption/desorption procedure using a mixed matrix membrane (MMM) as extraction medium is demonstrated as a new miniaturized sample pretreatment and preconcentration technique. Reversed-phase particles namely polymeric bonded octadecyl (C-18) was incorporated through dispersion in a cellulose triacetate (CIA) polymer matrix to form a C-18-MMM. Non-steroidal anti-inflammatory drugs (NSAIDs) namely diclofenac, mefenamic acid and ibuprofen present in the environmental water samples were selected as targeted model analytes. The extraction setup is simple by dipping a small piece of C-18-MMM (7 mm X 7 mm) in a stirred 10 mL sample solution for analyte adsorption process. The entrapped analyte within the membrane was then desorbed into 100 mu L of methanol by ultrasonication prior to high performance liquid chromatography (HPLC) analysis. Each membrane was discarded after single use to avoid any analyte carry-over effect. Several important parameters, such as effect of sample pH, salting-out effect, sample volume, extraction time, desorption solvent and desorption time were comprehensively optimized. The C-18-MMM demonstrated high affinity for NSAIDs spiked in tap and river water with relative recoveries ranging from 92 to 100% and good reproducibility with relative standard deviations between 1.1 and 5.5% (n = 9). The overall results obtained were found comparable against conventional solid phase extraction (SPE) using cartridge packed with identical C-18 adsorbent.

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