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MICROEXTRACTION BY PACKED SORBENT IN FORENSIC DRUG ANALYSIS

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Microextraction by packed sorbent (MEPS) efficiently combines extraction, pre-concentration, and clean-up in a single device comprising two parts: the MEPS syringe and the packed sorbent bed[1]. MEPS has been used for several bioanalytical applications, including extraction of endogenous metabolites, biomarkers, and drugs from biological samples. It is particularly useful in metabolomics and pharmacokinetic studies[2,3]. Regarding MEPS applicability to forensic toxicology, urine is the most used specimen, followed by oral fluid (despite of its relatively high viscosity). Protein precipitation followed by centrifugation and with, or without dilution of the supernatant is the most commonly reported approach. The most detected compounds in forensic settings using MEPS are drugs of abuse [opiates and opioids (26%), cocaine (13%) cathinones (11%), dissociative hallucinogens (11%), cannabinoids and amphetamines (9% each) and other drugs (10%)] and medicinal drugs [antidepressants (9%), benzodiazepines/Z drugs (4%)]. MEPS was also applied to a beverage for forensic purposes e.g. to evaluate its composition in drug-facilitated crimes. An important feature in MEPS is the miniaturization of the sorbent. A careful selection of the sorbent will allow working with complex matrices, separating the target analytes from interferences and improve recoveries. The most widely selected sorbent was the silica based C_{18} that is a popular reversed-phase material (41%). Starting in the 2000s, new modifications of sorbents appeared. Overall, what the future holds for MEPS applications in forensic toxicology is promising, and ongoing research and technological advancements are likely to enhance the capabilities of MEPS approaches, making this technique an increasingly valuable tool for toxicological investigations.

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