OC13. Optimization and validation of an analytical method for the determination of opiates in urine using microextraction by packed sorbent

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According to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), approximately 1.3 million individuals have used opiates, both for medical and illicit purposes[1], presenting a significant public health challenge[2,3]. To address this issue, methods for quantifying these substances are needed. Urine is a commonly employed matrix in clinical and forensic toxicological analyses due to its ease of collection and ample availability. Its short detection window is particularly effective for monitoring recent drug exposure[4,5].
This study aimed to optimize a method for determining tramadol, codeine, morphine, 6-acetylmorphine, 6-acetylcodeine, and fentanyl in urine samples (250 µL). The process involved centrifugation, acid hydrolysis, and extraction using microextraction by packed sorbent (MEPS). MEPS offered a rapid, environmentally friendly, and reusable extraction technique[6]. All parameters that influence the extraction were previously optimized. The method was validated following international guidelines, demonstrating excellent linearity [1 to 1000 ng/mL for all compounds, except for fentanyl (10 to 1000 ng/mL), with coefficients of determination of at least 0.99], and presenting coefficients of variation and bias ≤ 15% for precision and accuracy, except for the lowest calibrator (≤ 20%).
Recoveries obtained ranged from 17 to 107%, with lowest percentages for morphine (12 to 17%). Despite the low extraction efficiency obtained for morphine, it was possible to detect concentrations as low as 1 ng/mL for all compounds, except for fentanyl (10 ng/mL). The method was successfully applied to real samples from consumers of these substances.
This is the first method to use MEPS and GC-MS/MS for the simultaneous determination of these six opioids in urine samples.

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