

GREEN SOLID–LIQUID MICROEXTRACTION USING DEEP EUTECTIC SOLVENTS FOR MDMA DETERMINATION IN ECSTASY TABLETS

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RESUMO

Introduction: The analysis of synthetic drugs is challenging due to their chemical diversity and complex matrices, requiring efficient and cost-effective methods. In this context, green sample preparation approaches using deep eutectic solvents (DES) have gained attention for reducing reagent use and environmental impact. **Objective:** This study aimed to develop a DES based solid-liquid microextraction (DES-SLPME) method for MDMA determination in ecstasy tablets. **Methods:** In this study, analyte identification was performed by GC-FID. Thirty DES were prepared under three temperature conditions: room temperature, 60 °C, and 100 °C with stirring. The selection of extraction solvents was based on density and relative viscosity. The three DES with the lowest viscosity were selected for further optimization of the DES-SLPME procedure. Method optimization was carried out using a fractional factorial design (2^{5-1}), resulting in 19 experiments. Five variables were investigated: sample mass, DES volume, agitation time, pH, and buffer volume. Analytical responses were obtained from geometric mean peak areas. **Results:** The DES with the lowest viscosity and density were selected for optimization, namely DES 1 (prepared at room temperature), DES 3, and DES 8 (prepared at 60 °C). Among them, the camphor:thymol (1:1) system prepared at 60 °C showed the best extraction performance. The Pareto chart revealed that none of the evaluated variables had a statistically significant effect, indicating robustness of the method within the studied conditions. The optimized protocol consisted of 10 mg of ecstasy tablet, 40 µL of carbonate buffer (pH 12.5), and 40 µL of DES, followed by agitation, centrifugation at 4000 rpm for 4 minutes, and injection of 1 µL into the chromatographic system. **Conclusion:** The DES-SLPME method proved to be efficient, simple, and aligned with Green Chemistry principles, demonstrating strong potential for the analysis of MDMA and other synthetic drugs in forensic context.

PALAVRAS-CHAVE: DES, SLPME, Green chemistry, MDMA, Forensic toxicology

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