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Optimization of Sample Preparation for 1-Hydroxypyrene as a Major Biomarker of Exposure to Polycyclic Aromatic Hydrocarbons Prior to High Performance Liquid Chromatography

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Abstract:

Urinary 1-hydroxypuren (1-OHP) is commonly used as a major metabolite and biological indicator of the overall exposure to polycyclic aromatic hydrocarbons (PAHs). For evaluation of human exposure to such compounds, biological monitoring is an essential process, in which, preparation of samples is one of the most time-consuming and error-prone aspects prior to chromatographic techniques. In this study, non classic form of liquid-liquid extraction (LLE) was optimized with regard to solvent type, solvent volume, extraction temperature, mixing type, and mixing duration. Through the extraction process, a mild temperature was used to keep the compound of interest as stable as possible. In this study, a high performance liquid chromatography, using reverse-phase column was used. The isocratic run was done at a constant flow rate of 0.8 ml/min, the mobile phase was methanol/water and a fluorescence detector was used, setting at 242 nm and 388 nm. At the developed conditions, the extraction recovery was exceeded 87.3%, achieving detection limit of 0.2 µg/l. The factors were evaluated statically and the procedure was validated with three different pools of spiked urine samples and showed a good reproducibility over six consecutive days as well as experiments. It was concluded that, this optimized method could simplify sample preparation for trace residue analysis of PAHs metabolites.

Keywords:

Liquid liquid extraction . 1-Hydroxypyrene . PAHs

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