OPTIMIZATION OF RAMIP-BSA IN THE SERUM SAMPLES TREATMENT TO BILIAR ACIDS DETERMINATION

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RESUMO

Introduction: The biological monitoring of occupational exposure to benzene, toluene, and xylenes (BTX), important volatile aromatic hydrocarbons in the Occupational Toxicology field, is assessed by the quantification of the solvents themselves, their biotransformation products, or other biomarkers in biological matrices, such as blood and urine. Thus, due to the complexity of the samples and the low levels found of the analytes, advances in analytical methods in order that they show the ability to concentrate, clean up, and detect, are indispensable. In this context, the use of smart sorbents in sample preparation techniques, such as restricted access materials (RAM), has proven to be an excellent alternative to the traditional materials, as they exhibit analyte concentration and matrix macromolecule exclusion capacity. **Objective:** This work aimed to synthesize and characterize the restricted access molecularly imprinted polymers coated with bovine serum albumin (RAMIP-BSA) in the sample preparation of serum containing bile acids. **Experimental:** The synthesized RAMIP-BSA, using cholic acid (CA) as a template, and selective to bile acid (changes in the levels of these molecules in human serum have been identified as potential biomarkers of the exposure to hepatotoxic substances), were used as a sorbent in the online solid phase extraction/liquid chromatography-mass spectrometry system (LC-MS). **Results:** The adsorption capacity and selectivity of the RAMIP-BSA were satisfactory, allowing the exclusion of approximately 100% of the serum proteins and the determination of nine bile acids with linearity (10 - 1000 µg/L, $r^2 > 0.99$), precision and accuracy. **Conclusions:** Therefore, with the use of intelligent sorbents in the sample cleanup and extraction, it was possible to apply automated analytical methods with sufficient selectivity and/or detectability to be used in the biological monitoring of exposure to BTX. In addition, "green analytical chemistry" principles were applied, such as the use of direct analysis of low volume of samples by multidimensional chromatography system by column switching; the use of adsorbent material for several cycles extraction; reducing the volume of reagents used and the generation of waste.

PALAVRAS-CHAVE: Biological monitoring, Hepatotoxic agents, Restricted access molecularly imprinted polymers, Smart sorbents

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