SERUM BILIAR ACIDS DETERMINATION AS BIOMARKERS FOR EXPOSURE ASSESSMENT TO BENZENE, TOLUENE AND XYLENES

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Liver damage induced by exposure to organic solvents is associated with oxidative stress caused by these during the stages of biotransformation that can lead, more specifically, to acute liver necrosis, cirrhosis or hepatorrenal syndrome. In this way, biomarkers more sensitive and capable of showing the harmful early effects on individuals are required to prevent the toxic effects. Bile acids (AB), molecules synthesized from cholesterol, can be used as an effect indicator of liver damage. Through the serum measurement of total or individual AB, although it is not yet routinely performed, it is possible to identify changes resulting from chronic exposures, having the advantage of being a specific organ. Restricted access molecular impression polymers (RAMIP) have represented a viable alternative because they are selective to the analytes for which it was designed, as they also allow the elimination of macromolecules. This work aimed to develop an automated multidimensional extraction system of column switching LC coupled to mass spectrometry for the determination of bile acids in human serum, using a RAMIP as an adsorbent material to sample treatment. The synthesized RAMIP-BSA, using cholic acid (CA) as a template, was used as a sorbent in the online solid phase extraction/liquid chromatography-mass spectrometry system (LC-MS). Using RAMIP selective for AB and a detector with high detectability, such as the mass spectrometer, the method presented satisfactory analytical performance for the determination of AB in the serum of workers occupationally exposed to BTX, representing a promising tool to be applied in the biological monitoring of exposed individuals. Smart materials used as adsorbents in automated extraction systems present important characteristics to apply in methods for exposure and risk assessment of workers exposed to the hepatoxic organic solvents.

Hepatotoxic agents; biomarkers, exposure assessment, restricted access molecularly imprinted polymers; smart sorbents