

Immersed Solid-phase Microextraction and Dynamic Solid-phase Extraction of Phenols from Water Sample by Gas Chromatography-Mass Spectrometry

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ABSTRACT

Recently, solid-phase extraction(SPE) techniques attract widespread attention as solvent-free sample preparation techniques because of regulatory pressure to reduce the use of toxic organic solvents. SPE is one of the most commonly used sorbent extraction techniques. Analytes are extracted by passing an aqueous matrix through a plastic cartridge containing sorbent or sorbent particle loaded membrane disk on a particulate support. A selective organic solvent is normally used to remove interference first. And then another solvent is chosen to wash out target analytes. SPE has a number of attractive features compared with traditional solvent extraction. It is quite simple, is inexpensive, and uses little solvent. to conventional applied to the analytical preparation techniques. Particle loaded disks are developed for further improve extraction efficiency, reduce the use of solvent, and decrease plugging in SPE³. SPE has some limitation such as low recovery, which results from interaction between the sample matrix and analytes, and plugging of the cartridge or blocking of the pore, which results in low breakthrough volume and capacity⁴. One solution to these limitations is to improve the geometry of the sorbent by coating it on a rod such as fused-silica fiber or wires made of appropriate materials. The cylindrical geometry of the resulting solid-phase micro extraction (SPME) system⁵ allowed rapid mass transfer during extraction and desorption, prevent plugging, and facilitates handling and introduction into analytical instrument. The SPME results applied to the sampling phenols in water were obtained mainly using polyacrylate coating ; the detection limit, linear range, and precision are better than or equivalent to EPA method specifications.³ The aim of this work was to

develop selective, sensitive, and solvent free methods for the analysis of phenols in water. The previous study carried on the analysis less polar, less water soluble, and relatively volatile compounds. The application solid-phase techniques to the phenols are not frequent. In this work applying solid-phase techniques to the phenols, the extraction efficiencies related to the sorbent material and the shape of solid-phase(cartridge, disk SPE, and. SPME) dependent on the effect of acid and salt treatment were investigated. It is expected that, for phenols, it will be necessary to use more polar phase or derivatization procedure to deduce their polarity and improve the chromatographic properties. Derivatization has the advantages of converting polar analytes into their less polar analogues, thus increase extraction **efficiencies..**

Key words: Phenols, Solid-phase extraction(SPE), Solid-phase micro extraction(SPME)