

GREEN ANALYTICAL CHEMISTRY SAMPLE PREPARATION FOR ENVIRONMENTAL POLLUTANTS

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Abstract

The 12 Principles of Green Chemistry provide a road map for chemists to implement green chemistry i.e. it gives guide lines for chemists to make their activities harmless or to minimize their harmfulness. The use of analytical extraction methods such solid phase microextraction (SPME-the so-called solventless sample preparation method), stir bar sorptive extraction (SBaSE), solid phase extraction (SPE) and supercritical fluid extraction (SFE) assure observation of the principles of green analytical chemistry. Elimination or reduction of the amount of solvents used in an analytical procedure leads to financial savings due to reduced purchases of high purity solvents and there is no need for organizing a system of collection of used solvents. Elimination of reagents displaying high toxicity from analytical procedures protects the operator from its ill effects and also the environment from harmful effects. In our laboratory, as an effort to reduce the consumption of hazardous organic solvents in extraction, we used the microextraction technique solid phase microextraction (SPME). Apart from the effort to reduce or eliminate the use of organic solvent, we also recycle used commercial SPME fibres and coat with laboratory-made sol gel fibers for the extraction of organophosphorus pesticides. Work also centers on the use of on-line preconcentration steps such as stacking and sweeping in micellar electrokinetic chromatography for analytes such as organophosphorus pesticides, triazole fungicides and dioxins and furan. We have started to explore the use of stir bar sorptive extraction (SBaSE) focussing on the development of coating based on sol gel process.

Keywords: Green Analytical Chemistry, Solid Phase Microextraction, Sol gel, Online Pre-Concentration, Micellar Electrokinetic Chromatography, Stir Bar Sorptive Extraction