

Fabric Phase Sorptive Extraction (FPSE): A versatile sample preparation technology that meets the

Statement of the Problem: The invention of fabric phase sorptive extraction (FPSE) has begun a new era in analytical sample preparation by ingeniously combining two competing for sample preparation techniques, solid phase extraction (SPE) and solid phase microextraction (SPME) into a single sample preparation technology platform. The integrated system, FPSE utilizes a flexible, yet active fabric (cellulose, polyester and fiberglass) substrate to host a thin layer of sol-gel derived extracting sorbent. The engineered selectivity of the sol-gel sorbents and the hydrophobicity/hydrophilicity of the fabric substrate synergistically complement to the net polarity of the fabric phase sorptive extraction medium and consequently, determine its extraction efficiency. The sponge-like porous architecture of sol-gel extraction sorbent and the inherent permeability of the fabric create an extraction medium that mimics a solid phase extraction disk and allows permeating aqueous sample matrix through its body, leading to rapid sorbent-analyte interaction and subsequent successful retention of the analyte(s) onto the extraction medium. The flexibility of the FPSE medium permits direct insertion into the sample container for analyte extraction and thus minimizes the number of transfer containers used in the sample preparation process. The sol-gel coating technology allows utilization of typical functional ligands commonly used in solid phase extraction such as C8/C18 as well as polymers used in solid phase microextraction such as polydimethylsiloxane (PDMS). Unlike SPE and SPME, FPSE can be performed either in equilibrium

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