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## Green extraction techniques for separation and enrichment of traces analyte ions in water, food and environmental samples

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Direct determination of traces analyte ions in water, food and environmental samples is restricted by two main difficulties. These are very low concentration of analyte ions, which may be lower than the detection limit of spectroscopic techniques and the interfering effects of the matrix components. These problems can be solved by using separation and enrichment methods. Microextraction techniques has recently attracted great interest in modern research due to its simplicity, cost effective, high efficiency and reduced exposure of toxic chemicals to the environment. In this presentation, various microextraction methods such as solid phase microextraction (SPME), magnetic SPME, dispersive liquid liquid microextraction, solidified floating organic drop microextraction, ultrasound assisted ionic liquid dispersive microextraction, fibers, hallow fiber liquid phase microextraction, direct immersion, head space single drop microextraction, supramolecular solvent extraction, switchable solvents, deep eutectic solvent extractions (DESs) and its application will be discussed. DESs are obtained by mixing two or more cheap and green components, including hydrogen bond donor and hydrogen bond acceptor, with the ability to relate to each other by hydrogen bond interactions. DESs are frequently achieved by means of generating complex of salt named choline chloride (Vitamin B4, ChCl) (e.g. inexpensive, nontoxic and biodegradable) through hydrogen bond donor (HBDs) or a metal salt (e.g. low-cost and green, sugars, glycerol and carboxylic acids). Separation and enrichment of organic and inorganic analytes will be discussed by using sensitive, selective and green extraction techniques.

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