Stability of amphiphilic and hydrophobic pollutants in nanostructured liquids based on anionic micelles

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Preservation of water samples from their collection to their analysis in the laboratories is an important issue in chemical analysis. Ineffective conservation leads to losses and incorrect results. Traditionally, chemical addition and temperature control during sample storage have been used, but these procedures are not recommended for long periods of time[34]. In the last years stabilization of analytes on SPE cartridges has been successfully proved, reducing the effort of transport and storage of large volumes of water samples[35].

Supramolecular assemblies (e.g. micelles, vesicles, etc.) have a high potential in analytical extraction processes[36], both in liquid-liquid (nanostructured liquids) and solid-phase (hemimicelles and admicelles) extractions, because of the number of interactions they can establish with analytes. Since they have been known to efficiently extract a variety of pollutants from environmental water and solid matrices, their ability to stabilize the extracted analytes should be investigated in order to use them advantageously in monitoring campaigns. Recently, hemimicelles and admicelles have been known to effectively stabilize some pollutants[37]; in this work the ability of nanostructured liquids for this purpose was assessed.

Anionic micelles of sodium dodecanesulfonic acid (SDSA) undergo coacervation in an acid medium[38]. The nanostructured liquid yielded efficiently extract amphiphilic and hydrophobic compounds, so their capacity to stabilize them before sample analysis was investigated. Benzalkonium surfactants (BAS) homologues and PAHs were the analytes selected for this study. The preservation of the target compounds in the nanostructured liquids was investigated under three temperature conditions (room temperature, 4ºC and -20ºC). Quantitative recoveries were achieved during at least three months at the different conditions tested. No influence of the water matrix (tap, river or waste water) on the stabilization of BAS and PAHs was observed. So, nanostructured liquids are an interesting strategy for the simultaneous extraction, preconcentration and stabilization of analytes.

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