Sampling High and Low - From Skylarks to Groundwater

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The quality and relevance of all chemical analysis is dependent on how the samples are collected. In the case of water sampling there is a gap between the need for adequate concentration measurement of organic pollutants and the usefulness of the field sampling procedures available. As a result, much effort and money is spent on time-consuming handling and advanced instrumental analysis of samples collected in a way not answering the scientific questions raised. One example is collecting grab samples for measuring chronic exposure, another is the use of passive sampling when a quantitative measure of whole water concentration is requested.

In response to this, an innovative device for quantitative, time integrated whole water sampling and simultaneous infield extraction has been developed - the TIMFIE sampler[1]. It enables determination of not only a wide range of compound classes using different SPE materials, but also of non-extractable analytes. The principle of this new, inexpensive and low-tech method, as well as some applications, will be presented.

Another challenging area of sampling is exposure measurements in studies on small animals. Much of this work is strictly regulated by law and the scientific benefit must outweigh the harm inflicted to the animals. The studies must follow the 3R principles, i.e. reducing the number of animals used, without jeopardizing the integrity of data produced, as well as refining the sampling and handling of the animals. The single most important factor to realize these goals is micro sampling.

The capillary micro sampling (CMS) technique[2-4] is a flexible and accurate method to collect and handle low microliter volumes of blood, plasma, serum and other liquid matrices. The samples can be prepared using well known principles and analyzed using techniques like LC-MS, GC-MS and immunoassays. The CMS principles, possibilities and different applications from pharmaceutical and environmental research will be given.

[1] O. Jonsson et al. *Environ. Sci. Technol.*, ***2019***, *53 (1), 279–286*

[2] O. Jonsson et al. *Bioanalysis* ***2012*** *4(16), 1989-1998*

[3] O. Jonsson et al. *Bioanalysis* ***2013*** *5(4), 449-462*

[4] O. Jonsson *e-Book chapter, Future medicine,* ***2013****, 68-82*