OP 1.5

Environmental speciation analysis: - A practical viewpoint and some applications in a contract laboratory

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The development of analytical techniques for the determination of chemical species has been one of the growing features of the 1990's in analytical chemistry. The determination of these chemical species, known as speciation analysis, is currently performed routinely in many laboratories to control the quality of the environment. Some typical examples are: tributyltin in water and sediment rather than simply determining total tin, arsenic species in drinking and ground waters), methylmercury in fish, selenium in yeast, wheat flour and tap water, chromium species (e.g. Cr(VI) in the workplace, environmental risk assessment (e.g. arsenic and chromium species in polluted soils).

Speciation has been considered in a few EC Directives. Nevertheless, the need for determination of chemical species is well established and today laboratories have to manage with this goal and have to propose a panel of fit for purpose speciation analysis related to their scope of activity. The determination of the total metal concentrations is not always the appropriate response to address the problem because we clearly know that it is rather the chemical forms of an element which controls its fate, impact and behaviour. Consequently, we have developed rapid and robust speciation measurement methods with an emphasis on retrieving as much information as possible from the analysis with a minimum of sample pre-treatment. (There is always a danger that sample pre-treatment can alter the speciation.)

Elements most often investigated in routine analysis by our laboratory are organotin compounds in wide range of environmental samples; arsenic species in polluted soil; ground water and leachates from soil samples; chromium VI in soil and sludge samples and also selenium species in drinking water samples, see references [1-6]. Some practical examples will be given to illustrate and highlight the problems encountered with speciation analysis as well as ensuring suitable Quality Assurance and Quality Control (QC/QA) protocols required to achieve ISO 17025 speciation accreditation

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