

ISOTOPE DILUTION MASS SPECTROMETRY AS A TRACEABLE TOOL TO ASSESS SELENIUM STATUS IN HUMANS

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Selenium (Se) is one of the most studied trace elements in the last decades due to its beneficial role in human health. It has been demonstrated that most of the biological functions of Se are driven by selenoproteins and/or Se-containing proteins (selenoprotein P, SEPP₁; glutathione peroxidase, GPx₃ and selenoalbumin, SeAlb). Therefore, Se species and in particular selenoproteins, have been considered as potential bio-indicators of Se status in human serum. In order to conduct an accurate determination of Se status, certified reference materials (CRMs), pure primary standards and reference methods need to be developed.

In this work, we will discuss the use of isotope dilution associated to inductively coupled plasma mass spectrometry (ID-ICPMS) as a tool to assure the traceability of Se status in clinical chemistry. ID-ICPMS fulfills the requirements of a primary method able to provide reference values to Proficiency Testing (PT) and clinical trials and to quality control of existing assays for clinical use. The development of quantification approaches based on ID-ICPMS for the determination of total Se, selenomethionine (the interlaboratory comparison CCQM-K107, *Elements and Se speciation in human serum*) and selenoproteins (GPx₃, SEPP₁ and SeAlb) in human serum will be presented. The research leading to these results has been partially funded by the EMRP Joint Research Project "Metrology for metalloproteins". The EMRP is jointly funded by the EMRP participating countries within EURAMET and the European Union..