

Speciation of selenium in animal tissues using high performance liquid chromatography with on-line detection by inductively coupled plasma mass spectrometry

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Selenium is recognized as an essential trace element in the living organisms and as an important component of the antioxidant enzymes that protect cells against free radicals that are produced during the normal oxygen metabolism. The range between essentially level and toxicity level of selenium is very narrow. Selenium intake below the daily recommended amount can lead to numerous diseases caused by the deficiency of selenium, but also with the consumption of selenium in high doses its toxic effect is observed. Selenium has an important protective role against various forms of cancer and helps in prevention of heavy metal toxic effects. The influence of selenium on the metabolism depends not only on its total amount but mainly on the chemical form, which are uptake and metabolized. Therefore the identification and quantification of its species is crucial in a view of understanding of its metabolism and its importance in biology, toxicology, clinical chemistry and nutrition.

In this study inductively coupled plasma mass spectrometry (ICP-MS) coupled with anion-exchange high performance liquid chromatography (AE-HPLC) was used for the determination and speciation of selenium in animal tissues. A set of animal samples origin from the sheep exposed to the feed enriched with selenium and conjugated linoleic acid were used. The extraction of selenium species were performed with various media: water, SDS, driselase, lipase, protease as well as the mixture of lipase and protease. The use of ultrasounds or mechanical stirring assisted extraction was also compared. By using anion-exchange chromatography the presence of Se(IV), Se(VI) Selenomethionine and methyl-Se-cysteine together with few unknown selenocompounds were detected in extracts.