Study on the determination of selenium and tellurium in foods by hydride generation atomic absorption spectrometry

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A method has been investigated for the determination of selenium and tellurium in Ginseng radix, Ganoderma lucidum and Garlic using hydride generation atomic absorption spectrometry(HG-AAS). The concentration effects of hydrochloric acid and sodium tetrahydroborate and their flow rate on the hydride generation for the determintion of selenium and tellurium were investigated. The method of sample decomposition was also investigated using various mineral acids, such as nitric, perchloric and sulfuric acid in the closed system. In the optimum conditions, we obtained calibration curve for selenium in the range of 0 -40ppb and 0 - 60ppb for tellurium. The detection limits of selenium and tellurium are 0.1 ppb, 0.2 ppb, respectively. Analytical data of selenium and tellurium in Garlic, Ganoderma lucidum and Ginseng radix are 289, 296, 198 ng/g and 146, 127, 110 ng/g, respectively.

INTERACTION OF SELENIUM WITH METAL IONS AT MOLECULAR LEVEL

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It is known that a higher than normal intake of selenium may protect against the toxic effects of cadmium, mercury, lead and other metal ions. It was shown by E. Johansson that selenium interacts with metal ions at the cellular level when supplemented at low doses.
In this paper the interaction between inorganic and organic selenium containing compounds and metal ions (Cd^{2+}, Pb^{2+}, Hg^{2+}) was studied by polarography following the changes in polarographic limiting currents and half-wave potentials.
These preliminary molecular data are discussed in the light of the previous findings in cellular systems and a comparison between the results from the electrochemical experiments and the biological studies may clarify the selenium protective effects against metal toxicity.

[194] **SELENIUM IN TYPICAL BRAZILIAN DIETS**

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The aim of the present work was to determine the total amount of Se in some Brazilian typical diets in order to predict the need for suplementation. The essentiality of Se was suggested by Schwarz and Foltz (1957) and after their work Se has been intensively studied. So far there is no scientific consensus as to optimal Se intake, but the RDA (1989) recomended 50 to 70μg/day. The data presented here was obtained by prepared typical diet from different regions of Brazil, i.e. North, Center, Southwest and South, with the ingredients produced and consumed by local population. The amount of foods was obtained by dietary recall data and/or by duplicate analysis. These diets were prepared according to brazilian habits. The methods utilized were fluorimetric and radiochemical neutron activation analysis after nitric-perchloric acid digestion, and the accuracy of the methods was tested by means of the standard reference material. The Se intake by the population in brazilian diets ranges from 20 to 40μg/day in Se deficient areas (Mato Grosso and São Paulo states) to about 100μg/day in the North and South (Amazonas and Santa Catarina states). Our results indicated that the population with marginal Se intake, could benefit by suplemented diets with brazilian nuts which has been shown to be rich in this element.

[196] STRAIN DIFFERENCE IN IRON ACCUMULATION IN MICE FED TORULA YEAST DIET DEFICIENT OR SUFFICIENT IN SELENIUM. Y Seko and N Imura. Kitasato University, Minato-ku, Tokyo 108, Japan.

During the course of our study on the effects of selenium deficiency, we found the strain difference in iron accumulation in organs of mice. Several strains (CBA, NZB, DBA/2, CDF1, C57BL, CBF1, and C3H) of female mice (4 week old) were fed selenium deficient (Se(-)) or sufficient (Se(+)) torula yeast diet for 10 months. Mice were sacrificed and iron concentration in organs was measured by atomic absorption spectrophotometry. Iron accumulations in the liver (2090 μg/g wet tissue) and kidney (492 μg/g) of CBA mice were highest among the strains used regardless of dietary selenium level. Lowest accumulation was observed in the liver of C57BL mice (246 μg/g) and kidney of DBA/2 mice (58 μg/g). Both Se(-) and Se(+) CBA mice suffered from anemia as judged by hemoglobin concentration in the blood. Though the mechanism of iron accumulation in CBA mice has not yet been clarified, the iron accumulation might have followed the anemia if the anemia is hemolytic one. Hepatic and renal iron concentration in NZB mice, which are known to suffer from autoimmune hemolytic anemia with splenomegaly under the normal dietary condition, were reduced by selenium deficiency. Iron concentration in the liver and kidney correlated with spleen weight, i.e. the more the augmentation of the symptom, the higher the concentration of iron in the organs. Splenomegaly and anemia were less augmented in Se(-) NZB mice, suggesting that Se deficiency cured the autoimmune disease to some extent. Iron concentration in the spleen was not higher in CBA and NZB mice than those in other strains. This phenomena is similar to that observed in hemochromatosis in human, and different from that in the usual animal model of iron overload with oral administration of high amount of iron.

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