

Comparative analysis of vitamin content of food supplements marketed in Hungary

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According to the Order of Hungarian Minister of Health No. 37/2004. (IV. 26.) food business operators must notify their food supplements at National Institute for Food and Nutrition Science before placing them to the Hungarian market. National authorization before marketing of food supplements ended at first of May 2004. Producers of food supplements have been allowed to use vitamins and minerals in chemical forms exclusively given in supplements I. and II. of the Decree mentioned above. Since 1st of May 2004 more than 4500 food supplements have been notified in Hungary. This number increases daily by four but in the first four months of 2009 nearly nine products per day were included into the list of notified products. More than half of the notified products contain vitamins, solely or in combination with other vitamins, minerals, plant extracts or isolated substances, as well. Most frequently used vitamins are C, E and Bs, including B1, B2, niacin and B6, at smaller frequency other vitamin Bs, vitamin A, D and K are the components of food supplements. Products contain vitamins at different levels but majority of them have vitamins not more than RDA (recommended dietary allowances). Controlling of the real composition of the products before marketing depends only on the decision of the food business operators; the market control authorities screen the products only at limited frequency.

In the frame of PHARE 2005/17/520.01.01 transition facility project National Institute for Food and Nutrition Science was provided with a Thermo Surveyor Plus HPLC-DAD/FLD equipment which could serve as the tool for the screening of the level of vitamins in food supplements sold in Hungary. Validated methods were set out for separating, qualifying and quantifying water and fat soluble vitamins with different chemical structure in food supplements. The most important element of the methods was the sample preparation step (direct extraction, saponification, or acid base solution) of products with different forms as hard and soft gel capsules, tablets, and so on, for obtaining the whole amount of active substances. The preparation step was followed by the separation of different vitamins and chemical forms on a reversed phase chromatography column and finally detection based on UV signal of the molecules. With the use of newly developed methods screening of vitamin content of about fifty food supplements found in Hungarian market was done. It can be stated that most part of the products contain vitamins at level indicated on the label, only in certain cases significantly higher or lower level (20%) of vitamins could be detected. There were some products where declared amount of vitamin indicated in the label did contain only the added vitamin and amount coming from natural source was not summed up. Methods developed are suitable for separation, qualifying, as well as quantifying vitamins with different chemical structure and monitoring the composition of food supplements marketing in Hungary.

Exogenous selenium influences the reactive oxygen radical production and restores intestinal perfusion in a porcine model of cardiac tamponade

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Selenium (Se) is essential for the function of redox regulator enzymes that have major roles in cardiovascular diseases with transient hypoxia, but the clinical value of Se replacement is still controversial.

The aim of our study was to assess the effects of Se treatment on reactive oxygen intermediates (ROI) production and splanchnic circulatory consequences in experimental cardiac tamponade (CT).

Anesthetized, thoracotomized minipigs (n=6) were subjected to acute CT by intrapericardial fluid infusion; the mean arterial pressure was kept at 40 mmHg for 60 min. After removal of the pericardial fluid, macrohemodynamic changes, small intestinal flow and pCO₂ gap (tonometric probe), blood ROI (superoxide and H₂O₂ production, chemiluminometry), plasma

nitrite/nitrate (NOx) level (Griess reaction) were monitored for 180 min. Another group of animals (n=6), received Se infusion (25 µg/kg/h iv) after CT induction.

CT was followed by hemodynamic signs of cardiogenic shock. During resuscitation, the significantly increased intestinal pCO₂ gap, elevated ROI production of the blood referred to prolonged mesenteric ischemia in spite of restored macrohemodynamics. In contrast, superoxide producing capacity of blood, NOx production in plasma, intestinal blood flow and pCO₂ gap were significantly improved by Se treatment.

CT-caused peripheral circulatory derangement could be effectively influenced by Se treatment due to reduced free radical production and improved intestinal microperfusion.

Study on total phenol content and antioxidant capacity (FRAP) of *Ginkgo biloba* L. leaves from different places

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Blood flow regulating and antioxidant effects of ginkgo (*Ginkgo biloba* L.) leaves are well known. Products containing standardized ginkgo leaf extracts are among the most popular medicinal goods in Hungary. Also more and more ginkgo teas (crude leaf drugs) are available in the trade flow as monoteas or in mixtures.

Total phenol content and antioxidant capacity (by the FRAP method) were determined from extracts of ginkgo leaves collected in different places.

Places of collection (all in Hungary): Budapest city (Botanical Garden of Eötvös Lóránd University called "Füvészkert", Botanical Garden of Corvinus University of Budapest - BCU, Margit boulevard in the city centre), Gödöllő city (park of Szent István University), Paks city (city centre) and Székesfehérvár city (city centre). In Füvészkert we collected leaves both from male and female trees. Leaves were dried at 30°C and then pulverized. Based on prescribes of the Hungarian Pharmacopoeia aqueous and aqueous ethanolic (water/ethanol 80/20, v/v) extracts were made from the prepared leaves. Total phenol content was measured spectrophotometrically ($\lambda = 760$ nm) with the use of Folin-Ciocalteu reagent. Antioxidant capacity was determined also spectrophotometrically by the FRAP method.

In case of all samples total phenol content of aqueous extracts was higher than that of aqueous ethanolic extracts. For aqueous ethanolic extracts more pronounced differences were obtained among the samples than for aqueous extracts. In case of aqueous extracts the highest total phenol content (0,132 mg/ml) was detected in the sample from the tree of BCU, while the trees of Füvészkert had the lowest value (0,079-0,081 mg/ml). In aqueous ethanolic extracts the total phenol content was the highest (0,089 mg/ml) in ginkgo leaves collected in Gödöllő city, statistically significantly higher than in the other samples. In case of ethanolic extraction big differences between the sexes could be detected for the phenol content. The lowest value (0,016 mg/ml) was detected from the sample of the female ginkgo tree of Füvészkert.

Total antioxidant capacity determined by the FRAP method was higher in aqueous extracts than in aqueous ethanolic extracts. In case of ethanolic extraction samples of old trees of Füvészkert showed an unexpectedly low antioxidant capacity (0,21-0,28 mmol ascorbic acid/l), significantly lower than the other samples (0,63-1,22 mmol AA/l). In aqueous ethanolic extracts the highest antioxidant capacity (0,81 and 0,73 mmol AA/l) were found for samples of Gödöllő city and of BCU, while the lowest (0,31 mmol AA/l) for the sample of Székesfehérvár city. Antioxidant capacity values of the other samples were about the same. Antioxidant capacity of leaf extracts of male and female trees did not differ from each other.

Both of total phenol content and total antioxidant capacity were higher in aqueous extracts than in aqueous ethanolic extracts. Among the samples collected from different places significant differences were obtained for both of the investigated parameters. Differences in antioxidant capacity did not show connection with the pollution grade of sampling places, these could be caused by age of the ginkgo trees. However the significant differences may worth consideration, as it could have an important role in the therapeutic use of ginkgo leaves. It is also worth to mention, that the antioxidant capacity of ginkgo leaf extracts was much lower than that of products containing standardized extracts, so antioxidant effect of ginkgo teas is lower than that of the standardized extracts.