

**M. Anke, S. Holzinger, M. Seifert, R. Müller and U. Schäfer:** The biological and toxicological importance of molybdenum in the environment and in the nutrition of plants, animals and man. Part 4: the molybdenum intake of adults with mixed and vegetarian diets in Germany and Mexico (duplicate portion studies). Pp. 1-11. [mathias.seifert@gmx.de](mailto:mathias.seifert@gmx.de)

The molybdenum intake by German and Mexican adults (21 test populations) aged 20 to 69 years with mixed and ovo-lacto-vegetarian diets were determined. Each test group consisted of at least 7 women and 7 men, which collected all consumed foodstuffs and beverages as visually estimated duplicates on 7 successive days. The balance studies were carried out with 8 test populations (women and men) with mixed and ovo-lacto-vegetarian diets. People with mixed diet in Germany consumed, on average, 89 (women) and 100 µg

**Keywords:** molybdenum, intake, mixed and vegetarian diets, apparent absorption

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**M. Anke, M. Seifert, W. Arnhold, S. Anke and U. Schäfer:** The biological and toxicological importance of molybdenum in the environment and in the nutrition of plants, animals and man. Part 5: essentiality and toxicity of molybdenum. Pp. 12-26. [mathias.seifert@gmx.de](mailto:mathias.seifert@gmx.de)

In animals and man, molybdenum has been recognized as an essential component of the enzymes xanthine oxidase, aldehyde oxidase and sulfite oxidase. Nutritional molybdenum deficiencies in animals have been produced in experiments with goats and a molybdenum-poor diet (growth depression, decrease in conception rate, poor foetal survival rate). In practice, the molybdenum supply to animals and humans meets the requirements (animals < 100 µg/kg<sup>-1</sup> feed dry matter, man 25 µg/day). The essentiality of molybdenum and sulfite oxidase in man was documented by more than 100 patients who lacked the enzyme function, either as the result of a defect in genetic coding, or of a genetic deficiency in the molybdenum cofactor and a molybdenum deficiency during parenteral nutrition. Molybdenum toxicity (molybdenosis) in animals primarily affects ruminants (cattle). It is manifested by diarrhea, anorexia, depigmentation of hair, neurological disturbances and premature death. Molybdenum interacts with copper, and some symptoms of molybdenum toxicity are similar to those of copper deficiency. Only few data are available concerning toxicity to humans.

**Keywords:** molybdenum, essentiality, toxicity, animals, man

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**A. Gábor, V.A. Kovács, Zs. Fajcsák and É. Martos:** From guidelines to practice – nutritional habits of Hungarian elite athletes compared with the data from the 3rd national dietary survey. Pp. 27-34. [anitagabor@freemail.hu](mailto:anitagabor@freemail.hu)

This study evaluated the diet of 615 professional athletes (PA) (306 males and 309 females; 21.3±5.5 years) compared with 312 age-matched non-athletes (NA), who participated in the 3rd Hungarian National Dietary Survey in 2003. Dietary intake was assessed based on 3-day food record. In males, daily energy intake was 3513±1143 kcal and 2965±551 kcal for PA and NA, respectively (P<0.001). In females, there were no significant differences between PA and

NA concerning the intake of energy. Athletes reported insufficient energy intake in both genders. Similarly to NA, PA failed to meet the adequate rate for macronutrients. Energy intake from carbohydrates was lower ( $47.3\pm 6.6\%$  in male and  $49.2\pm 7.3\%$  in female) and from lipids higher ( $36.8\pm 6\%$  in male and  $35.2\pm 6.7\%$  in female) than recommended. Athletes reported higher intakes of vitamin C and E, potassium and calcium than NA. Sodium and cholesterol intake was highly above the RDA in every group. Surprisingly, sodium intake of NA was even higher than PA in females ( $5535\pm 1282$  mg/day vs.  $5068\pm 2028$  mg/day;  $P<0.05$ ). In addition, iron intake of women was less than two-third of RDA in both groups. In summary, the dietary habits of elite athletes showed many misconceptions and lack of proper nutrition in terms of quality. These findings point out the need for adequate education of athletes and trainers to provide optimal food choice and for continuous monitoring of dietary pattern to maximize exercise performance and improve recovery.

**Keywords:** dietary intake, professional athletes, non-athletes, RDA

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**G. Bujdosó, M. Tóth-Markus, H. G. Daood, N. Adányi and P. Szentiványi:** Fruit quality and composition of Hungarian bred walnut cultivars. Pp. 35-47. [geza.bujdos@uni-corvinus.hu](mailto:geza.bujdos@uni-corvinus.hu)

Eight registered Hungarian walnut cultivars were tested for composition and sensory properties. The samples were collected at the Experimental Fields of the Research Institute for Fruitgrowing and Ornamentals in Érd-Elvira major. Proximate composition, fatty acids, minerals (P, Na, Ca, Mg, Ca, Fe, and Se), polyphenols and vitamins (C, E) were determined in four consecutive years 2003-2007. The tested cultivars have an oil content, which falls within the upper range of the literature values. Polyphenols, iron and selenium contents are also high while the values for potassium and phosphorus are in the lower part of the given range. In our case, the crop years make a larger difference in the composition than the cultivars. Tiszacsécsi 83 is the only cultivar slightly differing from the others in lower mineral and protein content.

**Keywords:** walnut, fruit quality, breeding, composition, organoleptic, Hungary

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**R. Engel, I. Abrankó, É. Stefanovits-Bányai and P. Fodor:** Simultaneous determination of water soluble vitamins in fortified food products. Pp. 48-58. [rita.engel@uni-corvinus.hu](mailto:rita.engel@uni-corvinus.hu)

Vitamins form a heterogeneous chemical group having different stability. In foodstuffs some of them might be bound to matrix components. In the case of vitamin supplemented food products, since the vitamins are not strongly embedded in the matrix a general extraction method could be fit for purpose. The aim of this study was the simultaneous determination of the most common water-soluble vitamins i.e. ascorbic acid<sub>(C)</sub>, riboflavin<sub>(B2)</sub>, niacin<sub>(B3)</sub>, pyridoxine<sub>(B6)</sub>, folic acid<sub>(B9)</sub> in enriched food products. Sample preparation based on the European Standard (CEN, 2003) was optimised for further LC-MS compatible chromatography. The separation of the vitamins was achieved by reversed-phase liquid chromatography. Detection was carried out with a photodiode array detector at four different wavelengths. The chromatographic method and the sample preparation were successfully applied for vitamin-enriched cereal, instant cacao powder and fruit juice samples.

**Keywords:** water-soluble vitamins; supplemented foodstuff; liquid chromatography; cereal;

cacao; fruit juice

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**M. Stéger-Máté, G. Ficzek, E. Kállay, G. Bujdosó, J. Barta and M. Tóth:** Optimizing harvest time of sour cherry varieties on the basis of quality parameters. Pp. 59-68.  
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The variation of some compositional quality parameters in connection with ripening time in the case of four sour cherry varieties (*Prunus cerasus* L. Mill.) was studied. Our aim was to optimize the harvest time on the basis of antioxidant capacity. The experiments were carried out in the Érd-Elvira orchards of the Research Institute for Fruit-growing and Ornamentals (cultivars Érdi bőtermő, Kántorjánosi 3) and in orchards of the Agárd Frucht Ltd. in Agárd (cultivars Érdi jubileum, Maliga emléke). Anthocyanin, polyphenol and vitamin C contents as well as the water-soluble dry matter content of fruits were measured. According to the results of quality parameter measurements it can be stated, that in case of the studied cultivars the optimal picking time for industrial processing is the second picking. At this time the anthocyanin, polyphenol and water-soluble dry matter content of the cultivars are optimal. In general, at the end of the ripening period the fruits shrink, fruit weight and juiciness decreases as a consequence of water loss, therefore determining optimal harvest time for the desired utilization purpose is very important. According to our results, out of the four studied cultivars, Érdi jubileum has the highest values regarding anthocyanin and polyphenol contents.

**Keywords:** sour cherry, anthocyanin, polyphenol, vitamin C, refraction

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**D. Cais-Sokolińska and M. Majcher:** Sensory properties and volatile composition of full and non-fat cheese produce from curd - ripened fried acid tvarog. Pp. 69-80.  
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The study was aimed at sensory analysis and volatile content determination in fried cheese. Fried cheese was produced under commercial conditions from acid tvarog ripened and fried with no butter added (non fat) and with an addition of butter at 4:1 (reference cheese). Cheese was evaluated immediately after production and after 6 weeks of storage at 4°C. Total and casein nitrogen, water and fat were assayed in cheese. Sensory analyses of cheese descriptors were conducted by profiling on a 0-10 scale, while volatiles were isolated by solid phase microextraction (SPME) technique. The dominant aroma in reference cheese was cowy/phenolic and cooked, while in non-fat cheese it was cooked and free fatty acid. Sulphur aroma was least perceptible in reference and non-fat cheese. After 6-week storage the only significant changes were weakened cooked aroma in non-fat cheese and waxy/crayon aroma in reference cheese. Differences in profile analysis of full and non-fat cheese were reflected in amounts of determined volatiles, especially total sulphur compounds, acids, methyl ketones, terpenes and esters.

**Keywords:** fat reduced, sensory properties, fried cheese, storage, volatile compounds, flavour

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**M. Al-Bachir:** Effect of gamma irradiation on microbial load, chemical and sensory properties of sheesh tawoq; prepared chilled meal. Pp. 81-89. [scientific@aec.org.sy](mailto:scientific@aec.org.sy)

Locally prepared meal Sheesh Tawoq was treated with 0, 2, 4 or 6 kGy doses of gamma irradiation. Treated and untreated Sheesh Tawoq were kept in a refrigerator (1-4 C°). Microbiological, chemical and sensory characteristics of Sheesh Tawoq were evaluated at 0, 4, 8, 12, 16, and 20th week of storage. The results indicate that 4 and 6 kGy doses of gamma irradiation decreased the total counts of mesophilic aerobic bacteria, total coliform and yeast. Thus the microbiological shelf-life of Sheesh Tawoq was significantly extended from 12 weeks (control) to more than 20 weeks (samples treated with 4 or 6 kGy). Irradiation doses did not have a significant effect on the major constituents of Sheesh Tawoq (moisture, protein and fats). The radiation doses required to reduce the microorganisms load one log cycle ( $D_{10}$ ) in Sheesh Tawoq were 435 and 385 Gy for the Salmonella and E. coli, respectively. The chemical parameters, total acidity and volatile basic nitrogen, which were chosen as the indices of freshness, were all well within the acceptable limit for up to 12 weeks for Sheesh Tawoq treated with 0 and 2 kGy, and for up to 20 weeks at 1-4 C° for samples treated with 4 and 6 kGy. Sensory evaluation showed no significant differences between irradiated and non-irradiated samples.

**Keywords:** gamma irradiation, microbial load, sheesh tawoq, prepared meals.

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**K. Marković, I. Panjkota Krbavčić, M. Krpan, D. Bicanic and N. Vahčić:** The lycopene content in pulp and peel of five fresh tomato varieties. Pp. 90-98. [kmarkov@pbf.hr](mailto:kmarkov@pbf.hr)

The lycopene content in pulp and peel of five fresh tomato cultivars, most common on Croatian market, was determined by spectrophotometry and the high-performance liquid chromatography (HPLC). Peels from the raw tomatoes contained more lycopene (expressed on a fresh basis) than the pulps: the ratio was  $3.75 \pm 1.08$  for spectrophotometric and  $3.50 \pm 0.95$  for HPLC measurements. Comparison of the results of lycopene content expressed on a dry weight basis revealed that the peel from raw tomato contains  $1.74 \pm 0.36$  times (spectrophotometry) more lycopene than the pulp as compared to a factor of  $1.61 \pm 0.24$  obtained by HPLC analysis. Fraction of the pulp in a whole tomato was found to vary between 89.9 and 95.2%, while that of tomato peel was between 4.9 and 10.1%. Nutritional habits in Croatia often include tomato-based food, all year around, prepared partly of whole fresh tomatoes (including peel), partly of industrial tomato products (from which peel is often excluded). This study provides evidence that the peel of one of the most common varieties of tomatoes on Croatian market is richer in lycopene than the pulp and, moreover, that a diet including 100 g of raw tomatoes provides  $1.35 \pm 0.29$  mg lycopene from pulp as compared to  $0.35 \pm 0.18$  mg lycopene from tomato peel. In addition, results of this study will be useful in further attempts to quantify lycopene content of intact, whole tomatoes by means of the nondestructive, photoacoustic method.

**Keywords:** HPLC, lycopene, spectrophotometry, tomato, peel