Analysis of glycosylated forms of vitamin B_6 in plant-derived foods. Velimatti Ollilainen,* Anja Pakkanen, Liisa Vahteristo & Pertti Varo

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Free and phosphorylated B_6 vitamers usually compose the predominant part of food vitamin B_6. However, in plant foods glycosylated pyridoxine is the major vitamer, dominating especially in vegetables and fruits. Glycosylated vitamers can be utilized as sources of vitamin B_6 to some extent, but their bioavailability is limited (Gregory *et al.*, 1991; Gibert & Gregory, 1991).

In this study glycosylated and non-conjugated vitamers were extracted with perchloric acid and separated using reversed-phase liquid chromatography. Post-column derivatization with bisulphite reagent was used to enhance the fluorescence of B_6 vitamers, especially PLP. The amount of pyridoxine was measured before and after β-glucosidase treatment of the sample extract, and the increment of pyridoxine was assumed to be derived from the enzymatic hydrolysis of conjugated vitamers. In certain samples pyridoxine glucoside was also characterized using proton NMR spectroscopy.

In the cereals and vegetables studied, a significant part of vitamin B_6 constituted conjugated pyridoxine. In cereals, around 20–50% of the total amount of vitamin B_6 was derived from glycosylated pyridoxine. The amount in carrot, broccoli and tomato was 70%, 40% and 30%, respectively. Thus more information on the presence and chemical structures of glycosylated B_6 vitamers in foods is needed in order to estimate the significance of glucosylated vitamers as dietary sources of vitamin B_6 in plant-derived foods.

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Analytical problems in the study of the dietary significance of natural toxicants in plant foods. Michael J. C. Rhodes* & Keith R. Price.

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Many secondary metabolites present in plant food are considered as natural toxicants. However there is increasing evidence which links some of these same compounds (including isothiocyanates in Brassicas and alkenyl polysulphides in Alliums) with the protective effects against cancers and degenerative diseases associated with diets rich in fruit and vegetables. We are interested in one such group of compounds, the flavonoids, which are thought to have an overall beneficial effect due to their activity as direct antioxidants, chelating agents and inducers of phase II anticancer enzymes.

In plant foods, flavonoids and related phenolic compounds exist in a multiplicity of complex conjugates with sugars and organic acids. Important questions remain on the fate of such conjugates during processing and digestion, on the nature of the nutritionally important form of flavonoids and on the extent of their uptake and metabolism in the gut. An important prerequisite for tackling such problems is the development of convenient high resolution separation systems to resolve and quantify flavonoid aglycones and conjugates. We will describe the use of the combination of diode-array based HPLC and capillary electrophoretic methods to study flavonoids and their conjugates applied to important dietary sources of flavonoids.

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Different biological forms of mercury. Marjatta Kantola.

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In biological systems mercury can exist both in organic and inorganic forms. By inorganic mercury it is meant elemental Hg (Hg^0), mercurous (Hg_2^{2+}) and mercuric salts (Hg^{2+}) as well as mercury in such complexes in which Hg^{2+} is reversibly bound to different ligands. The general formula for organic Hg compounds is R-Hg-R′ or $R\text{-}Hg^+X^-$. R and R′ are organic groups in which a carbon atom is covalently bound to Hg. Dialkyl and diaryl mercury compounds are nonpolar and volatile with variable toxicity. Their existence in nature is small in comparison with the existence of methylmercury. compounds. Methylmercury compounds include all compounds derived from a methylmercury cation (CH_3Hg^+). The mercury released to the environment as a metal (e.g. by losses from industry or from compounds like fungicides) or as inorganic forms like HgS (from sulphide ores) is converted to CH_3Hg^+ by biological methylation. Because methylmercury compounds are lipophilic, they accumulate much more efficiently in mammals than inorganic mercury and therefore have a great toxic potential.

No metabolic functions in the human body are known for which mercury is required. The neurological symptoms and liver and kidney damage caused by acute mercury poisoning are well known. The relief of Hg from amalgam tooth fillings and the possible connection between increased Hg concentration in hair and excess risk of coronary heart diseases have raised a question about the health effects of longterm exposure to sufficiently low mercury and methylmercury concentrations. It has been supposed that mercury can promote lipid peroxidation through a free radical mechanism. The ability of mercury to form very stable compounds with S and Se can lower the protective effect of selenium.

Hair, serum, red cell, urine and faeces samples are used for monitoring Hg status in a human. Cold-vapour techniques with atomic absorbtion or atomic fluorescence detection with suitable digestion procedures are mostly used for the total mercury analyses in human