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This Vitamin Supplement presents some of the main information presented at The First International Vitamin Conference in Copenhagen, May, 2010. The theme of the conference was 'Vitamins in foods and supplements: Analytical possibilities versus nutritional needs in human research, food databases, and labeling'. All 13 vitamins were represented. Although vitamin D and folate that in recent years have been heavily debated, also were the one in focus and is represented in 8 of the 17 papers included in this vitamin supplement. Furthermore, vitamin K covered a whole session and is discussed in three papers, while six papers are more general or cover other vitamins.

An adequate intake of vitamins is necessary for survival and good health. Appropriate analytical methods to assess the content of vitamins in our foods are of outmost importance. Preferably these should be combined with the assessment of the optimal daily dietary intake of vitamin to achieve the most beneficial vitamin status for a healthy life. These goals have not yet been established for several of the vitamins, which was one of the main reasons to set up the conference.

The origin of vitamins is diverse, and the variety of the vitamin-active compounds depends on the origin of vitamins, for example is it a plant product or a product of animal origin? Similar to the story for human 'You are what you eat', the nutrient in our food depends on the growth condition for plant and the feeding procedures for animal products. Two papers describe how to use biofortification to increase the content of vitamin. Mushrooms are shown to be a very promising vitamin D source, if exposed to light in the region of 290–315 nm (1) and biofortification of folate in pita bread is a possibility by germination prior to milling (2).

The above examples indicate that, for example selection of the food to be analysed to assess vitamin content in our food is a challenge. The paper by Roe and Finglas (3) shortly describes the European initiatives to improve the tool behind the food composition data and the European Standard for Food Composition Data based on the EuroFIR initiatives. The initial step to build a European food composition database for ethnic food showed huge diversity in products and in the contents of vitamins. The authors ask for a cautious approach to use the data for calculation of dietary intake (4).

The paper by Gregory (5) describes the differences in the bioactivity and bioavailability of vitamers, and the importance to take these differences into account in food databases. The paper also highlights the approach in the USA of introducing folate equivalents.

Quantification of the vitamins present in food has always been a challenge. Basically, due to the low concentration at parts per billion and even parts per trillion, combined with the rather wide variety of vitamin active compounds which exist for each vitamins. Talking about specific methods, the paper by Do et al. (6) describes a unique analytical procedure to quantify each of the 7 B_6 vitamers, that is pyridoxine, pyridoxal, pyridoxamin, pyridoxine 5′-phosphate, pyridoxal 5′-phosphate, pyridoxamin 5′-phosphate and pyridoxine-β-glucoside. Unfortunately, the method is rather time consuming, but the authors state that the intention is to develop an analytical toolkit. Another paper (7) describes the difficulty to combine data from different protocols using different analytical methods. For a period of approximately 10 years, the Dutch Food Composition Database contained data based on specific chemical method. In 2010 these data were replaced by data deriving from analyses by the microbiological assay. In average the folate content in foods increased "overnight" by 24%, and the dietary intake of folate in young children increased by 11–15%. This happened without any change in the diet (7).

For vitamin K you will find one paper describing the content in food and dietary intake (8), and one covering the effect on health beyond coagulation for vitamin K (9). These papers describe the distribution of phylloqinone in our foods being primarily present in leafy plants and vegetables oils, and emphasize the fact that vitamin K is no longer only accepted as essential for blood coagulation. We will highlight that content of phylloquinone in oil containing food products depend on processing, and content of menaquinone varies with region. For blood coagulation phylloquinone and menaquinone are considered equivalent, while no consensus is present regarding the influence on bone and cardiovascular calcification. Askim et al. (10) report the results from a study in chicken that tested phylloquinone and menaquinone-4 as natural sources of vitamin K on the effect of the content of vitamin K forms in the organs liver and pancreas. A similar debate is ongoing for the vitamin D active compounds that are vitamin D_2, vitamin D_3, and 25-hydroxyvitamin D_3 (11). The ability to increase vitamin D status in humans is discussed. The conclusion states the requirement for further research in this field. Similarly we conclude that further research is warranted to assessment of the activity of the vitamin K forms.

A sufficient dietary intake of vitamins may also be assessed by determination of an appropriate biomarker for vitamin status. Pfeiffer et al. (12) discuss the complexities of using biomarkers in combination with the calculation of dietary intake based on dietary survey combined with data in food composition databanks to set and evaluate public health policy. Pfeiffer et al. (12) use vitamin D and folate as case studies.

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Another paper (13) shows the results from an investigation of whether the variation in unmetabolised folic acid in serum measured in a representative group of adults ≥60 years in the USA could be explained by differences in dietary intake of folic acid. Based on the results, the authors suggest that our genes are responsible for the difference in unmetabolised folic acid.

Furthermore, Roswall et al. (14) investigate the relation between dietary intake of vitamin C, vitamin E, folate and β-carotene and all-cause mortality in a prospective Danish cohort and showed no relation. However, supplemental folic acid showed association to increased mortality. But, the authors conclude that further studies are required to underpin this result.

As mentioned, vitamins are needed to secure a healthy life. Recommendation for dietary intake is given by, for example the Institute of Medicine in the USA and in the Nordic Nutrition Recommendation in the Nordic countries. In addition to these recommendations is the benefit–risk assessment. The controversy how to settle the level to secure neither too low nor too high dietary intake among the general population is described by Verkaik-Kloosterman et al. (15). Among the different fortification policies, the politician may choose to spread and optimise the dietary intake of nutrients by announcing how to select the most optimal food source. Fortification policy should regularly be evaluated to investigate the effect. Such investigation took place in 2010 regarding the Dutch voluntary fortification policy about benefit–risk aspect for children (16). de Lourdes Samaniego-Vaesken et al. (17) give a more general overview and discussion of different strategies to improve public health in the past and in the future using vitamin D and folate as cases.

Analytical quality is somehow part of all the papers. Researchers in the field have to make sure to adjust for method differences and use reference materials as part of quality control (3, 5, 12).

We would like to thank the authors for submitting these papers, and for their patience.

We hope that you will enjoy reading the papers and contact the authors if you need further information. Best wishes!

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