The databank currently provides only information on retinol equivalents of foods, not on individual carotenoids. However, within the framework of the so-called total diet studies, analytical data of the content of carotenoids and β-carotene of about 200 food items (determined by calorimetry and HPLC, respectively) have recently become available. To assess the intake of β-carotene in the Netherlands, efforts have been made to collect information on the content of β-carotene in about 1100 products. For this purpose, data from the Dutch total diet study, as well as data from food composition tables, were used. Comparing several sources, substantial differences wee found for the same products. In conclusion, for a number of crucial food items in the Netherlands there is a need for more analytical data regarding carotenoids and β-carotene.

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Sources of variability in the intercomparison of food cartenoid content data. F. Granado, B. Olmedilla,* I. Blanco & E. Rojas-Hidalgo.

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As part of a European Union Project (AAIR), we have compiled data on carotenoid in vegetables and fruits (more than 80 items) reported/analyzed in four European countries (United Kingdom, Netherlands, Finland and Spain), in order to develop a Database to compute carotenoid intakes as well as a food frequency questionnaire to be applied on dietary assessment surveys and epidemiological studies.

From this evaluation, we have observed the lack of important information, in some cases very easy to provide, that can alter both the data quality in the Food Composition Tables and outcomes of studies using these data.

We will show examples of some major sources of variability regarding:

- those variables provided together with analytical data,
- those variables that, although known by the authors, have not been reported (i.e. ripeness degree, moisture).

Variability factors associated with sampling, sampling handling, analytical procedures, data reports, etc., have already been pointed out by other authors. In addition, there are still few carotenoid data on prepared vegetables as consumed, and cooking methods seem to be poorly described. Major sources of variability should always be reported which include scientific name, variety, moisture, ripeness degree, seasonality, edible part of the plant, edible portion, sample size for cooking and type, time and temperature of cooking.

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Study on the nutrient composition of hydroponic water dropwort (*Oenanthe stolonifera* DC). Y. J. Park & Y. O. Kim.

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Water dropwort (*Oenanthe stolonifera* DC) is used for various cooked vegetable dishes and Kimchi, a fermented vegetable preservation, in Korea and is therefore an important vegetable of the Korean diet. Interest in water dropwort grown in hydroponic condition has arisen because of the possible use as fresh material for salad and green leaves juices. This study was conducted to investigate the nutrient composition of hydroponic water dropwort and the effect of blanching condition on ascorbic acid content. Nutrient compositon of hydroponic water dropwort was measured in three portions of stems, petioles and leaves. Hydroponic water dropwort were obtained from the department of Horticultural Science, Seoul National University on the day of the experiments. The results were as follows. The nutrient contents of leaves were significantly higher in ash and ascorbic acid and lower in moisture, crude fat and crude fiber than those of stems and petioles. Especially, ascorbic acid content of leaves was 57 ± 0.05 mg/100 g. There was no significant difference in total vitamin A and thiamin contents among three portions. The results of nutrient composition analysis suggest that the leaves of hydroponic water dropwort are important in ascorbic acid and ash. It is recommended that shorter blanching time and addition of 0.5% NaCl to the blanching water are better for the higher ascorbic acid retention of hydroponic water dropwort. In conclusion, as hydroponic water dropwort has high content in vitamin, mineral and free sugar with its alkalinity, leaves as well as stems and petioles of fresh hydroponic water dropwort can be recommended for salad and fresh vegetable juices.

Nutrient composition and nutritional importance of wild gathered foods in an agricultural district in southern Mali. M. B. Nordeide,[a]* M. Følling,[b] E. Lied,[c] A. Hatløy[a] & A. Oshaug.[a]

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This project focuses on gathered foods in an area with surplus food production. Methods included nutrition survey with identification of wild foods plant and their nutrient analysis. Malian diets are based on staple foods (millet, sorghum, yellow mais, rice, wheat) and sauces with different ingredients according to seasons. Gathered foods such as leaves, seeds and fruits are used in sauces, fruits are also used in between meals and roots as staples. Baobab leaves (*Adansonia digitata*) were most frequently used. Samples of green leaves (*A. digitata*, *Amaranthus viridis*, *Tamarindus indica*, *Allium cepa*), seed and flour (*Parkia biglobosa*) and fruits (*Tamarindus indica*) were analyzed for water, energy, fat, protein, minerals, amino acids and carotenoids. Dried green leaves were high in protein and minerals (Ca, Fe, Zn). *A. viridis* was particularly rich in betacaroten (3300 μg/100 g). Fermented seeds from *Parkia biglobosa*, used as a condiment, had 37% protein and 35% fat. Wild foods are common ingredients of the local diet and provide important dietary micronutrients in this agricultural area. We have earlier found wild foods to be important in other parts of Mali (Nordeide *et al.*, 1994). In combination with locally produced staples, wild foods are nutritionally important in these communities in Mali.

M. B. Nordeide, H. Holm & A. Oshaug (1994). Nutrient composition and protein quality of wild gathered foods from Mali. *International Journal of Food Sciences and Nutrition*, **45**, 275–286.

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Nutritional features of selected fruits and vegetables in Italian consumption patterns: an assessment based on composition data. S. Ruggeri, P. Conforti, A. Turrini,* A. D'Amicis & E. Carnovale.

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Food composition and consumption data are both crucial for nutritional quality assessment of diet. This work is aimed at assessing the nutritional contribution of a group of selected fruits and vegetables in Italy, taking into account their effective consumption. Pooling data retrieved from different sources allowed us to work with 18 fruits and 21 vegetables, which include the most frequent in Italian diet. Four key components — sugars, dietary fibre, vitamins A and C, whose contents come from Italian composition tables — were chosen as nutritional quality markers for fruits and vegetables. Sugars, dietary fibre and vitamins intakes from each kind of fruit and vegetable have been calculated, in order to assess which are the most important sources. Results indicate apples as the first most important source of sugars (23%) and dietary fibre (18%) in Italian consumption of the above-selected fruits. Carrots and tomatoes are the most important sources of sugars among vegetables, while dietary fibre comes basically from artichokes. The highest contribution for vitamin C comes from oranges (22%), followed by peppers (13%). Vitamin A comes especially from carrots (almost 40%), from tomatoes (10%) and from oranges (8%). This classification could be compared with another one based on nutritional quality of the above-selected fruits and vegetables drawn, aside from Italian consumption, from simple composition data. This may provide indications for interventions in consumption patterns.

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Variability of minerals in foods from the U.S. total diet study. Jean A. T. Pennington.

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The nutrient levels of foods vary according to inherent (age, maturity, species, variety, cultivar, diet), environmental (climate, soil type, rainfall, season), and processing (storage time/temperature, methods of preservation/preparation) factors. The nutrient content of some processed foods is also affected by reformulations, use of food additives, and levels of nutrient fortification. In addition, the values reported by laboratory chemists and statisticians are affected by sampling design, sample preparation, analytical methods, and statistical treatment of the data (e.g. handling of outliers). Some nutrients are more variable than others, and some foods (e.g. liver, oysters) are more prone to nutrient variability.

Frequency distributions are provided for sodium, calcium, and iron in several foods from the U.S Total Diet Studies conducted yearly between 1982 and 1991. These studies included 37 individual analyses of 261 foods for 11 minerals. Median, mean ± SD, and CVs were calculated for the 11 minerals in each food. Foods considered to be 'sources' of the minerals were those that provided at least 10% of the Daily Value (recommended intake levels used for nutrition labeling) per typical serving of food.

Results indicated that of the 261 foods there were more foods (43–81) that were sources of iodine, phosphorus, sodium, selenium, and iron. There were fewer foods (28–40) that were sources of manganese, potassium, and zinc, and fewer (16–20) that were sources of calcium, magnesium, and copper. Phosphorus, potassium, and magnesium were the least variable minerals in these sources, with average CVs of 15–17%, followed by sodium, calcium, zinc, copper, iron, and manganese with average CVs of 21–28%. Selenium was more variable at 37%, and iodine was highly variable at 158%.

Database compilers should consider the variability of nutrients in foods before determining which values (e.g. means, medians, or modes) are the most representative for a database. Frequency distributions are useful in evaluating the variability of nutrients in foods and may assist database compilers in identifying outliers and deriving representative values. Values with high variability should be used with caution when assessing nutrient intakes or providing dietary guidance. Reliance on a food as a nutrient source could be misleading if the nutrient levels are highly variable.