Phytochemicals in the FAO/INFOODS Food Composition Database for Biodiversity

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Background

Phytochemicals are high in the agenda of research in nutrition, health and food science, also due to their claimed health benefits.

Materials and methods

FAO/INFOODS developed a Food Composition Database for Biodiversity with analytical data for different varieties, cultivars and breeds, as well as for underutilized and wild foods. The database was launched in 2010 and it is aimed to update the database annually. (Available http://www.fao.org/infoods/biodiversity/index_en.stm). A first update was conducted in 2011 (version1.1) and a next version is planned for April 2012.

Results

The 2011 version of the database contains more than 2400 food entries and 280 components. As shown in figure 1 the majority of the components compiled are for phytochemicals (including antioxidant capacity) (29%) followed by macronutrients (28%), minerals (18%), vitamins and pro-vitamins (14%), fatty acids (4%), amino acids (3%), heavy metals (1%) and other (2%). The food group with the highest percentage of phytochemicals are potatoes, followed by vegetables and fruits. As shown in figure 2, carotenoids (not vitamin A active) (48%) account for the highest contribution to the group phytochemicals, followed by organic acids (25%), antioxidant capacity (17%) and flavonoids (10%).

- **Carotenoids** include:
  Total cartenoids, lutein, zeaxanthin, violaxanthin, antheraxanthin, lycopene, cryptoxanthin, neoxanthin, and neurosporene

- **Organic acids** include:
  Phenolic acids total, caffeic acid, chlorogenic acid, vanillic acid, malic acid, p-coumaric acid, gallic acid, citric acid, cinnamic acid, salicylic acid, fumaric acid, ellagic acid, ferulic acid, phytic acid, syringic acid, galacturonic acid, tartaric acid and sinapic acid

- **Flavonoids** include:
  Flavonoids total, flavonols total, anthocyanidin total, catechin, epicatechin, quercetin, kaempferol, naringenin, anthocyanins total, procyanidins total, cyanidin-3-rhamnoside, cyanidin-3-rhamnoside, quercetin-3-rhamnoside and isorhamnetin

- **Antioxidant capacities** include:
  DPPH, ABTS and ORAC

For many phytochemicals standardized methods for analysis, units and data expression are lacking, which results in a challenge for data compilation and use. Components were found to be analysed with different analytical methods (e.g. HPLC, colorimetric method) or different extraction methods (e.g. methanol or acetone). Moreover, different units (e.g. DPPH or FRAP expressed per equivalent trolox or ascorbic acid; phenolic acids expressed in equivalent gallic acid or chlorogenic acid) were found to be used.

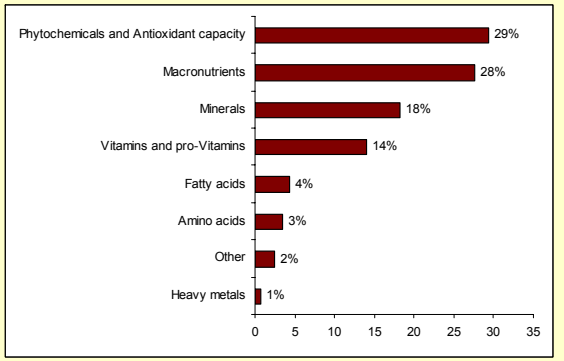

Figure 1: Overview of component groups reflected in the FAO/INFOODS Food Composition Database for Biodiversity

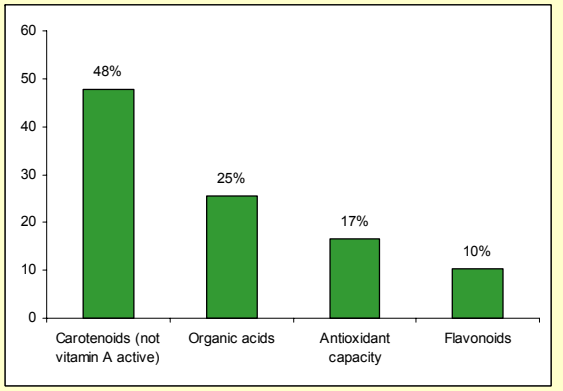

Figure 2: Proportion of components counting for phytochemicals (including antioxidant capacity)

Conclusion

Harmonization and standardization of data expression and method of analysis are needed. A working group between INFOODS and EuroFIR was formed that will establish a set of harmonized component identifiers and it is hoped that in future more of these new components of high interest can be reflected in food composition tables/databases.