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Food Composition Databases 2016 and 2030: Status quo and future needs

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Food composition databases (FCDBs) provide detailed information on the nutritional composition of foods, usually from a particular country. About 10 years ago food composition data were compiled, documented and presented in many different ways, e.g. on paper, in spreadsheets and in several data management systems. The resulting tables were incompatible without considerable adjustments and only few FCDBs were available online. In 2005 the European Food Information Resource Network (EuroFIR) was launched as a partnership of universities, research institutions and small-to-medium sized enterprises to build up a framework for the compilation, management and publication of validated food composition data. Main goals of this framework were harmonisation of food description and thesauri (e.g. components, analytical methods and units) as well as standardisation of data interchange and development of a standardised food composition database management system (FoodCASE). Hereby EuroFIR could build on achievements of former initiatives like INFOODS, COST Action 99 and the EPIC-Study.

Current work of standardisation and harmonisation of FCDBs focusses on the improvement of data quality. The core task is to generate validated and traceable nutrient data. Therefore, food and value documentation, and training of nutrient data compilers is promoted. Due to limited resources, there is an essential need to distributed networking, sharing of results and avoidance of redundant work.

The German Nutrient Database (Bundeslebensmittelschlüssel (BLS)) is part of the EuroFIR network. The present version 3.02 comprises 14,814 foods, including unprocessed and processed foods, all described by 131 nutrients. Nutrient data are derived from measured values or calculations considering changes during food preparation by means of weight yield and nutrient retention factors. To improve data quality, the EuroFIR quality index was adjusted for evaluating literature data and results from own analysis projects conducted at the MRI or by cooperation partners. In addition, the BLS calculation software is merging with FoodCASE.

In the future, the FCDB network will be expanded. Machine-to-machine interaction via web services and cloud computing will facilitate database linkage of many research areas. As a result, users will be able to gather data from databases on nutrient composition, food metabolomics, food consumption or agricultural statistics with only one query. Precise data matching is the basis for this upcoming development. This enables the database servers localised in distributed networks to interact autonomously and to select and combine the data for delivering the correct query output. Therefore, interdisciplinary standardised descriptions and machine readable thesauri will be mandatory.

Food metabolomics as a rapidly growing research field may profit from the experiences and developments of the FCDB network especially with regard to data standardisation, its use for data harmonisation, and establishing a distributed technical infrastructure for data interchange.