

SESSION 6.

Current Activities on Food Composition at National, Regional and International Levels

S6-S-1

European Food Information Resource NoE (EuroFIR): Results, Achievements and Future Plans

Paul Finglas¹, Anders Møller²

¹ *Institute of Food Research, Norwich, United Kingdom;*

² *Danish Food Information, Roskilde, Denmark on behalf of the EuroFIR Consortium (www.eurofir.net)*

Rationale and Objective: Food composition databases (FCDB) represent fundamental and essential information resources for food, nutrition sciences and public health. EuroFIR has reached its fifth year of a 6-year programme, and its objectives are:

- To strengthen the scientific and technological excellence in food databank systems and tools in Europe;
- To identify and provide new information on missing data for nutrients and bioactive compounds for all food groups, including traditional and ethnic foods;
- To train a new generation of European scientists in the development, management and application of food databank systems;
- To communicate with all user and stakeholder groups to develop food databank systems for the benefit of European food and nutrition research;
- To disseminate and exploit new scientific and technological knowledge to create a sustainable and durable collaborative framework for food composition activities in the future.

Results: The project operates on four interconnected platforms (Integration, Research, Spreading of Excellence and Management activities, sub-divided into small work packages, and working groups operating cross platforms. The EuroFIR Platform is based on a prototype databank system and distributed national databases in each country. This model preserves the national databases so that they can be maintained and developed locally in each country, and by the end of 2009, over twenty authoritative European food composition databases are forecast to be available on the internet (see <http://www.eurofir.org/eurofir/EuropeanDatabases>).

A key EuroFIR aim is the harmonisation and standardisation of work on food composition data in Europe requires that databases are established according to common principles, and that data in national online databases are presented, with their metadata, in a uniform way. To ensure these prerequisites, EuroFIR has drafted recommendations that form the basis of a European standard for food composition data, adopted within the European Committee for Standardisation (CEN) framework. The EuroFIR standard is described in the document EuroFIR standard description and the Technical Annex, available from <http://www.eurofir.org/eurofir/CENStandard.asp>. Food description forms an integrated part of the EuroFIR standard and the work on LanguaL (Langua aLimentaria: <http://www.langua.org>) as its primary tool in food description is presented

elsewhere. Most work within EuroFIR on food description has now been completed and a total of >27,000 foods from 25 EuroFIR countries have been LanguaL indexed.

Documentation of data, including quality assessment of values, is also a key deliverable of EuroFIR. A data quality assessment system for published nutrient values has been developed, based on the EuroFIR BASIS quality system. A quality framework for both laboratories producing data, and for compilers managing databases, has been developed, guided by two 'fit for purpose' approaches to ensure adherence of all compilers to quality standards, and to demonstrate transparency and traceability of data in European food composition databases (see separate presentations on the food databank system/eSearch prototype, LanguaL and quality testing).

EuroFIR has designed and implemented a process for the identification, prioritisation, collection and analysis of both traditional (TF) and ethnic foods (EF), using a common methodology for European countries. The TF work has documented the composition of traditional foods from different countries, in order to preserve these elements of European culture, and also to use the new data to enrich and improve dietary habits across the whole continent. Five traditional foods have been selected from each of 13 European countries and analysed for key nutrients by appropriately quality-verified laboratories in each country. There is currently a gap in the information available on the composition of ethnic foods, which prevents effective health and disease interventions and limits the provision of dietary advice. The ethnic foods work has provided new and reliable data on the nutritional composition of up to five commonly consumed ethnic foods or recipes from seven countries for inclusion in national food composition databases. Dishes have been analysed to specified quality standards.

EuroFIR-BASIS is a unique database that collates international research on the composition and biological effects of plant-based bioactive compounds into a single, comprehensive reference resource. It covers ca 10,000 compositional entries on plant foods, representing 108 of the prioritised plants; over 500 references have been included in the database giving biological effects data on 144 different compounds and 69 food plants. The EuroFIR-NETTOX list of ca 700 European food plants has been published including scientific and English names, details on plant parts and is now translated in 15 European languages, and two further lists have been compiled covering ca 700 exotic plants and 100 plants used for food supplements and herbal teas.

The database is internet-deployed to ensure widespread accessibility, and outputs are user-defined and easily downloaded. Potential uses include the substantiation of nutrition and health claims, calculations of exposure to bioactive (both EFSA) compounds and the development of new food products.

The training opportunities are designed to build capacity and spread excellence in the field of food composition. EuroFIR's training programme covers both individual exchanges, specifically designed to enable EuroFIR PhD students to visit other partners and attend conferences and specialised workshops (e.g. LanguaL for indexing foods, value documentation and quality systems) as well as more general training in food composition (the 'FoodComp' Courses and e-learning modules).

A major effort to date has been our achievement to launch the new legal entity EuroFIR AISBL (*"Association Internationale Sans But Lucratif"*), a non-profit association based in Belgium. Its main aim will be to provide continued support to the EuroFIR national compiler organizations, offering data access and services to users of food composition data in Europe and beyond.

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Keywords: Food composition; Databases; Food information; Food description; Food indexing; Quality standards; EuroFIR

Corresponding author: Dr. Paul Finglas / Email: PAUL.FINGLAS@BBSRC.AC.UK

Uncovering the Origins of Food Composition Tables

Paolo C. Colombani

Department of Agricultural and Food Sciences, ETH Zurich, Switzerland

Rationale: Josef König is often named as author of the first food composition table (FCT) (König, 1879). However, considering that modern chemistry as the science of separating mixtures was common for more than 200 years before König, one might expect earlier FCTs to exist. Discussion: In order to uncover the first FCT, one must first define it. Corresponding to what we are familiar with, FCTs should be systematically compiled tabular collections of compositional food information that are published in a book-like form rather than as a single article. This definition excludes from the candidate list Percy and Vauquelin's report containing one table listing only 12 foods (Percy and Vauquelin, 1818), which is sometimes referred to as the first FCT ever published. König's FCT, in contrast, perfectly fits the definition: It contains nearly 200 pages of tabular compositional information. Yet, König's FCT was not the first one. Moleschott also compiled nearly 200 pages of tabular food composition information (Moleschott, 1859) and Pereira's "A treatise on food and diet" contains numerous food composition tables interspersed with the main text (Pereira, 1843). As a peculiarity, Pereira's table represents a mix of results from ultimate food analysis, i.e., destructive distillation yielding elements such as carbon, hydrogen and oxygen, and proximate analysis using solvents leading to separation of components. A promising candidate for the first FCT, however, might be the "Chemische Tabelle der Pflanzenanalyse" by John. The 1814-published book on plant analysis contains 78 pages with 21 tables grouping plants according to their main component. Each table contains five columns (original plant name, systematic Latin name, compositional information, source, general remarks), and the compositional information consists mostly of quantitative or qualitative data from proximate analyses, with few data from ultimate analyses (John, 1814). Conclusion: Though older FCTs than John's 1814 FCT might still be uncovered, one cannot attribute to König's 1879 FCT the title "Oldest FCT" anymore.

John, J.F., 1814. Chemische Tabellen der Pflanzenanalyse oder Versuch eines systematischen Verzeichnisses der bis jetzt zerlegten Vegetabilien nach den vorwaltenden näheren Bestandtheilen geordnet und mit Anmerkungen versehen. Johann Leonhard Schrag, Nürnberg.

König, J., 1879. Chemie der menschlichen Nahrungs- und Genussmittel. Erster Theil. Chemische Zusammensetzung der menschlichen Nahrungs- und Genussmittel. Julius Springer, Berlin.

Moleschott, J., 1859. Physiologie der Nahrungsmittel. Ein Handbuch der Diätetik. Ferber'sche Universitätsbuchhandlung. Emil Roth, Giessen.

Percy and Vauquelin, 1818. Sur la qualité des aliments comparés entre eux. Bulletins de la Faculté de Médecine de Paris VI, 75-86.

Pereira, J., 1843. Treatise on food and diet: observations on the dietetical regimen suited for disordered states of the digestive organs. Longman, Brown, Green and Longmans, London.

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Key Words: History, Chemistry, Food composition table

Corresponding author: Dr. Paolo C. Colombani / Email: paolo-colombani@ethz.ch

Scientific and Funding Activities for Generating Food Composition Data for South Africa

Petro Wolmarans, Natasha Danster

Nutritional Intervention Research Unit of the South African Medical Research Council, South Africa

The compilation of food composition data for use by South Africans started in the early 1980s to provide researchers from the Nutritional Intervention Research Unit (NIRU) of the South African Medical Research Council (SAMRC) with a tool to analyse dietary intake data. The SAMRC has been mandated to compile food composition data for South Africa. Interest in the Food Composition Tables compiled by NIRU increased and these tables are now extensively used by the broader nutrition fraternity in the country. The South African Food Composition Database System (SAFOODS) is now the most comprehensive database in the country and probably also in the region. The purpose of this paper is to describe the historical background and current activities involved in compiling food composition data for SAFOODS. As funding is not readily available for the chemical analysis of food, the generation of information on the nutrient composition of foods commonly eaten in South Africa for inclusion in SAFOODS remains a challenge. In an effort to address this shortcoming, new strategies are being introduced to generate money and food composition data for SAFOODS. At the end of 2008, a SAFOODS Advisory Group (SAFDAG) was formed which included different nutrition interest groups in the country. The SAFDAG consists of seven working groups, i.e: finances; sampling procedures; data generation; laboratory activities; food composition compilation; product development; and education/users. In the first five groups, activities are aimed at generation of new food composition data. Aspects addressed with a survey amongst users are inter alia the satisfaction with the products produced from SAFOODS and special requirements regarding the database. The new website for SAFOODS will in future also give online access to food composition data and enable the users to receive updated information on food composition activities in South Africa. The generation of new information on the nutrient composition of food remains a challenge in South Africa, but new strategies introduced will help to increase information on country-specific data for SAFOODS.

Keywords: Compilation; South Africa; Food; Activities

Corresponding author: Dr. Petro Wolmarans / Email: petro.wolmarans@mrc.ac.za

Project for Developing a Food Composition Data Base for Argentina, Chile and Paraguay to Strengthen International Trade and Consumers' Protection

Norma Cristina Sammán¹, L. Masson², S. de Pablo², E. Ovelar³

¹ARGENFOODS, INSIBIO, Universidad Nacional de Tucumán, Tucumán, Argentina; ²CAPCHICAL CIDGRA, Facultad de Ciencias Químicas y Farmacéuticas and INTA, Universidad de Chile, Santiago, Chile; ³PARAGUAYFOODS INAN, Asunción, Paraguay

Activities related with National Food Composition Tables in Argentine and Chile has been traditionally assumed by National Universities. It was considered by food researchers together with Government Agencies related with Health and Agriculture, as a first priority, to present a Project to FAO to achieve the institutionalization and governmental recognition of the activity. The support given by LATINFOODS was an important tool in the Project proposal.

FAO approved the Project TCP/RLA/3107 (D) presented by the three Governments with the main objective to develop Food Composition Data Base for each country to strengthen the international trade and consumers' protection and to contribute with these new data to LATINFOODS's Data Base.

Results: i) Leaders' training of every country across regional and national workshops with participation of international experts in methodology for sampling plans, compilation and managing database; ii) A Food Sampling Manual was developed; normalized Compilation Form approved and implementation of the software for a Database of hierarchic structure with a principal node and secondary interconnected nodes has been structured by Argentine experts, which could be adopted by the other countries and LATINFOODS net iii) Sampling plans for 30 key foods were developed and composition data of 250 foods were compiled in each country; iv) Analytical Efficiency Assay was performed under the direction of the Swedish Food Agency among 21 laboratories; v) Strengthening of the three national chapters; vii) Transfer the results to all the LATINFOODS Net is other goal expected to be achieved.

This project constitutes an important step for the food composition institutionalization activities in Argentine, Chile and Paraguay, through a permanent Government program which permits to establish and to maintain actualized in the time the national Data Base, contributing to strengthen the international trade and consumers protection of their population.

Our gratefulness to FAO and its Representatives by the support given to this project, which has permitted a fluent develop of all the activities planned. Our recognition to the Secretariat of Agriculture, Ranching, Fishing and Food of Argentina, to the Health Minister of Chile and Paraguay for their high compromise with this Project and the active participation of their Representatives during its execution.

Keywords: Database; Food composition; Sampling plan; Compilation; FAO project

Corresponding author: Dr. Norma Cristina Sammán / Email: nsamman@arnet.com.ar

BRASILFOODS: Food Composition Activities (2006-2009)

Elizabete W. Menezes¹, Eliana B. Giuntini², Milana C.T. Dan², Nelaine C. Santos², Franco M. Lajolo¹

¹Depto. Alimentos Nutricao Experimental, FCF, USP. Av Prof Lineu Prestes, 580. Sao Paulo, SP, Brazil. Coordinator of TBCA-USP and BRASILFOODS; ²Depto. Alimentos Nutricao Experimental, FCF, USP

The Brazilian Network of Food Data Systems (BRASILFOODS) has been keeping the Brazilian Food Composition Database - USP (TBCA-USP) (<http://www.fcf.usp.br/tabela>) since 1998. Besides the database constant compilation and update work, the network tries to innovate through the introduction of food information that is related to the decrease in the risk for nontransmissible chronic diseases, such as the profile of carbohydrates and flavonoids in foods. Around 764 data about compounds in the different flavonoid subclasses, present in 192 Brazilian foods, were compiled. The quality of this information was evaluated according to the USDA's data quality evaluation system. The value of each component and its confidence code (A, B, C or D) will be introduced in the TBCA-USP. This year, BRASILFOODS disseminated to Latin America the Form and Manual for Data Compilation, version 2009. In 2008, TBCA-USP included data on carbohydrates, individually analyzed, present in 112 foods and also 41 data related to the glycemic response produced by foods widely consumed in the country. In this same period, the vice president of BRASILFOODS administered a Food Composition Data Compilation Course in the context of the regional project of FAO: TCP/RAL/3107 (D). Together with the activities related to data production and compilation, BRASILFOODS organized in 2007, with FAO, LATINFOODS and USP, the 7th International Food Data Conference "Food Composition and Biodiversity". Approximately 110 researchers (65 international and 44 Brazilian) from 40 countries attended the 7IFDC. Part of the program had biodiversity as the main subject, and the contribution of the wild, uncommon and underutilized species foods to the nutrition field and food security. This conference was a unique opportunity for interaction between renowned researchers and participants from several countries and it allowed the discussion of aspects that may improve the food composition area.

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Keywords: Food data compilation; TBCA-USP; Carbohydrates; Flavonoids; 7IFDC

Corresponding author: Assoc. Prof. Elizabete Wenzel Menezes / Email: wenzelde@usp.br

Evaluation of Important Nutrients and Phytocompounds in Indigenous Vegetables from Tropical Asia and Africa

Ray-Yu Yang¹, Jane Wan-jen Wu¹, Doreen Ying-chuang Chen¹,
Ruby Yun-yin Hsiao¹, Mandy Lin¹, Mel Oluoch², George Kuo³, Liwayway Engle³

¹AVRDC-The World Vegetable Center; ²AVRDC-Regional Center for Africa; ³AVRDC-The World Vegetable Center (Retired)

Rationale: In tropical Africa and Asia indigenous vegetables provide beneficial nutrients and phytochemicals to diets. However, many edible plants remain underutilized and information about their nutrient values, phytocompounds, antinutrient factors, and potential health hazards is limited.

Objectives: To evaluate nutritional and functional properties of tropical African and Asian indigenous vegetables, and to develop a web-based database for public access.

Methods: Vegetable seeds were collected from 2000-2006 through international collaborative projects. Seeds were sown and transplanted in appropriate seasons at AVRDC - The World Vegetable Center. Edible parts were harvested at mature stages. Important nutritional traits were evaluated by Official Methods of Analysis of the Association of Official Analytical Chemists, high performance liquid chromatography, or widely used published methods. Functional traits were investigated, including antioxidant activities, flavonoid contents, and antibacterial activity against food-borne pathogens. Dragendorff's test was used to screen for the presence of free and salt forms of alkaloids. A web-based database was constructed using the MySQL program. **Results:** In total, 340 samples representing 143 species were evaluated. Compared with vegetable species included in the United States Department of Agriculture nutrient database, only 26 species in both databases overlapped. Wide variation exists among the tested plants for most traits. Vegetable group means based on 100 g fresh weight and maximum content values, respectively, are dry matter (12.3, 36.5 g), protein (3.3, 10.8 g), lutein (4.8, 23.9 mg), β -carotene (2.9, 21.9 mg), ascorbate (79, 528 mg), tocopherols (2.9, 71.3 mg), folate (67, 349 g), calcium (158, 1435 mg), iron (2.1, 25.7 mg), zinc (0.7, 5.3 mg), total phenol (0.53, 12.0 g), and oxalate (132, 1277 mg). Antioxidant activities and flavonoid contents were published elsewhere. **Conclusions:** Nutritional assessment provides information fundamental to the selection and promotion of underutilized indigenous vegetables. Greater use and consumption of nutrient-rich and safe indigenous vegetables can be promoted in tropical Africa and Asia; however, consumption precautions should be made clear for vegetables containing significant amounts of oxalates and alkaloids.

Keywords: Nutrition; Antioxidant vitamins; Antinutrient; Local vegetables; Germplasm

Corresponding author: Dr. Ray-Yu Yang / Email: ray-yu.yang@worldveg.org