EuroFIR

European Food Information Resource

3rd International EuroFIR Congress

European Food Composition Data for Better Diet, Nutrition and Food Quality

8th - 10th September 2009
University of Vienna, Austria




Food Quality and Safety Programme
FOOD-CT-2005-513944

European Food Composition Data for Better Diet, Nutrition and Food Quality

Congress Organisation

The 3rd International EuroFIR Congress is organised by the British Nutrition Foundation (London, UK), the Institute of Food Research (Norwich, UK) and the Institute of Nutritional Sciences, University of Vienna (Vienna, Austria), on behalf of the EuroFIR consortium.

For further information please email ifr.eurofir@bbsrc.ac.uk

Supporter

European Food Composition Data for Better Diet, Nutrition and Food Quality

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Topics

- Using food composition data to address current public health and nutrition issues
- Major public health/nutrition education tools and software that utilize food composition data and databases
- New food composition data/databases - the need for quality standards
- New or novel methods of analyses for nutrients and non-nutrient bioactive compounds in foods and supplements
- New data on traditional and ethnic foods in Europe
- Delivering food composition data via emerging interfaces for dietary assessment and health applications.

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9.35-10.05	Prof Ibrahim Elmadfa *University of Vienna, Austria*	Importance of food composition data to nutrition and public health
10.05-10.35	Paul Finglas *Institute of Food Research, UK*	EuroFIR – results, achievements and future plans
10.35-11.05	**COFFEE & POSTER VIEWING**	
11.05-11.35	Prof Judith Buttriss *British Nutrition Foundation, UK*	Nutrition and health claims
11.35-12.05	Dr Stefan Fabiansson *European Food Safety Authority, Italy*	EFSA's work on nutrient profiling: Tapping into the resource
12.05-12.20	Dr George Chryssoichodis *Agricultural University of Athens, Greece*	Food labelling to advance better education for life
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15.20-15.45	Viktoria Scherrer *dato Denkwerkzeuge, Austria*	Use and generation of food composition data in nutritional software
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16.00-16.15	Prof Gregorio Varela-Moreiras *San Pablo CEU University/Spanish Nutrition Foundation, Spain*	Evaluation of food consumption and dietary patterns in Spain according to the Spanish Food Consumption Survey: updated information
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EVENING EVENT	**Congress Dinner at Mayer am Pfarrplatz Heuriger ***	http://www.pfarrplatz.at/start.htm

** Please note the Congress dinner is only open to delegates with a ticket for this event [i.e. EuroFIR partners (consortium members) and invited speakers, and to external delegates (paying delegates) who have paid in advance for a ticket (£50 pounds sterling)].*

Wednesday 9th September 2009

Session 3

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Chairs: Joanne Holden (USDA) and Dr Maria Antonia Calhau (INSA)

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9.35-10.05	Anders Møller *Danish Food Information, Denmark*	The EuroFIR Food Composition Databank Platform
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Chairs: Dr Helena Costa (INSA) and Dr Barbara Burlingame (FAO)

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16.50-17.10	Discussion	
EVENING EVENT	**Drinks and finger food reception at the Vienna City Hall**	http://www.wien.gv.at/english/cityhall/

Thursday 10th September 2009

Session 5

New data on bioactive constituents and other food componenets

Chairs: Dr Mairead Kiely (UCC) and Assoc Prof Peter Hollman (WU)

8.45- 9.05	Dr Roland Poms *International Association for Cereal Science and Technology, Austria*	MoniQA Network of Excellence and its efforts to promote applicability and reliability of rapid methods in support of food safety and quality
9.05-9.25	Dr Paul Kroon *Institute of Food Research, UK*	Using EuroFIR BASIS Online bioactive database – a case study on phytosterols
9.25-9.45	Dr Mairead Kiely *University College Cork, Ireland*	EuroFIR BASIS Online Bioactives Database: Potential application for health claims evaluations
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10.20-10.35	Catalina Vasco *Food Science, SLU, Sweden*	Andean blackberry, strawberry and mortiño as sources of antioxidants
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Delivering food composition data via emerging interfaces for dietary assessment purposes

Chairs: Dr Paolo Colombani (ETHZ) and TBC

11.00-11.25	Priv.-Doz. Dr. med. habil. Ralf Schiel *MEDIGREIF-Inselklinik Heringsdorf GmbH, Germany*	Electronic health technology for the assessment of physical activity and eating habits in children and adolescents with overweight and obesity
11.25-11.45	Dr Angela Paleologou *University of Ioannina, Greece*	The Vitalog innovative approach to a healthy nutrition and enhanced lifestyle
11.45-12.15	Assoc Prof Barbara Koroušić Seljak *Jožef Stefan Institute, Slovenia*	Web-based eHealth applications with reference to food composition data
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Training, education and capacity building

Chairs: Assoc Prof Cornelia Witthöft(SLU) and Prof Maria Glibetic (IMR)

14.00-14.10	Poster Prize	
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14.30-14.50	Mirjana Gurinovic *Institute for Medical Research, Belgrade, Serbia*	Capacity building in food composition data base in Central and Eastern European, Middle Eastern and North African countries: Successful collaboration between EuroFIR and other networks
14.50-15.15	Assoc Prof Peter Hollman *Wageningen University, The Netherlands*	EuroFIR's Digital Learning Material (E-learning) for education in the application of food composition data
15.15-15.30	Paul Finglas *Institute of Food Research, UK*	The way ahead through the EuroFIR AISBL
15.30-15.45	**Concluding remarks/close**	

WORKSHOPS

16.00-17.30	EuroFIR E-learning Demo	Contact ifr.eurofir@bbsrc.ac.uk to register for this workshop. Contact Peter.Hollman@wur.nl for information about the workshop
16.00-18.00	FoodCASE Workshop – Feedback Discussion and Data Quality Research	Contact karl.presser@inf.ethz.ch to register for this workshop and for information about the workshop
16.00-18.00	Nordic Food Compiler Group Meeting	Contact heli.reinivuo@thl.fi to register for this workshop and for information about the workshop

Friday 11th September 2009

WORKSHOPS

09.00-14.00	WP 1.8 TG1.3 Web Service Workshop	Contact ifr.eurofir@bbsrc.ac.uk to register for this workshop. Contact heikki.pakkala@thl.fi for information about the workshop

Speaker Abstracts and Biographies

Session 1 - Using food composition data to address current public health and nutrition issues

Chairs: Paul Finglas (IFR) and Prof Ibrahim Elmadfa (UVI)

• Prof Ibrahim Elmadfa *University of Vienna, Austria*	Importance of food composition data to nutrition and public health
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• Prof Judith Buttriss *British Nutrition Foundation, UK*	Nutrition and health claims
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• Raffaella Goglia *French National Institute for Agronomic Research (INRA), France*	The French observatory of food quality

INVITED PRESENTATION

Importance of food composition data to nutrition and public health

Prof. Ibrahim Elmadfa

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Biography

Prof. Ibrahim Elmadfa is Director and Professor of the Department of Nutritional Sciences at the University of Vienna, Austria. He trained in Nutritional Sciences in Giessen, Germany in 1968 and in Food Science in Assiut, Egypt in 1966, completing a PhD in Human Nutrition in 1970. He was Full Professor between 1980-1990 in Giessen and has been Professor at the Department of Nutritional Sciences, University of Vienna, since 1990.

Prof. Elmadfa is President of the Austrian Nutrition Society, former President of the European Academy of Nutritional Sciences (EANS), Vice-President of the World Public Health Nutrition Association (WPHNA) and President-Elect of the IUNS. He is author/co-author of several books in human nutrition, food science and health monitoring (the “Austrian Nutrition Report" 1998, 2003 and 2008; the European Nutrition and Health Report 2004) and more than 300 publications in international scientific journals and many submissions to scientific conferences. He is editor of Annals of Nutrition and Metabolism and the book series “Forum of Nutrition” (formerly Bibl. Nutritio et Dieta). His fields of expertise / main research subjects are: nutrient requirements in health and disease (Nutrient based dietary guidelines for Central European countries); Monitoring of nutrition and health status; Bioavailability of Nutrients; Nutrition and immune function; Food safety and quality; Nutrition information and communication and Cooperation with various academic institutions worldwide. Prof. Elmadfa has been Scientific Advisor to the Codex Alimentarius Austriacus Commission since 1994, advisor to the European Commission as member of the Scientific Committee on Food (vice president) from 1995-2000 and sits on a number of working groups on nutrition and dietetic foods (chair until December 2000), novel foods, upper safe limits and flavourings.

Abstract

Introduction: Adequate nutrition is one of the pillars of public health. Before developing and implementing effective intervention programmes to improve nutrition at population level, it is important to know the nutritional situation of the target group.

Assessment of energy and nutrient intake: The estimation of nutrient intake from food consumption requires reliable data on food composition. Food composition data are also the foundations of food-based dietary guidelines for a healthy nutrition, providing the necessary information on food sources of the different nutrients. Furthermore, food composition tables can provide information on chemical forms of the nutrients and the presence and amounts of interacting components, and thus give information on bioavailability. For some nutrients, such as

vitamin A, vitamin E and niacin, the concept of equivalents has been introduced to account for differences in availability and biological activity of different chemical forms.

Non-nutritive food components: While most food composition tables focus on energy, macro- and micronutrients, interest in non-nutritive components is increasing. Considering the beneficial effects of secondary plant cell compounds such as polyphenols and carotenoids, more data on these are needed. On the other hand, there are a number of naturally occurring or “man-made” non-nutritive substances with negative effects, and to control exposure, the main dietary sources must be known.
Another aspect is contaminants, which could have detrimental effects on consumers’ health. Among these are agrochemicals, industrial pollutants reaching the food chain and substances formed during food preparation. A valid risk assessment requires data on exposure, and thus on the content of contaminants in foods. However, these data are highly variable and may significantly differ even within narrowly confined regions.

Current food composition databases are far from complete: The fact that composition tables generally do not provide information about the origin of substances found in food can also influence their usability. For example, the German Nutrient Database does not discriminate between naturally occurring and added sucrose, impeding the estimation of added sucrose intake that should be limited.

Points of focus: Considering the increasing number of people relying on community nutrition and catering, healthy menu lines can improve the consumers’ diet and contribute to nutrient supply. The development and implementation of appropriate guidelines for recipe and meal development also requires food composition databases.
The ever-increasing number of new food preparations and industrial products requires food composition databases to be steadily updated. Moreover, there is a lack of data particularly for essential trace elements like copper, chromium or molybdenum and also vitamin K, as well as the already mentioned non-nutritive components.
Limited comparability between countries is another issue. Regional differences arise, especially from the use of local varieties, soil quality or meteorological aspects. This variability is further increased with composite meals, due to the variation of recipes.

Conclusions: Information about food composition is necessary for the assessment of dietary quality and the development and application of food based dietary guidelines, providing a useful tool for the field of public health nutrition. In this regard, more attention should be paid to the preparation, extension and maintenance of food composition databases.

INVITED PRESENTATION

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

[1]Paul Finglas and [2]Anders Møller

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Biography

Paul Finglas joined the Institute of Food Research in 1981 and is currently Head of the Food Databanks Exploitation Platform at the Institute (http://www.ifr.ac.uk/science/platform/FD/default.html). He has, for most of his science career, been involved in a wide range of research in food composition and analysis, and the nutritional effects of micronutrients, especially B-vitamins and folates, in health and disease. Paul has considerable experience of co-coordinating both national and international projects and is the co-coordinator for the EuroFIR NoE. He has been involved in producing and evaluating data for the 4th and 5th Editions of the UK food tables and was the co-compiler for the current 6th Edition of McCance & Widdowson's Composition of Foods in the UK. Paul has a broad range of experience in science publishing and is currently Editor of the journals Food Chemistry, and Trends in Food Science and Technology. Paul has a degree in Chemistry from Aston University in Birmingham and has published over 100 publications on a wide range of topics in food science and nutrition.

Abstract

Background and Aims: 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.

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.

Results: 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. This process 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.langual.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 on TF 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 and details on plant parts. The list has now been 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 compounds (both EFSA) and the development of new food products. EFSA has recently funded the integration of the EuroFIR-BASIS and NETTOX-BASIS databases into a single bioactives platform (eBASIS) in order to utilise it for their current applications.

EuroFIR's 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 Lucrative"*), 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.

Conclusions: EuroFIR has made significant progress in establishing a sustainable food databank platform in Europe covering nearly all Member States. Its activities and impact has initiated several additional national funding supports for FCDB compiler organizations in Europe. The development of a well-defined quality system and the Technical Standard forms the basis of the new draft European CEN Standard on Food Composition Data, which should give both compilers and users more confidence in generating and using the data. Several activities should continue under the EuroFIR AISBL, including continued availability of national datasets, technical support, training and new income streams.

Funding: *This work was performed on behalf of the EuroFIR Consortium, funded under the European Union's FP6 'Food Quality and Safety Programme': FOOD-CT-2005-513944.*

Key Words: Food composition, databases, food description, food indexing, quality standards, EuroFIR.

INVITED PRESENTATION

Nutrition and health claims – the role of food composition data

Prof. Judith Buttriss

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Biography

Professor Judith Buttriss took over the role of Director General of the British Nutrition Foundation (BNF) on 1st October 2007, having been BNF's Science Director for almost 10 years. She is an Honorary Professor at Robert Gordon University, a Visiting Professor at Kings College London and a Registered Public Health Nutritionist. She has been a member of a number of national committees concerned with funding research, and with public health and nutrition issues. Recent examples are the Public Health Commission and the UK Government Office of Science's committee that reviewed the Food Standard Agency's use and commissioning of science. She has contributed extensively to UK government activities in the area of diet and nutrition, including work on nutrient profiling and on signposting for the Food Standards Agency, on obesity in children for the Department of Health, on school meals, and on the Family Food Survey for Defra. She was also a member of the UK's former Joint Health Claims Initiative Expert Committee since its inception. Prof. Buttriss has a wide range of research interests in the area of nutrition and its communication and is currently Workpackage Leader of EuroFIR's *Dissemination and Communications* Workpackage.

Abstract

Regulation on nutrition and health claims number *1924/EC/2006* came into force in the EU (European Union) in 2007. Before this regulation, there was no legal control of nutrition or health claims in the EU and, although a number of countries, including the Netherlands, Sweden and the UK, had voluntary schemes in place, there was concern that the way claims were being made on food in Europe was becoming increasingly fragmented and uncontrolled. The regulation on nutrition and health claims aims to ensure that claims are truthful and do not mislead consumers. It also aims to stimulate innovation to produce healthier food products in the food industry.

Nutrition claims are defined in an annex to the regulation which states the wording of permitted claims and the conditions of use, e.g. the minimum amount of a nutrient that must be present. Potential health claims are being assessed by the European Food Safety Authority (EFSA) and a list of approved health claims is due to be published in 2010. These are divided into a number of categories; Article 13 claims based on generally accepted scientific evidence, Article 13 claims based on emerging evidence and Article 14 claims based on disease risk reduction or child health and development.

Food composition data are vital to making accurate claims on food as, in order to ensure the food or drink fulfils the claims made, the amount of the nutrient or food component in question

must be defined. It is also important that the composition of a particular food or food category has been sufficiently defined in order for a health claim pertaining to this to be approved. In addition, to prevent foods with a less healthy profile making claims, nutrient profiles are being developed which will specify threshold amounts of saturated fat, sodium and sugar present in any product bearing a nutrition or health claim, and thus the composition of a food will be critical in determining whether it is eligible to carry a claim. Therefore the access that EuroFIR will provide to pan-European food composition data will be of great importance in making the regulation workable.

EuroFIR has been actively involved in EFSA's work on nutrient profiles, supplying data which have been used to develop the current profiling model. It is hoped that EuroFIR and the not-for-profit organisation EuroFIR AISBL can continue to provide guidance to stakeholders as the regulation develops.

Acknowledgement: *This work was completed on behalf of the EuroFIR consortium and funded under the EU 6th Framework Food Quality and Safety Programme (FOOD-CT-2005-513944).*

INVITED PRESENTION

EFSA's work on nutrient profiling: Tapping into the resource

Dr. Stefan Fabiansson

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Biography

Dr. Stefan Fabiansson is a registered veterinarian by profession specialising in food safety. He has a PhD in muscle biochemistry and was appointed full professor in food hygiene at the Swedish University of Agricultural Sciences between 1987 and 1990. He has been working in meat and food safety sciences in Sweden, Australia and now Italy. He is currently Head of DATEX, the Data Collection and Exposure Unit at EFSA. DATEX is responsible for collecting and analysing food consumption, food composition and chemical occurrence data. It contributes the exposure component of food safety risk assessments of contaminants in food and feed.

Abstract

Background: Regulation (EC) 1924/2006 on nutrition and health claims made on food requires the setting of nutrient profiles as one eligibility condition. To evaluate the impact of the range and level of nutrients to be proposed, the European Commission requested that EFSA develop a food composition database. Since no complete database was easily accessible, information was assembled from national and commercial sources. The harmonisation effort of EuroFIR was a necessary prerequisite for the creation of a uniform database.
The final EFSA 'Food Basket' contains results from official national analyses in nine countries, and commercial information submitted through CIAA (Confederation of the Food and Drink Industries of the EU). All sources are acknowledged in any use of the database. The total number of food products in the EFSA Food basket is 19,208, and data for up to 36 macro- and micro-nutrients are included. In the following, two examples of the food basket's use are described:

Case Study 1: During 2008, foods in the EFSA Food Basket were tested for their eligibility to use claims by developing an algorithm based on inputs from three stakeholder groups. DG Health and Consumers, consumer groups and food business operators proposed threshold values for saturated fats, sugars, and sodium, for the nutrient profiling system. By comparing these threshold values with the nutrient values of foods they were identified as:

- Eligible to bear health and nutrition claims (comply fully with nutrient profile);
- Eligible to bear nutrition claims according to derogation (comply with the nutrient profile except for one nutrient, article 4(2)(b) in the Regulation);
- Ineligible to bear a nutrition or health claim (do not comply with nutrient profile).

A report was produced for the European Commission and used in the further negotiations with Member States, although a more pragmatic approach seems to prevail for a final decision.

Case Study 2: In 2007, a fast-track procedure was developed for EFSA to address requests for urgent assistance. This new procedure has been used for the following cases: dioxin in Irish pork; melamine in composite foods; 4-methylbenzophenone (4-MBP) in breakfast cereals; mineral oils in sunflower oil and nicotine in mushrooms. These cases all involved a significant amount of food product on the EU market, and EFSA statements were requested to assist the European Commission and Member States with their risk management measures.

On 8 December 2008, the Commission's DG Health and Consumers asked EFSA to provide scientific assistance on the risks for human health related to the possible presence of dioxins in pig meat and pig meat products from Ireland and the presence of possibly contaminated processed pig meat products from Ireland in composite foods. Risk assessments require both expertise and relevant data. Specific data relating to the food hazard is required, for example, the concentrations and frequency of the contamination, and the toxicology of the identified hazard. However, more generic data sources, such as food consumption and food composition data, are also important. In this case, food consumption data for pork and pork products and composition data relating to the proportion of fat in pork and pork products was needed. Through the EFSA Food Basket it was possible to quickly determine a range of products that would not pose a health risk and could remain on the market.

Conclusion: Although it is impossible to fully represent the market for food products across all EU Member States in any given sampling, it can be concluded that the current food composition database is as good a tool as can be expected given the dynamic market situation.

SHORT COMMUNICATION **1_36**

Food Labelling to Advance Better Education for Life

G. Chryssochoidis[1] on behalf of FLABEL partners[1]

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Background/aims: Reviews of consumer research on nutrition labelling have identified a gap for scientific evidence on whether nutrition information on food labels is exerting an effect on healthy food choices among consumers, how strong this effect is, under which circumstances it occurs, what factors are responsible for it occurring, and whether the effect differs between consumer groups.

Methods: We want to achieve this aim by determining how nutrition information on food labels can affect dietary choices, consumer habits and food-related health issues, developing and applying an interpretation framework incorporating both the label and other factors/influences.

Results: The expected results will be: 1) the provision of the first EU-wide benchmark study on incidence and penetration of nutrition information on food labels, leading to insights into what extent nutrition labelling is actually available in different parts of the EU; 2) the generation of knowledge on the determinants of consumer attention and reading, liking and understanding of different types of nutrition labels, explicitly dealing with the potential trade-offs between simplicity, completeness and coerciveness of nutrition information on food labels; 3) the generation of European large-scale knowledge of actual nutrition label use in a real world context, drawing on both store observations and retail scanner data, leading to solid insights into the extent and ways in which nutrition labels have behavioural consequences and affect consumption patterns; 4) the provision of research evidence on how consumers form opinions about the healthiness of products, and how the nutrition label information interacts with other information in this process, including media, advertising and school education; 5) knowledge on the role of nutrition information on food labels in food decision-making in families with children, thus providing evidence on how nutrition labels can be used to positively influence children's dietary intake; 6) a research-based best practice proposal for nutrition labelling, and test it in a real-world store environment; 7) the provision of a set of best practice methods for assessing the effect of nutrition labelling that can be used in the evaluation of labelling policies.

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SHORT COMMUNICATION **1_14**

The French observatory of food quality

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Background/aims: The French Observatory of Food Quality (Oqali) was set up in 2008 by the Ministries in charge of Agriculture, Health and Consumer Affairs. The implementation is entrusted to INRA and Afssa. The primary goal of Oqali is to monitor global changes in food supply by measuring the evolution of the nutritional quality of processed and packaged foodstuffs in the French market. This monitoring also includes economic parameters (such as market shares and prices) in order to guarantee the maximum coverage of the market and to assure that the changes in nutritional content benefit all consumers. An additional aim of Oqali is to provide tools to assess the efforts made by the food chain to improve nutritional quality.
The Observatory collaborates with manufacturers and retailers in the food chain. This partnership facilitates the collection of information and is important for the validation of the scientific methods used to analyse the data.

Methods: The Observatory records the available nutritional and socio-economic data on processed foodstuffs in a database, which is designed to monitor any changes on products. Each product is described by: nutrient content (e.g. sugars, saturated fatty acids, fibre or sodium), listed ingredients, nutrition and health claims, advices to eat the product as part of a balanced diet, market shares, prices etc. To collect nutritional data, Oqali uses information provided by manufacturers and retailers, information available to consumers (on the packaging) and nutrient analyses when information is missing. Socio-economic parameters are obtained from survey and panel data on French food consumption and food purchases.

Results: Different categories of food products (breakfast cereals, sweet biscuits and fresh dairy products) have already been studied in 2008. For each category and type of brand (national brands, retailer brands, best-value items, and hard discount brands), Oqali has analyzed all the collected information to describe products characteristics. The anonymity of collected data is always preserved. This approach is continuously expanded to include additional product groups: e.g. in 2009 pre-packed meat products, stewed and canned fruits will be also studied.

Conclusions: Oqali publishes an annual report, presenting the main results obtained by the data processing. This report is available online: www.oqali.fr. The monitoring of the nutritional quality of foodstuffs is also aimed to provide tools to meet public health challenges and consumer expectations on nutritional information.

Funding acknowledgement: The French Observatory of Food Quality (Oqali) was set up in 2008 by the Ministries in charge of Agriculture, Health and Consumer Affairs. It was created as part of the French National Nutrition and Health Programme 2006-2010 (PNNS 2), a nutrition-

based programme aimed at improving public health. Oqali is financed and supervised by the 3 ministries.

Session 2 - Major public health/nutrition education tools and software that utilize food composition databases

Chairs: Prof Judy Buttriss (BNF) and Dr Santosh Khokhar (UL)

• Dr Carolin Krems *Max Rubner-Institut, Germany*	Energy and nutrient intake of the German population using the German Nutrient Database
• Dr Christophe Matthys *International Life Sciences Institute, Belgium*	The Eurreca toolkit for aligning micronutrient recommendations
• Viktoria Scherrer *dato Denkwerkzeuge, Austria*	Use and generation of food composition data in nutritional software
• Emily Fitt *MRC Human Nutrition Research, UK*	Disaggregating composite food codes in the UK National Diet and Nutrition Survey food composition databank
• Prof Gregorio Varela-Moreiras *San Pablo CEU University/Spanish Nutrition Foundation, Spain*	Evaluation of food consumption and dietary patterns in Spain according to the Spanish Food Consumption Survey: updated information

INVITED PRESENTATION

Energy and nutrient intake of the German population using the German Nutrient Database – results of the second German National Nutrition Survey

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Biography

Dr. Carolin Krems, a nutrition scientist, is research fellow at the Max Rubner-Institute, Federal Research Institute of Nutrition and Food in Karlsruhe, Germany. She has been involved, as senior researcher, in a European project investigating the nutritional behaviour of elderly people and in the second German National Nutrition Survey. Since March 2007, Dr. Krems has been leader of National Nutrition Monitoring Project in Germany. In addition she is currently work package leader of the EU-funded "European Nutrition and Health Report (ENHR) 2009" project. Her main research areas are nutritional behaviour, nutrition and health status, and nutrition assessment methods.

Abstract

Background/Aims: The aim of the second German National Nutrition Survey (NVS II) was to provide up-to-date information on food consumption, energy and nutrient intakes, as well as the nutritional behaviour of the German population. This cross-sectional study was conducted between November 2005 and January 2007.

Methods: In order to obtain a comprehensive description of food consumption, three nutrition assessment methods were applied (dietary history interviews, 24-h-recalls and weighed dietary records). Energy and nutrient intake was analysed using the German Nutrient Database (BLS, the national food composition database of Germany). Food composition data for food items especially needed for the analysis of the NVS II were reviewed and updated, or newly incorporated in the BLS. For example, fortified and energy reduced food items were incorporated, recipes were reviewed for fat and salt content, and names were adapted. The following results are in reference to 15,371 participants between 14 and 80 years of age who were asked about their usual food consumption during the 4 weeks prior to the interview by using dietary history interviews.

Results: The median energy intake is 1833 kcal/day for women and 2413 kcal/day for men. This corresponds to the recommended value for energy intake, valid for a low level of physical activity in the German, Austrian and Swiss (D-A-CH) reference values for nutrient intake. 52 % of women and 57 % of men exceeded these values. The percentage of energy intake from carbohydrates is below the recommended value of >50 % for both sexes (women 49 % and men 45 %). Percentage of energy intake from fat is still too high (women 35 % and men 36 %). The

median intake of dietary fibre is 23 g/day for women and 25 g/day for men and therefore below the recommended value for dietary fibre of at least 30 g/day.

In general, the intake of most of the vitamins and minerals is equal or above the reference values, apart from folate and vitamin D, which are critical nutrients in all age groups, and calcium and iron, which are critical in some age groups. The median intakes of folate and vitamin D are below the reference values for all age groups (folate: women 252 µg/d and men 283 µg/d; vitamin D: women 2.2 µg/d and men 2.9 µg/d). The proportion of subjects who do not reach the recommended intake for vitamin D is highest in adolescents, young adults and older people. In addition, female adolescents and older women and men had calcium intakes below the recommended levels. Therefore, these age groups present at-risk groups for the prevention of osteoporosis.

Conclusion: In Germany, the average energy intake corresponds to the recommended value for a low level of physical activity of the D-A-CH reference values for nutrient intake. Macronutrient intake is not appropriate in comparison with the reference values, whereas the intake of most vitamins and minerals corresponds to the reference values. However, the intake of folate and vitamin D is too low. Calcium and iron are critical nutrients in some age groups.

INVITED PRESENTATION

The EURRECA toolkit for aligning micronutrient recommendations

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Biography

Dr. Christophe Matthys holds a PhD in Medical Sciences, nutritional epidemiology. He was educated as a Bioscience Engineer and gained experience working as a member of the scientific staff at the Department of Public Health, Ghent University, Belgium. He continued his education through different national and international courses in statistics, epidemiology, public health nutrition, leadership and technology transfer. His research experience comes from various national and international projects. He has teaching experience through his former appointment as Lecturer in Human Nutrition at Massey University, New Zealand and through various positions at several Belgian University Colleges. He joined ILSI Europe on the first of April 2009. At ILSI Dr. Matthys is the EURRECA Network Manager and Scientific Project Manager of the Nutrient Requirement Task Force.

Abstract

The approaches by which reference values for micronutrients are derived, as well as the reference values themselves, vary considerably across countries. Harmonisation may improve nutrition policy and eventually public health. The EURRECA (EURopean micronutrient RECommendations Aligned) Network of Excellence (34 partners in 17 countries; www.eurreca.org) aims to develop tools for systematically setting, and keeping up-to-date, micronutrient reference values or recommendations.

A consultation process has been completed to prioritise the types of guidance to develop in the EURRECA 'toolkit'. This presentation will outline the future plans for all EURRECA tools but will focus on the tools which best complement the work of EuroFIR. The aim of the 'EURRECA Nutrition Software Wiki' is to create an open directory of nutrition software products for food composition data to allow users to make an informed choice on which software will work best for them.
Nutri-RecQuest is another web-based tool which will allow users to assess the 'status quo' of reference values. It is a searchable database of those values currently used in Europe/ Rest of World.

The use of these tools by EFSA, national nutrition societies and others should ultimately help to align recommendations across Europe. In this way, EURRECA can contribute to nutrition policy and eventually to public health[1].

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Use and generation of food composition data in nutritional software

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Biography

Viktoria Scherrer has been working as an innovation assistant at *dato Denkwerkzeuge* since 2007. *dato Denkwerkzeuge* started to develop software in the late 1980s for recording dietary histories of patients for the Ludwig Boltzmann Institute of Metabolic Diseases and Nutrition, Hospital Lainz, Vienna. At that time *dato Denkwerkzeuge* was the first software company granted permission to integrate the German Nutrient Database (BLS) into its software programs. Since then *dato* has developed various projects in the scientific field, like EWP (Nutritional Scientific Program) or DISHES for the RKI Berlin. In 2007 *dato* planned and implemented the software and database for the documentation and composition of all data comprising the BLS. One of *dato*'s major projects last year was to develop a new software program for and in cooperation with the Department of Nutritional Sciences of the University of Vienna. Besides the scientific field, *dato* has also set up software programs for the food industry and various nutritional consultancies, as well as the catering sector. Viktoria is currently developing concepts for the different software modules, providing scientific background including appropriate data. She studied Nutrition at the Department of Nutritional Sciences of the University of Vienna.

Abstract

Food composition data are used in many different fields including food industry, the catering sector and nutritional consultancies. To meet the varied needs of its clients, *dato Denkwerkzeuge* has developed a wide range of nutritional software based on the German Food Code BLS[1].

Table 1: Use of food composition data in existing software

Nutritional Software	**Industrial**	**Consulting**	**Kitchen**	**Science**
Sector	Food industry	Nutritional consultancy	Kitchen operations, catering	Nutritional science
Main features	- Nutrient calculation - Declaration - Labelling	- Evaluation of dietary records - Meal planning	- Calculation of recipes - Meal planning	- Nutritional epidemiological studies - Generation of local databases
Main data	Nutrients according to Bundeslebensmittelschlüssel [1] Retention- and yield factors according to Bognár [2, 3, 4] and USDA [5]			

Generation of food composition data using software: Working with food composition data also means generating new data. Nutritional software can be used to calculate the nutrients in new recipes, new products or even identify new nutrients/ nutrient groups. In addition, missing values can be extra- and interpolated.

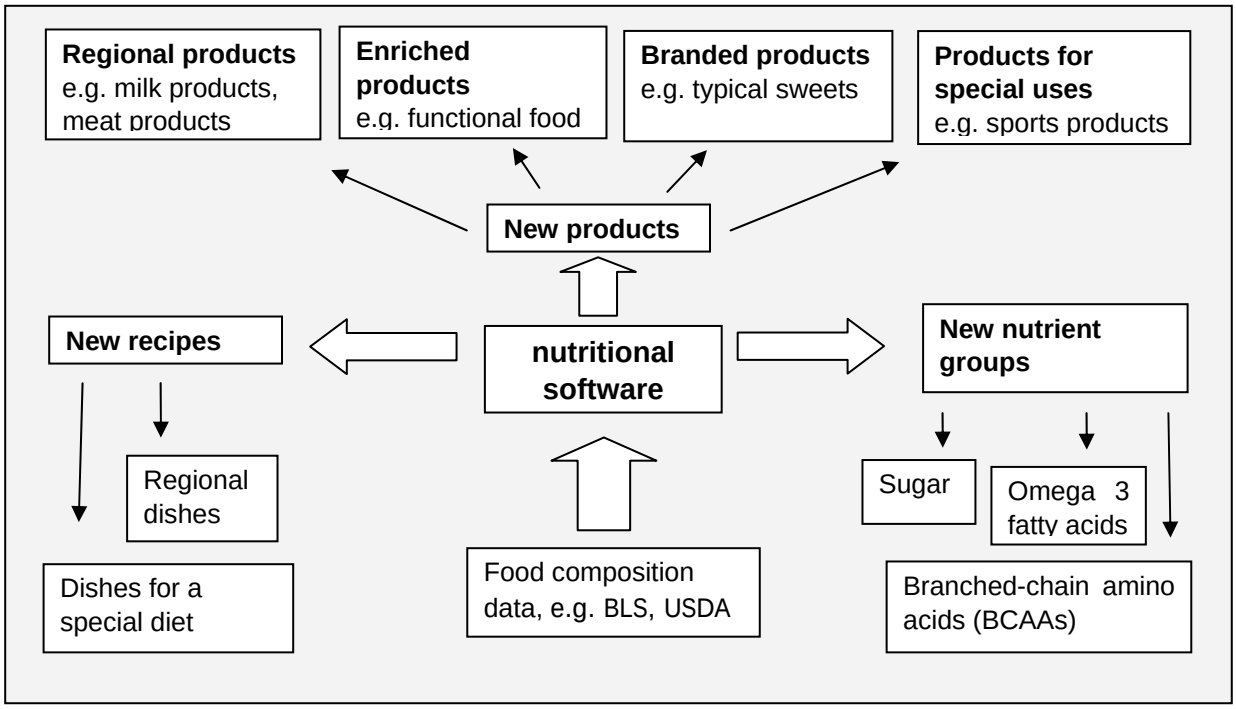

Fig.1: Generation of new food composition data

Trends in the use of food composition data: There is a trend towards huge interest in more detailed food composition data, and this trend can be observed in all of the different settings where food composition data are used. An increasing demand for information about nutritional values of food additives, allergens, substances that are associated with intolerances (e.g. histamine), or harmful substances (acrylamide) can be observed. Many also want to get more information about substances associated with health benefits, like secondary plant metabolites or further micronutrients that are not yet available, such as selenium.
In the field of consultancy there is also a big interest in nutrients of branded products.
The latest trend is to focus on pet nutrition, which creates a demand for data about pet-relevant nutrients like taurine.

Conclusion: Food composition data are of huge interest for nutrition related business branches. Using these data, businesses also generate lots of new data. Nutritional software is the key to make data useable for science. Persistent communication and cooperation between commercial users of software, science and software companies would be of benefit for all sides.

Table 2: Trends in use of food composition data

Trend	Field	Data of interest	Example
Safety	All fields	Harmful substances	Acrylamide
		Allergens	all
		Substances associated with intolerances	Histamine, fructose, lactose
		Food additives	all
Health	All fields	Secondary plant metabolites	Polyphenols, phytosterines
		Nutrients	Selenium
Sports	Industry/Consultation	Special substances/nutrients	BCAAs, carnitine
Personal Consultation	Consultation	Portion sizes	
		Branded products	Sports products, sweets
Pet nutrition	Industry/Consultation	Pet relevant nutrients	Taurine

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SHORT COMMUNICATION **2_32**

Disaggregating composite food codes in the UK National Diet and Nutrition Survey food composition databank

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Background/aims: When reporting food intakes there is increasing need to quantify amounts of foods eaten as part of composite dishes, as well as discrete portions, to provide more accurate estimates of total food consumed. This is particularly relevant to the UK National Diet and Nutrition Survey (NDNS) when comparing reported dietary intake data to the adherence of public health nutrition messages, such as 5-a-day for fruit and vegetables[1] and two portions of fish, including one portion of oily fish, per week [2]. Previous NDNS separated meat into beef, lamb and pork but due to constraints in the food grouping systems of the food composition databank (FCDB) composite dishes were included intact into these subdivisions[3]. This project was designed to achieve better estimates of consumption at the individual food level in order to compare consumption data to dietary recommendations.

Methods: The main food components chosen included in this disaggregation project were; meat, fish, fruit, vegetables and cheese, which are then further divided into sub-categories of; beef, lamb, pork, processed red meat, other red meat, burgers and grillsteaks, sausages, offal, poultry, processed poultry, game birds, white fish, oily fish, shellfish, canned tuna, fresh and canned fruit, dried fruit, fruit juice, tomatoes, tomato puree, brassicaceae, yellow red and dark green leafy vegetables, other vegetables, beans and pulses, nuts, cottage cheese and other cheese. Within the NDNS FCDB, there are a total of 4821 codes for food and drink items, of which 3216 can be described as mixed or composite dishes, compiled from two or more basic food codes. In this project all food codes were subject to disaggregation, with single ingredient food codes such as orange juice or pork sausages being given a 100% disaggregation score as they fall under one of the disaggregation groups. A variety of methods were used to estimate the proportions of each food type in the composite dish[3,4]. Manufactured product information, standard recipes from McCance and Widdowson's 'The Composition of Foods'[5] and homemade recipes from respondents' food diaries were used to gather detailed information on the individual components of composite dishes in the NDNS FCDB. The haem iron content of existing meat and fish dish codes in the NDNS FCDB provided an overall estimate of the meat and fish content when other recipe details were not available.

Results: This project is ongoing and nearing completion, with 94% (n=3023) of all composite dishes in the NDNS FCDB disaggregated to date. All 1605 single ingredient food codes have been assigned to a single disaggregation group as 100% where appropriate.

Conclusions: To our knowledge the NDNS will be the first national nutrition survey to disaggregate food codes for such a wide variety of food types. The results of this disaggregation project will be applied to dietary intakes reported in the new NDNS rolling programme.

Funding acknowledgement: This work was carried out as part of the National Diet and Nutrition Survey rolling programme, funded by the Food Standards Agency and Department of Health, London, UK.

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SHORT COMMUNICATION **2_68**

Evaluation of food consumption and dietary patterns in Spain according to the Spanish Food Consumption Survey: an updated information

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Biography

Prof. Gregorio Varela-Moreiras obtained his PhD in Nutrition, from Complutense University in Madrid, 1989. He was Research Associate at the Vitamins Bioavailability Laboratory from 1989 to 1991 at the Jean Mayer USDA Human Nutrition Research Center on Aging at TUFTS University, Boston, MA (USA). From 1994 to 1996 he worked at the Institute of Biomedical Research (National Government Research Council, Spain) as Research Associate in Nutritional Biochemistry. In 1995, Prof. G. Varela-Moreiras obtained a position as Associate Professor in Nutrition & Dietetics at the University of Burgos (School of Food Science). In 1996 he was appointed as Full Professor in Nutrition & Food Science at the San Pablo CEU University (Madrid, Spain) where he leads the Department of Pharmaceutical and Food Sciences. At present, he is also President of the Spanish Nutrition Foundation (FEN) and Spanish Nutrition Society (SEN) conducting a high number of studies related to Spanish food composition and dietary surveys. He is also member of the Board of Directors of ILSI Europe. Gregorio Varela-Moreiras leads the research group on vitamins in physiological and pathological conditions with a total of five senior researchers and five PhD students. He has been involved in more than 25 Research Competitive Grants either international (USA, EU) or national (Ministry of Education and Research of Spain; Ministry of Health and Consumer Issues of Spain; Regional Governments of Castilla-León, Galicia and Madrid), as well as several industry contacts as Principal Investigator.

Abstract

Background/aims: The Food Consumption Panel, which has been conducted for over 20 years by the Spanish Ministry of Agriculture, Fisheries and Food (MAPA), represents the most reliable source to evaluate the nourishment of Spain. The aim of this study was to assess population food availability per capita per day (pc/d), which allows the calculation of energy and nutrient intake, and comparison of these data with the Recommended Intakes for the Spanish population. A second aim was to evaluate dietary intake in accordance to sex, socioeconomic status, geographic distribution, and family size.

Methods: The sample consists of consumption and distribution data, obtained from the 'Food Consumption Panel' between 2000 and 2006. The study was carried out in households, catering trades and institutions. A two-stage sampling method was carried out, where in the first stage the units to be sampled were towns or local entities, and in the second stage households which

were going to be part of the final sample from those entities were selected. Units consist of towns or local entities in the national territory. The sample size was 619 selected entities. Units of the second stage were households from the selected towns (8200 homes). As for catering and restaurant establishments, the sample was fixed in 898 establishments. The data allow us to calculate energy and nutrient intake, using the Food Composition Tables (*Moreiras and col.*2006). The quality of the diet has also been evaluated: adequacy of the energy and nutrients intake at recommended intake; energy profile; dietary fat quality; dietary protein quality; nutrient density; mediterranean diet adequacy indexes, etc.

Results: The *average menu* consumed was made up by milk and derivatives (379 g/person and day), fruit (310 g/person and day), vegetables and greens (302 g/person and day), cereals and derivatives (214 g/person and day), meat and meat products (179 g/day), fish (100 g/person and day), oil and fat (48g/person and day), precooked food (34 g/person and day) and eggs (32 g/person and day). There was also a high consumption of non-alcoholic beverages (433 g/person and day) and alcoholic beverages (247 g/person and day). Consequently, meats and derivatives consumption was higher than the recommendations, whereas cereals and derivatives, vegetables and greens, fruit and legumes and pulses consumption were below the recommendations.
Some *basic and Mediterranean foods* (bread, potatoes and olive oil) showed a dramatic decline when compared to 1964 data. Energy intake has declined by about 300 kcal/d when compared to 1964 intake. Insufficient nutrient intakes in the adult population when compared to dietary reference values were found for energy in men, zinc and folic acid in both sexes, and iron in women.

Conclusions: Food consumption patterns in Spain and energy and nutrient intake have markedly changed in the last 40 years, differing at present from the traditional and healthy *Mediterranean Diet*.

Funding acknowledgment: This work was funded by the Ministry of Agriculture, Fisheries and Food, under contract with the Spanish Nutrition Foundation entitled: *'Evaluation of food consumption and dietary patterns in Spain according to the Spanish Food Consumption Survey: an updated reliable information'.*

Session 3 - New food composition data/databases – the need for quality standards

Chairs: Joanne Holden (USDA) and Dr Maria Antonia Calhau (INSA)

• Dr Jayne Ireland *Danish Food Information, Denmark*	LanguaL food description: a learning process
• Joanne Holden USDA *Nutrient Data Laboratory, USA*	USDA's Food and Nutrient Analysis Program: Update of the USDA Projects and Progress
• Anders Møller *Danish Food Information, Denmark*	The EuroFIR Food Composition Databank Platform
• Prof Wulf Becker *National Food Administration, Sweden*	CEN standard on Food Composition Data - an update
• Luísa Oliveira *Instituto Nacional de Saúde Doctor Ricardo Jorge, Portugal*	A practical approach to the implementation of EuroFIR quality system for food composition databases
• Kimberley Bouckaert *International Agency for Research on Cancer, France*	Critical evaluation of folate data in European and international databases
• Prof Ian Givens *University of Reading, UK*	Effect of intensive vs. free range production on the fat and fatty acid composition of whole birds and edible portions of UK retail chickens
• Heikki Pakkala *National Institute for Health and Welfare, Finland*	Harmonised information exchange between decentralised food composition database systems
• Marie Macháčková *Institute of Agricultural Economics and Information, Czech Republic*	Full value documentation in the Czech Food Composition Database
• Niina Ylönen *National Institute for Health and Welfare, Finland*	Methodology for adding glycaemic index values to the Finnish food composition database
• Gül Löker *TUBITAK MRC Food Institute, Turkey*	Turkish national food composition data base

INVITED PRESENTATION

LanguaL Food Description: a Learning Process

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Biography

Dr. Jayne Ireland has worked in the field food composition data for 23 years. She was a founding member of the French food composition data bank and its director from 1992 until she retired at the end of 2008. Under her direction, the French food composition database (CIQUAL) has expanded over the years and follows international recommendations and standards. In 2008 the French food safety agency (AFSSA, EuroFIR partner 10) published the updated food composition tables/user database on the internet (http://www.afssa.fr/TableCIQUAL). Another success in 2008 was the creation of a new database on quality of processed foods (OQALI), which will be a precious source of information for the food composition databank.

Dr. Ireland has been active in the international harmonisation of food composition databases and has participated in several European projects: FLAIR Eurofoods-Enfant, COST Action 99 – Eurofoods, Balaton, Efcosum, EuroFIR. She is particularly concerned with food description and is Secretary of the European technical committee of the LanguaL thesaurus. She has now joined her husband, Anders Møller, at Danish Food Information (EuroFIR partner 46) where she works part-time on data documentation and food description.

Abstract

Background/aims: The EuroFIR network (http://www.eurofir.net) aims to provide validated food composition data from European food composition databanks. However, the network covers 27 countries with different languages and food cultures. In 2005, European food databases were like a Tower of Babel: foods were described by *ad hoc* classifications and food names in national languages; English translations and scientific names were not systematic. Only 25% of databases included international food classification or food description.

Methods: For the EuroFIR purpose, it was decided to link the European databases at the food level, using LanguaL. Originally developed by the US-FDA more than 30 years ago, LanguaL is a multilingual, facetted thesaurus created to describe foods in a systematic way (http://www.langual.org). In order to facilitate food indexing, the EuroFIR project developed a Food Product Indexer software incorporating the LanguaL thesaurus and a number of already indexed data sets. Between 2005 and 2009, several short (1-2 day) food indexing courses were organized for food composition data compilers from all participating countries.

Results: Feedback between the LanguaL Technical Committee and the compilers allowed the latter to improve their indexing skills (e.g. physical state defined at 20ºC) and thus improve their indexing scores. In turn, the compilers proposed translations (Czech, Danish, French, German,

Hungarian, Italian and Spanish) and new descriptors (e.g. European plants and fish) to be included in the LanguaL thesaurus. Some English translations of food names in databases were improved when the LanguaL description was found to be more accurate. The result was thus a set of more than 26,000 LanguaL indexed foods able to be searched in the EuroFIR network's data facilities.

Conclusion: Both the network and individual compilers benefit from standardized food description, allowing foods to be linked and compared across borders and language barriers. The LanguaL thesaurus has, in turn, benefited from the expertise of the compilers. The next challenge will be to index food consumption surveys, in order to allow automatic matching of foods through food description.

Funding acknowledgement: This work was completed on behalf of the EuroFIR consortium and funded under the EU 6th Framework Food Quality and Safety Programme (FOOD-CT-2005-513944). The authors are grateful for the support of all EuroFIR partners.

Key words: Food description, LanguaL, EuroFIR, Food composition database, Data interchange

INVITED PRESENTATION

USDA's Food and Nutrient Analysis Program: Update of the USDA Projects and Progress

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Biography

Joanne Holden is the Research Leader of the Nutrient Data Laboratory at the Beltsville Human Nutrition Research Center of the Agricultural Research Service, U.S. Department of Agriculture. In this role she is responsible for coordinating the acquisition, evaluation, and dissemination of food composition data for the US. The primary product of this food composition research is the National Nutrient Database for Standard Reference, which serves as the foundation for most food composition data applications. These data are disseminated on the internet and are available to everyone free of charge and without license requirements. Ms. Holden's personal research interests include food sampling and the evaluation of data quality.

Ms. Holden began her career working for the University of Maryland Cooperative Extension Service in Frederick County. She returned to school to pursue a Master's degree and began working at the Agricultural Research Service, USDA in the Carbohydrates Nutrition Laboratory where she was a member of the research team investigating the role of various carbohydrates in human health. Later she joined the Food Composition Laboratory to support research in developing analytical methods for foods and various dietary components. There she planned and conducted the first nationwide sampling studies for food composition. The resulting data were used to produce focused databases for nutrients in foods. In 1995 she was selected to be Research Leader of the Nutrient Data Laboratory. She continues to serve in this position.

Abstract

For more than 100 years the US Department of Agriculture (USDA) has supported the generation and compilation of food composition data. Today the Agricultural Research Service, USDA develops and maintains the National Nutrient Data Bank, a repository of food composition data which provides the foundation for most other U.S. food composition database applications including the databases for the U.S. What We Eat in America: NHANES (National Health and Nutrition Examination Survey) and for epidemiological applications. Values for more than 7200 foods and up to 140 dietary components may be derived from chemical analysis of representative samples of the foods, obtained from the food industry or scientific literature, or calculated from data for similar foods.

Through a collaboration with the U.S. National Institutes of Health, USDA has developed the National Food and Nutrient Analysis Program (NFNAP) to generate original analytical data for important foods. In 2005 USDA entered into a collaboration with the NIH Office of Dietary

Supplements to develop the Dietary Supplements Ingredient Database (DSID) to provide analytical estimates of dietary ingredients (e.g., nutrients) in various types of popular supplements. Both the food and dietary supplements projects employ statistically valid sampling plans, comprehensive quality control, and USDA analytical oversight as part of the program to generate new and updated analytical data. During 2009, data for vitamin D in more than 2700 foods were released. Also, the first release of the DSID was launched in April, 2009. The challenging process of maintaining a dynamic reservoir of accurate, current, and specific estimates for components in foods requires continuous support for food composition research, data generation, including studies of variability, and data compilation. Cooperation with the food industries, the scientific community and government agencies is essential to this process.

INVITED PRESENTATION

The EuroFIR Food Composition Databank Platform

Anders Møller

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Biography

Anders Møller is a food informatics specialist and worked as Senior Advisor in the Danish Institute of Food and Veterinary Research (DFVF) until the end of 2007. He has more than 30 years of experience in the research fields of food consumption and food composition, and has been responsible for developing the Danish food composition tables and more recently the Danish food composition databank as well as other databanks on the Internet. For 10 years, Anders Møller served as head of DFVF's IT Department. Furthermore, he has been involved in the statistical analysis of the national Danish food consumption surveys and household budget surveys and intake and exposure assessments. Over the years, he has participated in numerous European and international task forces and projects concerning food description, food composition, food consumption, and food informatics. Currently, he is director of the food informatics consultancy, Danish Food Information.

Abstract

Background: The variability, incomparability and incompatibility in food composition data can lead to many misinterpretations and heterogeneity in, and between, European food composition databases and tables. This is the cause of the most common errors when comparing food composition and nutrient intake data over the European borders.

EuroFIR: EuroFIR has established a food composition databank system, which uses the same methods of food description and component description for all the European food composition datasets on nutrients, as well as specialized datasets on, for example, bioactive components. This presentation will describe some of the ways in which the EuroFIR project harmonises and standardises European food composition data. These include:

- standardized food description
- standardized component and value description
- development of standard data interchange formats
- development of search functions and facilities
- investigations of new food composition data interfaces
- bibliographic repositories and data repositories

Furthermore, this presentation will describe the current status of the development of the EuroFIR food composition data platform, the work on the CEN standard, and the EuroFIR web services.

Acknowledgement: *This work was completed on behalf of the EuroFIR consortium and funded under the EU 6th Framework Food Quality and Safety Programme (FOOD-CT-2005-513944).*

INVITED PRESENTATION

CEN standard on Food Composition Data - an update

Prof. Wulf Becker [1] on behalf of CEN TC387 "Food composition data"

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Biography

Prof. Wulf Becker is Chief Nutritionist at the National Food Administration, Uppsala, Sweden, and Adjunct Professor in nutrition research at the Department of Public Health and Caring Sciences, Uppsala University. His main areas of work include intake assessments of nutrients, dietary assessment methods, dietary surveys and epidemiological and clinical studies relevant to dietary and nutrition recommendations.

Abstract

Background: A major goal of the EuroFIR NoE (Network of Excellence) is to provide tools to overcome existing differences among member states and parties, with respect to documentation and interchange of food composition data.

Aims: To establish a common European CEN-standard on food composition data, enabling unambiguous identification and description of food composition data and their quality in e.g. databases, for dissemination and interchange.

Results: A national standardisation project committee (TC 505) was established by SIS Swedish Standards Institute in 2007. A key achievement in 2008 has been the formation of the CEN/TC 387 project committee on Food Composition Data. TC387 is led by the SIS Swedish Standards Institute. So far 9 national standardisation organisations are project members with 4 other being observers. The work builds on EuroFIR's work packages 1.3 (Development of a quality framework for food composition data) and 1.8 (Complier network and supporting task groups) in close collaboration with GS1 Sweden and other stakeholders representing the Swedish food sector. The GS1 system is an integrated system of global standards (including the Global Data Synchronization Network, www.gs1.org/gdsn) that provides for accurate identification and communication of information regarding products, assets, services and locations. In particular, the GS1 Food and Beverage Extension contains a range of information on foods that is relevant and complementary to the EuroFIR specifications.

During 2009 a working draft of a standard is being prepared. This is based on EuroFIR and GS1 specifications and input from the various national delegations. The draft will be reviewed by TC387. Agreed amendments will be incorporated into an enquiry draft that will be submitted to CEN during 2010. A final, ratified standard is expected to be available in early 2012.

Funding acknowledgement: This work was completed on behalf of the EuroFIR consortium and funded under the EU 6th Framework Food Quality and Safety Programme (FOOD-CT-2005-

513944). Additional funding (TC505) has been provided by SIS, Swedish food manufacturers', retailers' and consumer organisations.

INVITED PRESENTATION

A practical approach to the implementation of a EuroFIR quality system for food composition databases

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Biography

Luísa Oliveira has been a member of the Food and Nutrition Department team at the Portuguese National Institute of Health in Lisbon since 1991. She is currently responsible for the Monitoring and Surveillance Unit, co-ordinator of PortFIR (Portuguese Food Information Resource – the Portuguese food composition network), and Department Quality Manager; from 2003 to 2008 she co-ordinated the Food Chemistry Laboratory. Luísa obtained her degree in Pharmaceutical Sciences at the University of Lisbon in 1985 and obtained her Clinical Analysis Specialist degree and Health Graduated Technician Specialist degree in 1991. From 1985 to 1991 she worked in Clinical Analysis at private and public laboratories. She started her career as Senior Scientist at the National Institute of Health working on vitamins, food additives and contaminants analysis. Her current main scientific areas of work are food composition and contamination data compilation, data quality and risk assessment. She was National Focal Point for SCOOP task 3.2.3 (Nitrates). She was a member of INSA's conception, execution and co-ordination team for the 2006 edition of 'Tabela da Composição de Alimentos'. She has experience in reference materials certification, having participated in LGC programmes and in methods standardisation, being a member of National and European Technical Committees on Food Analysis Horizontal Methods (vitamins and food additives).

Abstract

Introduction: The implementation of quality management systems (QMS) in food composition databanks is one of the aims of EuroFIR; for this reason a series of guidelines and quality requirements have been setup as part of the network's activity. The purpose of this work is to report on the approach used for implementing INSA's QMS with the Portuguese Food Composition Databank/bases (FCDB).

Materials and Methods: The first principle adopted was that the QMS should fit both EuroFIR and compiler organization requirements. A step-wise approach was developed to implement the QMS, specifically: collection of quality documents directly or indirectly related to the compilation process (EuroFIR, ISO, INSA); selection of reference standards and guides; establishment of adequate requirements; assessment of the level of requirements implementation; training at other EuroFIR organizations with a soundly implemented food composition data compilation system; definition of INSA's compilation flowchart and QMS; drafting of standard operation procedures; and pre-assessment auditing.

Results and Discussion: In this work we report the design and implementation plan of a quality framework supported by EuroFIR technical guidelines, compilation flowchart and standard operating procedures, and ISO 17025 management requirements. The QMS elements have been established by consensus. To implement the quality management plan, ISO 17025 management requirements, compilation needs and existing procedures have been compared using a cross-reference table. The first results indicate that the quality management requirements of ISO 17025 in place at INSA could fit the needs for document control, audits, contract review, non-conformity work and corrective actions, and users' (customers') comments, complaints and satisfaction, with minor adaptation. Because all staff members in our organisation are familiar with ISO 17025 requirements and principles, its use as a reference quality system is advantageous. Furthermore, the adoption of ISO 17025 may strengthen the linkage between compilers and data producers (laboratories) due to mutual understanding and sharing of a quality language.

Conclusions: Based on our practical results we can conclude that ISO 17025 management requirements are an adequate reference for the implementation of INSA's FCDB QMS with the advantages of being well-known to all members of staff and also using a quality language in common with the laboratories producing food composition data.

Acknowledgment: *This work was completed on behalf of the EuroFIR consortium and funded under the EU 6th Framework Food Quality and Safety Programme (FOOD-CT-2005-513944).*

SHORT COMMUNICATION **3_46**

Critical evaluation of folate data in European and international databases

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Biography

Ms Kimberley Bouckaert acquired her engineering degree in Biosciences in 2005 and a complementary Masters in Food Science and Nutrition in 2007 at Ghent University, Belgium. In 2008 and 2009, she worked as a EuroFIR exchange student in the Dietary Exposure Assessment Group at the International Agency for Research on Cancer in Lyon, France. As part of a preliminary study in the standardization of folate data for international nutritional studies, she carried out an inventory of folate data in several European and international databases and food composition tables. Ms Bouckaert is now a PhD student in the research group of Food Chemistry and Human Nutrition at Ghent University. She is participating in food science, public health and epidemiology projects in developing countries.

Abstract

Background/aims: Methodological issues related to folate measurement have implications on estimated diet-disease associations in international nutritional studies. These include a lack of completeness, documentation, comparability between and within folate databases, sensitivity of folate to oxidation and food-dependent bioavailability. The aim of this work was to carry out an inventory and critical evaluation of folate data in selected European and international databases, to establish guidelines for the compilation of a standardized folate database for international nutritional studies.

Methods: National databases from 14 European countries, participating in the EPIC (European Prospective Investigation into Nutrition and Cancer) Nutrient DataBase project and the European Food Information Resource Network of Excellence (EuroFIR), and two non-European countries were selected. An *ad hoc* folate questionnaire was prepared to critically evaluate different aspects of the 17 selected databases, including completeness of data, terminologies, quantification, inclusion of folic acid fortified products and documentation.

Results: Folate completeness is high in the majority of selected databases (75-100%). Folate terminologies vary across the databases. A great number of databases use only one folate terminology (folate(s), total folate(s), dietary folate equivalents or folic acid), while a few report the HPLC determined folate species (5-CH_3-H_4folate, 5HCO-H_4folate, H_4folate and/or 10-HCO folic acid), folic acid and/or total folate together with food folate, used in the definition of dietary

folate equivalents. All databases quantify folate in µg, except the Slovak database which uses mg, and a few also quantify in µg dietary folate equivalents. The use of multiple analytical methods (microbiological assay, HPLC, radio-assay/protein binding, LC/MS, LC/MS/MS), borrowing values from other sources and/or incorrect calculation adjustments explain the main inconsistencies between folate terminology and quantification methods in databases. Microbiological assay is the most reported analytical method. Most countries can provide some or all of the main documentation types (value type, method type, publication type, acquisition type). The majority of the databases contain folic acid fortified products, but there is a lack of easy identification of such food products and availability of a separate folic acid value. Only a few databases make use of a quality index for folate values.

Conclusions: Most databases lack relevant information on available folate data to properly assess folate data quality. *Ad hoc* compilation strategies will have to be developed to improve the comparability and standardisation of folate data within and between databases. Future folate data quality is warranted by full value documentation according to EuroFIR guidelines, the correct use of EuroFIR identifiers which distinguish between folate, folic acid and dietary folate equivalents, and the use of HPLC to quantify folic acid in fortified foods. More information will be provided during the presentation or in the poster.

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SHORT COMMUNICATION **3_18**

Effect of intensive vs. free range production on the fat and fatty acid composition of whole birds and edible portions of UK retail chickens

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Biography

Prof Ian Given's background training is a 1st degree in Biochemistry and Nutrition. He used to work for the Ministry of Agriculture, Fisheries and Food and is currently Director of large research group in the University of Reading focusing mainly on food chain and health related areas including composition of animal-derived foods and the environmental impact of their production. He is also a joint leader of the University's food chain and health research, which links events from primary food production to long term health outcomes. Prof Givens has a particular interest in food chain nutrition including the relationship between the nutrition of animals, the composition of animal derived foods and their impact on human nutrition and chronic disease.

Abstract

Background/aims: Poultry meat consumption in the UK has increased vastly from about 12 to 540 g/person/week between 1950[1] and 2007[2]. There have however, been concerns that modern chickens contain much more fat than in the past, making poultry meat a substantial source of dietary fat. This view may be based on measurement of fat in whole birds which are not eaten in their entirety. There are however, few data on the fat and fatty acid composition of current retail chicken meat or how these may be influenced by production method or choice of edible meat portion.

Methods: Two intensively reared and two free range reared birds of near identical size (~1.5kg) were purchased from each of four supermarkets. Birds were oven cooked at 180°C. After cooling, one from each pair of birds was retained whole with skin whilst the other had the main sources of edible meat quantitatively removed to provide breast and leg meat each with and without skin. The whole birds and the dissected edible meat fractions were homogenised and used to measure total fat content by extraction with petroleum ether. Fatty acids were measured by gas chromatography-mass spectroscopy.

Results: The total fat content of the cooked whole birds ranged from 12.1 to 17.8 g/100g and this was not significantly ($P>0.05$) affected by method of rearing or by supermarket. The effect of meat type and method of rearing on total fat and key fatty acids is shown in Table 1. Leg meat was richer in fat than breast meat and the inclusion of skin markedly increased the fat content of both. Overall, meat fat content was not influenced by method of rearing. Key fatty acids were significantly affected by rearing method with fat in free range birds containing more saturates, less polyunsaturated fatty acids and less n-3 fatty acids than in that of intensively reared birds. However, fat in intensively reared birds contained significantly more n-6 fatty acids.

Table 1. Effect of chicken meat type and method of rearing on fat and key fatty acids

	Breast meat		Leg meat		Effect of	
Measurement	-skin	+skin	-skin	+skin	Meat type	Rearing method
Total fat (g/100g)	2.4	7.7	8.7	15.2	***	NS
Fatty acids (g/100g total FA)						
Saturated fatty acids	33.0	31.5	30.9	30.9	NS	***
Monounsaturates	45.6	47.1	46.4	46.9	NS	NS
Polyunsaturates	21.4	21.4	22.7	22.2	NS	**
Linoleic acid	17.3	17.9	19.0	18.6	NS	**
Total n-3 fatty acids	2.57	2.71	2.94	2.90	NS	***
EPA + DHA	0.381	0.198	0.203	0.125	**	NS

Intensive vs. free range, **P<0.01, ***P<0.001, NS not significant P>0.05

Conclusions: These data suggest that chicken meat will contribute between 5 to 10 per cent of total fat intake in UK adults but there are few historic data to make a meaningful comparison with. Based on this small study, there is no evidence that free range birds provide meat with a lower fat content or an improved fatty acid profile relative to those reared intensively.

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SHORT COMMUNICATION **3_21**

Harmonised information exchange between decentralised food composition database systems

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Biography

Heikki Pakkala has been working at the National Institute for Health and Welfare (THL) for more than ten years as a data analyst. He is one of the team behind designing and implementing software and databases and running data management in the Nutrition Unit. This portfolio includes research oriented tools used in food composition database management, dietary surveys and data management, and promoting food composition information via the Fineli website (www.fineli.fi). Prior to his current position at THL, Heikki worked for more that ten years in the private IT sector, designing and programming all kinds of systems from environmental data to municipal housing and mortgages.

Abstract

Background/aims: The main aim of the EuroFIR project is to develop and disseminate a comprehensive, coherent and validated databank for the distribution of food composition data (FCD). This can only be accomplished by harmonising food description and data documentation and by the use of standardised thesauri.

Methods: The databank is implemented through a network of local food composition databases (usually national) under the control and the responsibility of the local (national) EuroFIR partner. These harmonised food composition databases[1,2] interact through the EuroFIR Web Services interface[3, 4]. All FCD retrieval happens via this interface, allowing the partners to implement their system (their network node) using methods and software suitable for the local computer environment. The implementation utilises common international standards, e.g. SOAP, WSDL and XML. The EuroFIR Web Services are meant only for computer-to-computer interaction via a specially constructed EuroFIR search facility (eSearch). Using this user-friendly front end, a food compiler may want to obtain FCD on, for example, Mediterranean apples. The eSearch compiles the query using a specially designed Food Data Query Language and sends a request to those network nodes linked to the EuroFIR Web Services that will most likely have the requested information. The request is then processed in the systems of network nodes. Once the request has been delegated to the right service, the Food Data Query Language is interpreted using the rules in its specification. Subsequently, the query is translated in order to match the partner-specific implementation. The query can then be processed in the local food composition

database, so that the FCD matching the query conditions can be retrieved. The retrieved FCD are compiled into a specially designed data interchange format (the EuroFIR Food Data Transport Package) in XML[5], which is sent back to the eSearch as the query response. The same request-response operation happens in all the nodes that have been selected in eSearch for the task. Finally, the FCD are combined by the eSearch and delivered to the food compiler.

Results: The project has published specifications for the FCD distribution system[3, 4]. Its implementation is currently under development. By the end of 2009, the network of the EuroFIR Web Services will consist of eight European partners and is expected to expand in the coming years.

Conclusions: The implementation of the FCD using decentralised computer systems instead of the traditional data-centre model has several advantages. First of all, the local partners have more control over their FCD, which evidently will increase commitment and improve quality. Secondly, a multi-centred solution is more economically viable than the creation of a centralised databank, due to the lack of national political support for multinational systems. Thirdly, a system based on independent implementations is robust and will remain functional even if the network organisation around it collapses.

Funding acknowledgement: *This work was completed on behalf of the EuroFIR consortium and funded under the EU 6th Framework Food Quality and Safety Programme (FOOD-CT-2005-513944).*

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SHORT COMMUNICATION **3_26**

Full value documentation in the Czech Food Composition Database

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Biography

Marie Macháčková works as an information officer at the Agricultural and Food Library at the Institute of Agricultural Economics and Information in Prague, Czech Republic. Her main areas of work are the processing of inputs for the *Food Technology and Science Abstracts* database and the provision of information services (including food composition issues) for users of the library. She has participated, as an author of articles, in information portal projects for the Institute of Agricultural Economics and Information, including writing articles for the agricultural and food information portal (www.agronavigator.cz) and the food safety information portal (www.bezpecnostpotravin.cz). Marie is co-author of a Food Safety Dictionary for Czech Consumers (www.agronavigator.cz/az/). In 2006-2007, Marie provided the recipe calculation for a new edition of *Recipes of Dishes for School Catering,* published by the Czech Nutrition Society. Since 2007, she has been involved in the Czech Food Composition Database Programme, as a co-author of its concept and as a database manager and a complier.

Abstract

Background/aims: Before the split of former Czechoslovakia in 1993, food composition database was managed by the Food Research Institute in Bratislava (now Slovakia). The new Food Composition Database Project in the Czech Republic was re-launched in 2007. According to its concept, all component values should be documented using the EuroFIR standard methodology for full value documentation and all foods should be indexed using the LanguaL Thesaurus. The first batch comprised data for 77 foods. The database has been started from the zero using various available data sources, including original Czech analytical values, data from available foreign food composition tables (first of all Slovak) and data obtained by calculation within the database system.

Methods: Selection of the initial set of foods was based on a list of foods used for evaluation of the food consumption basket. A set of 25 priority components were identified reflecting the range of components in former Czech tables. The priority list was enlarged by components for which original Czech analytical data or derived data were available. The final range for the aggregated / compiled database (level DB3) comprised 95 components. The data at the level of initial database (DB2) were archived using the Slovak Data Management Software version 1.2. Values imputed into the DB3 database were documented according to the EuroFIR standard within the entities FOOD, COMPONENT, VALUE and REFERENCE using Excel sheets. For processing the focus was on mandatory properties of foods according to the EuroFIR Standard Technical Annex. The EuroFIR thesauri with controlled descriptors were applied. Thesauri Reference, Acquisition, Method, Value Type, Value and Matrix Unit were translated into Czech for in-house

needs. A methodology for implementation of the standard, foods indexing using the LanguaL Thesaurus and compilation of data within the Czech database was proposed. Processed data were imputed into the Slovak nutrition SW ALIMENTA 4.2 (level DB4) and used for calculation of recipes.

Results: The initial set (status 31 March 2009) comprised data for 77 foods – 31 foods with values analytically determined (7 traditional potato dishes, 24 foods from the segment of Czech traditional fast foods), 17 fruits and 29 vegetables. 2882 values were documented according to the EuroFIR standard for full value documentation. All foods were indexed by the LanguaL Thesaurus. The aim of the initial stage of the project is to document at least 150 foods by the end of 2009.

Conclusions: The processing of the Czech food data is conducted according to the requirements of the EuroFIR standard for full value documentation. Compliance with the EuroFIR standard was confirmed by inclusion of the Czech dataset into the EuroFIR eSearch facility – a prototype of an authoritative source of food composition data in Europe. Information about Czech foods can be disseminated to Czech and international users.

Funding acknowledgement: This work has been supported by the Ministry of Agriculture of the Czech Republic.

SHORT COMMUNICATION **3_33**

Methodology for adding glycemic index values to the Finnish food composition database

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Biography

Niina Ylönen obtained her Master's degree in Food Science, from the University of Helsinki in 2007, Human Nutrition as her main subject. During years 2006-2007 she worked at, what is now called the National Institute for Health and Welfare, THL (before 1.1.2009 the Institute was named National Public Health Institute, KTL), as research assistant in diverse research projects including postprandial feeding studies and clinical epidemiological studies. Since September 2007 she has been working at THL as a PhD student and her postgraduate studies at the University of Helsinki are in progress. Her doctoral research belongs to the area of nutritional epidemiology and her research topic relates to the quality of dietary macronutrients and their associations with overweight, weight change and body composition.

Abstract

Background/aims: Glycemic index (GI) is a measure to quantify the relative postprandial blood glucose response to foods containing available carbohydrate (ACHO). In order to study associations between dietary GI and chronic diseases in epidemiologic settings, GI values must be assigned to foods and added to the Finnish food composition database (FCDB)[1]. Our aim was to describe the methodology for adding GI values to the FCDB and to find out whether the value documentation framework of the EuroFIR project[2] could be used for GI values.

Methods: GI values were assigned for foods used by the study population of the National FINDIET 2007 Survey (n=2038, age range 25-74). Publications were reviewed for the quality of the GI determinations. If a GI value of a food was missing, the GI of a related (e.g. the most similar food) was applied. For foods containing no or negligible amounts of ACHO the GI was set to zero. A recipe calculation procedure was used for composite foods: first the proportions of food ACHO, contributed by each ingredient, were calculated and multiplied by the respective ingredient GIs. The resulting values were summed up to yield the GI of the food. The EuroFIR value documentation framework was used when storing the GI values.

Results: The dietary data included 2210 foods, of which 350 foods with no or negligible amounts of ACHO (e.g. meats, fats) were assigned a GI of zero. The GI value of a similar food was available for 335 foods. The GI of a related food was assigned to 631 foods. These values were used in the calculation of 894 composite foods. We found that GI data could be modelled using a similar structure as is used with nutrient values of food composition data (FCD). The standard recipe calculation procedures could be utilised with only minor adjustments to the

algorithm. Most properties of the values (e. g. value type, acquisition type, method type) could be directly adopted from the EuroFIR Thesauri. However, the current EuroFIR component thesaurus does not have matching codes for the GI values, which could have been used. Some issues (e.g. the quality assessment) still need further development.

Conclusions: GI values can be added to the FCDB with minor adjustments and fit reasonably well to the value documentation framework of the EuroFIR project[2]. The added GI values cover a sufficient amount of foods to form a meaningful GI database for epidemiologic studies.

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SHORT COMMUNICATION **3_29**

Turkish national food composition data base (T-FCDB)

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Biography

Gül Löker has been based at TÜBİTAK Marmara Research Centre, Food Institute, Gebze-Kocaeli/Turkey, since 1993. She is an experienced senior researcher and is studying the areas of food composition, nutrition and dairy technology. She is responsible for the laboratories of food chemistry and nutrition. In addition to this role, Gül is involved in national commissions related to food and nutrition. She has carried out many research projects and has given various presentations, authored publications and been the recipient of a number of project grants. Gül Löker is the lead researcher for Turkey of the EU FP6 *EuroFIR* Network of Excellence and is the coordinator of the "Turkish national food composition database" project.

Abstract

Background/aims: In order to improve the quality of the population, determination of nutrition and health status and the formation of national nutrition policies are major necessities for a country. To achieve this aim one of the main and indispensable source documentation for a country are national food composition data bases (FCDB). Because of various factors, a national FCDB project has never been established in Turkey and various foreign FCDs have been used instead. However, nutrient contents of foods are affected by many factors such as geographical properties, harvesting, transportation, storage, processing and consumption conditions. Quality of data is one of the most important criteria for end users. It is therefore necessary to develop a systematic approach for determination of nutrient levels in various foods (animal and plant origin, raw and processed) which are produced and consumed in our country. The determination process should be carried out using high qualified instrumental analysis techniques under international quality criteria for producing, using and managing data and producing a national documentation.

Methods: The main work packages of the T-FCDB project are: *1. Sampling:* Sampling of national level 535±100 foods including 60 traditional foods during a 2 year period; *2. Analyses:* Analytical method harmonisation around the participant laboratories, setting up an analytical quality system, determination of 36 nutrient parameters; *3. Data evaluation system*: Setting up a quality index system both for produced project data and bibliographic data base; *4. Production of the FCDB:* Setting up a web based user friendly system; *5. Registration:* Preparation of geographical sign files of 60 traditional foods; and *6. Sustainability and marketing system:* Setting up membership system for food industry, marketing of FCDB printed documents and CDs, searching new resources.

Results: Achievements of the first 6 months period: study materials and analysis parameters are chosen; analysis standard operating procedures are prepared and training on analytical method validation and uncertainty are realised; method validation and uncertainty studies for the nutrient analysis are started in the participant laboratories; applications for accession to 2 proficiency test programmes are made; sampling for each study material and analysis protocols are prepared, and will be revised after pilot scale application; data base studies are started; various working groups are built up; and all the study is managed by networking.

Conclusions: Construction of T-FCDB is growing intensively in the context of project plan. The main aim of this research study is to build up a validated FCDB that represents Turkish foods by setting up a harmonised data production, use and management system among the laboratories of TUBITAK, The Ministry of Agriculture and Rural Affairs and The Ministry of Health.

Funding acknowledgement: This work has been funded by TÜBİTAK (The Scientific and Technological Research Council of Turkey) KAMAG TARAL 1007 (Support Programme for Research Projects of Public Institutions 1007) Research Programme, 107G208.

Session 4 - New data on traditional and ethnic foods in Europe

Chairs: Dr Helena Costa (INSA) and Dr Barbara Burlingame (FAO)

• Dr Barbara Burlingame *Food and Agriculture Organization of the United Nations (FAO), Italy*	Biodiversity and traditional foods
• Dr Helena Soares Costa *Instituto Nacional de Saúde Doutor Ricardo Jorge, Portugal*	New traditional foods data for inclusion in European food composition databases
• Prof Filippo D'Antuono *University of Bologna, Italy*	BaSeFood - Sustainable exploitation of bioactive components from the Black Sea Area traditional foods
• Prof Giuseppe Spano *University of Foggia, Italy*	BIAMFOOD - Controlling biogenic amines in traditional food fermentations in regional Europe
• Dr Santosh Khokhar *University of Leeds, UK*	Generating new data on commonly consumed ethnic foods in Europe using harmonised approaches
• Dr Kathleen Abu-Saad *Ben Gurion University, Israel*	Developing a habitual ethnic specific multi-nutrient intake scale (H-MNIS) using food composition tables, to assess the association between diet and adverse birth outcomes of minority women in Israel

INVITED PRESENTATION

Biodiversity and Traditional Foods

Dr. Barbara Burlingame, FAO

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Biography

Dr. Barbara Burlingame is the Senior Officer and Leader of the Nutrition Requirements and Assessment Group for the Food and Agriculture Organization of the United Nations (FAO). Her areas of responsibility include food composition, human nutrition requirements, dietary and nutritional risk assessments, the cross-cutting initiative on biodiversity for food and nutrition, and provision of scientific nutrition advice to member nations and the Codex Alimentarius Commission.

Since 1995 she has been the director of INFOODS, the International Network of Food Data Systems, and since 1998 she has been the editor of the international, peer-reviewed Journal of Food Composition and Analysis, published by Elsevier. In addition, she is a member of the Board of Editors in the Life Sciences, Chairperson of the International Union of Nutritional Sciences Food Data Task Force, recipient of the New Zealand Royal Society's Science and Technology Medal, and a member of several scientific advisory boards. She has authored many scientific papers and UN publications, and several book chapters and reference books.

Dr. Burlingame studied at the University of California, Davis, and obtained her Bachelor of Science degree in Nutrition Science and Environmental Toxicology. She did her postgraduate work in New Zealand at Massey University where she obtained her PhD. From 1987-1998 she worked for the New Zealand Institute for Crop & Food Research, and since 1998 she has worked for the FAO.

Abstract

It is generally acknowledged that traditional food systems combine the goals of good nutrition and sustainable environments. In this regard, biodiversity is the key element, and it is reflected at three levels: the ecosystem or agro-ecological zone, the species contained in the ecosystem, and the genetic diversity within the species. Food composition sampling, sample preparation, analyses, and compilation are capable of capturing food biodiversity at all these level. However, few attempts have been made to do this in national food composition projects and programmes.

Food composition has been identified as one of two key areas of investigation to improve the evidence base for the international cross-cutting initiative on biodiversity for food and nutrition. The Report of the FAO Regional Conference for Europe (2008) put strong emphasis on capturing biodiversity in food composition data systems, and acknowledged the role of

INFOODS and EuroFIR. FAO has recently developed two indicators for nutrition and biodiversity, one of which is food composition. Data are currently being collected and reported. This paper will also review some non-European traditional food systems which recognize nutrition as an important ecosystem service.

Food biodiversity and knowledge of traditional food systems serve many purposes and sectors, not just the health sector, but also agriculture, trade and the environment – and are keystones to well-being in its broadest sense, both human and environmental.

INVITED PRESENTATION

New Traditional Foods data for inclusion in European Food Composition Databases

H.S.Costa[1], E.Vasilopoulou[2] & P.Finglas[3]

Dr. Helena S. Costa, Senior Research Scientist, Food and Nutrition Department, Instituto Nacional de Saúde Doutor Ricardo Jorge, I.P. (INSA), Lisbon, Portugal[1] Instituto Nacional de Saúde Doutor Ricardo Jorge, I.P., Av. Padre Cruz, 1649-016 Lisbon, Portugal, helena.costa@insa.min-saude.pt
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[3] Institute of Food Research, Norwich, United Kingdom

Biography

Dr. Helena Soares-Costa obtained her PhD in Biochemistry, from Lisbon New University, 1995. For over ten years, she has been involved in food science research. Her main scientific areas of research are Biochemistry, Nutrition, Food Composition and Analysis, Public Health and Epidemiology. In September 2006, Dr. Soares-Costa was appointed work package leader of Traditional Foods, in the European Food Information Resource Network of Excellence (EuroFIR).

As a Researcher, she continues to develop projects in the area of food science, namely food composition studies and implementation, validation of analytical methods in Food Chemical Analysis and in Biological Samples (especially bioactive compounds). In the area of Public Health and Epidemiology, she is coordinating a project on the impact of nutrition on chronic diseases.

Dr. Soares-Costa has recently become a member of the Editorial Advisory Board for British Nutrition Foundation, Nutrition Bulletin and is also a reviewer for some scientific journals**.**

Abstract

Background/Aims: There are many different cultures, within Europe, each with their own, distinct dietary habits. Traditional foods are key elements for the dietary patterns of each country, but unfortunately, in most countries there is little information on the nutritional composition of such foods. Therefore, there is a real need to study traditional foods to preserve these elements of European culture and, if possible, enrich and improve dietary habits across the whole continent.

The Traditional Foods work package in EuroFIR aims to provide new data on the nutritional composition of traditional foods for inclusion in national food composition tables with representative raw ingredients and recipes for 13 European countries (Austria, Belgium, Bulgaria, Denmark, Germany, Greece, Iceland, Italy, Lithuania, Poland, Portugal, Spain and Turkey).

Methods: A EuroFIR consensus-based method with standardised procedures was applied for the systematic study of traditional foods and recipes. Traditional foods have been selected based on the EuroFIR definition of the term 'traditional food' and prioritised according to specific criteria: documentation of traditional character; compositional data; consumption data; health implications and marketing potential. From the prioritised list, the 5 traditional foods to be analysed per country were finally selected to represent a full meal course. A protocol with guidelines for the recording of traditional recipes and the collection, preparation and distribution of laboratory samples has been developed to establish a common approach for all countries and to ensure that representative food samples are analysed. The laboratories to perform the nutritional composition of traditional foods have been selected according to quality requirements in order to generate new data with consistent high quality and reproducibility. The laboratories chosen were either accredited laboratories for each component, taking into account the scope of accreditation, or had successfully participated in Proficiency Testing Schemes.

Results: Five traditional foods per country have been selected, the traditional character has been documented and the preparation of traditional recipes has been recorded. Chemical analyses to determine the nutritional composition of the selected traditional foods per country were performed and the data were documented and evaluated according to EuroFIR guidelines. Information on food description, recipe information, component identification, sampling plan, sample handling, analytical method and performance was gathered for each of the 58 investigated traditional foods to be included in national food composition databases.

Conclusions: This common methodology for the study of traditional foods will enable countries to further investigate their traditional foods and to continue to update their national food composition tables and EuroFIR's food databank system. Another goal of the traditional foods work package is to continue to raise awareness of the positive health effects of traditional foods and to increase interest among food manufacturers, in order to preserve and promote traditional foods.

Funding acknowledgement: *This work was completed on behalf of the EuroFIR Consortium and funded under the EU 6th Framework Food Quality and Safety Programme (FOOD-CT-2005-513944). The author would like to thank EuroFIR traditional foods work package partners.*

INVITED PRESENTATION

BaSeFood - Sustainable exploitation of bioactive components from the Black Sea Area traditional foods

Prof. Filippo D'Antuono

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Biography

Prof. Filippo D'Antuono was born in Bologna, Italy in 1956. He obtained his degree in Agricultural sciences at the University of Bologna in 1979 and specialised in the science and technology of medicinal plants at the University of Pisa in 1983. Between 1980 and 1992, Prof. D'Antuono worked as a fellow researcher at the Department of Agronomy, University of Bologna and as a permanent staff researcher at the Faculty of Agriculture, University of Tuscia, Viterbo. In 1992 he became Associate Professor at the University of Tuscia, before taking up post in 1993 as Associate Professor in the department of Food Crop Production and Quality at the Food Science University Campus, Faculty of Agriculture, University of Bologna. Between 2002 and the present, Prof. D'Antuono has been full professor, Food crop production and quality, at the Food Science University Campus, University of Bologna.

Prof. D'Antuono has been responsible for several research contracts during his career including partnerships in the EU funded projects:

- EU-AIR. Towards a model of technical and economic optimization of specialist minor crops. (1995-1996);
- EU-FAIR. Spelt, a recovered crop for the future of the European sustainable agriculture. (1997-2000);
- EU RESGEN. The Future of European Carrot: a programme to conserve, characterise, evaluate and collect carrot and wild relatives (2000-2003);
- EU AGRIGENRES "Leafy vegetables: stimulating use" (2007-2010).

Presently Prof. D'Antuono is the coordinator of EU-funded FP7 BaSeFood project "Sustainable exploitation of bioactive components from the Black sea area traditional foods". He is member of the International Society for horticultural science and of the Society for Economic Botany and is author of about 170 scientific contributions.

Abstract

BaSeFood is an FP7-funded collaborative research project for specific cooperation actions dedicated to international cooperation partner countries (SICA).
BaSeFood aims to promote sustainable development and exploitation of traditional foods of plant origin, containing emerging bioactive compounds with putative health effects in the Black Sea Region (BSR). The Consortium is coordinated by the University of Bologna, Italy, and

includes 13 partners covering the BSR, EuroFIR partners with experience on traditional foods and bioactive compounds at the pan-European level, and one representing 11 European Food and Drink Federations. The objectives of BaSeFood are:

1. To investigate the knowledge base of traditional foods of the BSR in order to identify those foods to be collected and analysed.
2. To define, characterise and collect nutrient and bioactivity data for a subset of about 30 prioritised traditional foods using previously developed and validated EuroFIR guidelines and bioactive databases, with appropriate analyses.
3. To carry out human intervention case studies (priority: cardiovascular disease protection), supported by intensive *in vitro* and *in vivo* laboratory tests, to address the requirement for supporting evidence in nutrition and health claims.
4. To accurately map and describe the flow charts of BSR traditional foods preparation and processing, and determine bioactive retention at both laboratory and pilot plant scale in close collaboration with industry partners.
5. To evaluate attitudes of processors and consumers in order to optimise and enhance the whole food chain for improved availability and health benefits of BSR traditional foods.
6. To widely disseminate results and findings in order to enhance awareness and sustainable development of traditional foods of the BSR for improved health.

BaSeFood will address the main goals of the original call, in which core points were the substantiation of nutrition/health claims for traditional foods and the cooperation between researchers and stakeholders.

BaSeFood activities will be carried out in a frame of broad-sense sustainability, in which issues of local communities, traditional foods, plant resources, biodiversity knowledge and preservation will be also taken into account. The final aim is to put bioactive substances and related health claims in a favourable, consumer-friendly, context, in order to give opportunities to all possible stakeholders, independently of strictly regulatory facts. The recent evolution in evaluations of submitted health claims seems to fully support this integrated approach.

BIAMFOOD - Controlling biogenic amines in traditional food fermentations in European regions

G. Spano[1], J.S. Lolkema[2] and the BIAMFOOD Consortium

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Biography

Prof Giuseppe Spano is an Associated Professor in Industrial Microbiology and Recombinant DNA Technology at the University of Foggia, Foggia, Italy. He started his career as plants scientist, working on cereals senescence at the Institute of Crops Physiology (Director Dr. N. Di Fonzo) located in Foggia, Italy. In 2003, he got his first PhD at Long Ashton Research Station (LARS), Department of Agricultural, University of Bristol (UK) (Tutors Professor P. Shewry and Dr J. Napier). Thereafter, in 2003 he moved at the University of Foggia, Foggia, Italy, where he start his career as food microbiologist. In 2005 he got his second PhD on Food Microbiology at the University of Foggia, Foggia, Italy. He has been visiting professor in several European University and Research centers and has strong collaborations with research groups located in Bordeaux (France), Dijon (France), Institute Pasteur (France), Groningen (The Netherlands), Wageningen (The Netherlands), Lovain (Belgium), Madrid and Valencia (Spain). His research on food microbiology is mainly focussed on 1) Abiotic stresses and regulation of gene expression in Lactic Acid Bacteria; 2) Genetic engineering of Lactobacilli; 3) Biogenic amines in fermented beverages; 4) Probiotics and 5) Food borne pathogens. Giuseppe Spano is author or co-author of more than 100 publications. He frequently contributes as referee for journals such as *Journal of Bacteriology, Journal of Applied Microbiology, Applied and Environmental Microbiology, International Journal of Food Microbiology, Food Microbiology, Applied Microbiology and Biotechnology, Letters in Applied Microbiology, BMC Genomics, FEMS microbiology letters, Journal of Agricultural and Food Chemistry, Food Technology and Biotechnology Journal, Molecular Nutrition and Food Research, Journal of Food Science, Food Microbiology, Critical Review in Food Science and Nutrition.*

Abstract

Background/aims: Microorganisms are responsible for the production of biogenic amines (BA) that may cause serious health problems in humans. This project focuses on microorganisms in the food chain that produce BA with the main goal to improve the quality of traditional fermented food by reducing their BA content. The project focuses on three different fermentation processes in four different regions of Europe. The whole food chain is considered. At the beginning of the food chain, the potential of microorganisms to form BA is analyzed; during the fermentation process the physiological conditions that result in BA formation are controlled, and at the end of the chain the survival of microorganisms producing BA in the digestive tract are analyzed and their effect on the consumer considered. In this work we present our preliminary results on the Lactic Acid Bacteria (LAB) involved in BA production in fermented food and beverages.

Methods: Genomic DNA of LAB strains was isolated with protocols available in literature or commercial DNA extraction kit. About 100 ng of genomic DNA was added to 50 ml of a Multiplex - PCR mixture containing oligonucleotides able to identify agmatine deiminase, histidine, tyrosine and ornithine decarboxylase genes. All the amplified products were purified and cloned. In order to confirm the origin of the strains, the 16S rDNA gene was amplified with universal primers Bact 16S-F/16-R. DNA sequences were analysed and compared with the GenEMBL databases, using the BLAST network service (NCBI). Production of BA by positive strains was confirmed by TLC (Thin Layer Chromatography) analysis.

Results: A total of 936 strains were screened for the presence of genes and/or BA such as tyramine, histamine, putrescine and cadaverine. Though full analysis is ongoing, some preliminary conclusions seem to emerge: (i) *Lactobacillus brevis* and *Lactobacillus hilgardii* are supposed to be the main BA producers in wine and cider. (ii) The potential to produce putrescine is frequently observed in LAB such as *L. brevis* and *L. hilgardii*. The pathway is usually the agmatine deiminase pathway. In addition, new LAB species such as *Lactobacillus plantarum* were identified as putrescine producers. (ii) Histamine decarboxylase gene was mainly detected in wine *Oenococcus oeni*. (iii) Cadaverine producers were really rare. The pathway was only identified in one species: *Lactobacillus saerimneri*. A spin-off of these screening activities, the characteristics of histidine/histamine transporters of three different species was determined and the genetic organization of the histidine decarboxylation (*hdc*) locus was determined in a Pediococcus species and three Lactobacilli. Two types of histamine pathway encoding *hdc* loci appear to exist.

Conclusions: The methods developed allowed for fast screening of BA-forming LAB in fermented foods and can be applied to various food matrices. Histamine, tyramine and putrescine are the main BA produced by LAB. Physiological function of the histidine decarboxylation pathway appears to be acid stress resistance rather than proton motive force generation.

Funding acknowledgement: This work was funded under the EU 7th Framework Food, Agriculture and Fisheries, and Biotechnology Programme (Grant agreement no.: 211441 211441).

INVITED PRESENTATION

Food composition of ethnic foods commonly consumed in Europe

Dr. Santosh Khokhar

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Biography

Dr. Santosh Khokhar is the Senior Lecturer of Food Biochemistry at the 5* research rated School of Food Science and Nutrition, University of Leeds, UK. Prior to taking a faculty position at Leeds in 1998, Santosh had an academic position as Assistant Professor at Haryana Agricultural University, Hisar, India and research positions as Marie-Curie Fellow at the Institute of Food Research, Norwich, UK and at Wageningen University and RIKILT, Wageningen, and TNO-voeding, Ziest, The Netherlands. Santosh's main research interests centre on *food composition and health with special emphasis on the diets of minority populations*. She has been working in this area for 20 years and, in January 2005, she began working within the EuroFIR Consortium as Workpackage Leader for Ethnic Foods.

Abstract

Background: Health researchers, epidemiologists and dietitians use nutrient databases in a variety of ways to ensure healthy living for people. However, there is currently incomplete and fragmented information on the composition of ethnic foods in Europe. Therefore, it is necessary that food composition databases are extended to include important ethnic foods that are consumed by both mainstream and ethnic populations in Europe.

Objectives: The key objective was to generate new and reliable data on ethnic foods and harmonise methods for chemical analyses and recipe calculation.

Results: New data on 128 ethnic foods for inclusion in the national databases was generated by EuroFIR through participants from France (AFSSA), Israel (BGU), Spain (CESNID), Denmark (DTU), Italy (INRAN), The Netherlands (RIVM), Belgium (UGhent) and the UK (UL). To achieve this, methods for chemical analyses and recipe calculation were harmonised. In each selected European country, the list of prioritised foods and key nutrients, methods of analyses and quality assurance procedure were agreed. The methods for recipe calculation were harmonised by considering EuroFIR standards, yield factor at recipe level and nutrient retention factor at ingredient level.

The data on the nutrient composition of ethnic foods consumed by mainstream and ethnic populations in Europe varied widely. In particular the saturated fatty acids were least (0.1g/100g) in *Chukwangue* (Belgium) and highest (47.1g/100g) in *Nachos* (Italy). Mono-unsaturated fatty acids ranged between 0.11g/100g (*Chukwangue*, Belgium) and 55.01g/100g (*Sarmale*, Italy) whilst poly-unsaturated fatty acids range was 0.01g/100g (*Buttermilk*, France) to 56.6g/100g

(*Falafel*, Italy). Interestingly, both PUFA and MUFA were considerably higher in all Italian and Spanish ethnic foods when compared with others. Calculated data as compared with analysed showed that the differences for most macronutrients were smaller and within acceptable range whilst the micronutrients such as vitamins showed larger variation.

Conclusions: The new data have been scrutinised and are fully documented for inclusion in the national databases. It is concluded that the inclusion of these data and dissemination of appropriate knowledge to stakeholders will aid effective health and disease interventions, and enhance the provision of dietary advice to all European consumers. Transfer of scientific and technical knowledge to small-to-medium-sized enterprises (SMEs) will support new market opportunities and healthy food production.

Acknowledgments: This work was completed on behalf of the EuroFIR Network of Excellence Consortium funded under the EU FP6 'Food Quality and Safety Programme' (Contract nº FP6-513944) and from additional funding from UK's Food Standards Agency for 46 foods (Project No. N10038).

SHORT COMMUNICATION **5_53**

Developing a habitual ethnic specific multi-nutrient intake scale (H-MNIS) using food composition tables, to assess the association between diet and adverse birth outcomes of minority women in Israel

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Biography

Dr. Kathleen Abu-Saad obtained her PhD in epidemiology from Ben-Gurion University of the Negev, Israel, in 2009. Over the past ten years, she has conducted nutrition research among the ethnic minority Bedouin Arab population in southern Israel, which has undergone a rapid process of modernization and urbanization and is currently suffering from disproportionately high chronic disease rates. She has been involved in compiling recipes and food composition data for traditional Bedouin foods for incorporation into the regional nutrient database maintained by the S. Daniel Abraham International Center for Health and Nutrition at Ben-Gurion University; in modifying the 24-hr recall dietary assessment questionnaire to quantify individual intake from common-plate meals among this population; and, in developing other dietary assessment tools that incorporate traditional/ethnic Bedouin foods for exploring specific research questions. Dr. Abu-Saad has been very involved in the analysis of how the Bedouin diet has changed over the past several decades, and the implications of these changes for health and disease risks in the areas of prenatal exposures and birth outcomes, and chronic disease development among adults.

Dr. Abu-Saad has recently taken a position with the Gertner Institute for Epidemiology and Health Policy Research which involves developing nation-wide research projects in nutritional epidemiology, with a special emphasis on health research projects among the Arab minority in Israel.

Abstract

Background/aims: Preterm birth (PTB), low birth weight (LBW) and small-for-gestational-age (SGA) are adverse birth outcomes (ABOs) that may have life-long health consequences and are more prevalent in minority ethnic populations, whose diet includes items not always found in food composition tables. The aim of the study was to develop a multi-nutrient intake scale in order to examine the associations between the habitual, periconceptional nutritional intake of pregnant Bedouin women and adverse birth outcomes in this ethnic population.

Methods: The BGU food composition table was expanded to include food items commonly consumed by the Arab Bedouin population of the region. The list of available nutrients was also expanded to provide intake data on omega-3 fatty acids. Periconceptional diet was assessed in a prospective study of non-primipara Bedouin women with singleton pregnancies using a short, targeted food frequency questionnaire (TFFQ) to measure the habitual pre-pregnancy intake of protein, iron, zinc, calcium, folate, and omega-3 fatty acids (ALA, EPA, and DHA). To overcome the high multi-collinearity (Pearson's r>±0.70) between the components an intake scale, the H-MNIS, was created. The intake of each nutrient was assessed and given its quartile value, thus if a woman's energy intake fell in the second quartile of the population, she received the value 2 for energy. The H-MNIS score was then computed as the average of the protein, lysine-protein ratio, energy, calcium, iron, folate, ALA, EPA, and DHA quartiles. This resulted in a measure ranging from 1.0 to 4.0. Data on maternal anthropometrics, obstetric history, index pregnancy, SES indicators, and birth outcomes were abstracted from the medical records.

Results: The TFFQ was administered to a sample of 404 participants, whose mean±SD gravidity and parity were 4.2±2.8 and 3.7±2.5, respectively. Birth outcomes for the index pregnancy were 9% each for PTB, LBW, and SGA; and a total of 18% had one or more ABO. The mean±SD H-MNIS score for the whole sample was 2.50±0.82. In multivariate logistic regression analysis controlling for possible confounders, women in the lowest H-MNIS intake quartile had a 7.1-times higher risk (95%CI: 2.3-22.0) of having any ABO than women in the highest quartile (P for trend=0.001), and the RR for PTB alone comparing women in the lowest and highest H-MNIS quartiles was similar (P for trend=0.001). Women in the lowest quartile of complete protein intake had a 7.0-times higher risk (95%CI: 1.7-28.1) of having a child with LBW than women in the highest quartile (P for trend=0.006).

Conclusions: Diet quality as assessed by the multi-micronutrient index developed was associated with adverse birth outcomes. Thus we can state that in this ethnic minority, a better quality periconceptional diet was associated with reduced risk for ABOs. Interventions to improve the habitual diet quality of Bedouin women of childbearing age may reduce ABO rates.

Funding acknowledgement: The maintenance of the data base was supported by EuroFIR and the work was completed on behalf of the EuroFIR consortium and supported by funds from the EU 6th Framework Food Quality and Safety Programme (FOOD-CT-2005-513944). The establishment of the data base was supported by the S. Daniel Abraham International Center for Health and Nutritionat BGU and the fields work was supported by a NIHP Grant.

Session 5 - New data on bioactive constituents and other food components

Chairs: Dr Mairead Kiely (UCC) and Assoc Prof Peter Hollman (WU)

• Dr Roland Poms *International Association for Cereal Science and Technology, Austria*	MoniQA Network of Excellence and its efforts to promote applicability and reliability of rapid methods in support of food safety and quality
• Dr Paul Kroon *Institute of Food Research, UK*	Using EuroFIR BASIS Online bioactive database – a case study on phytosterols
• Dr Mairead Kiely *University College Cork, Ireland*	EuroFIR BASIS Online Bioactives Database: Potential application for health claims evaluations
• Dr Kirsten Pilegaard *Technical University, Denmark*	Information on plant foods in eBASIS – what's in a name?
• Dr Jara Perez-Jimenez *INRA, France*	Phenol explorer – a new comprehensive database on polyphenol composition in foods
• Catalina Vasco *Food Science, SLU, Sweden*	Andean blackberry, strawberry and mortiño as sources of antioxidants

INVITED PRESENTATION

MoniQA Network of Excellence and its efforts to promote applicability and reliability of rapid methods in support of food safety and quality

Dr. Roland Ernest Poms

Coordinator of MoniQA (Monitoring and Quality Assurance in the food supply chain) Network of Excellence) and Secretary General/CEO, International Association for Cereal Science and Technology (ICC), Vienna, Austria
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Biography

Dr. Roland Poms is Secretary General/CEO of the International Association for Cereal Science and Technology (ICC), based in Vienna, Austria. He holds MSc and PhD degrees in Food Technology and Biotechnology from BOKU, the University of Natural Resources and Applied Life Sciences, Vienna, Austria. During the past 12 years Dr. Poms has held several research positions in Austria, Belgium, Italy, and the USA. His major expertise is method development for food safety assessment (microbiological and biochemical) and GMO detection. In recent years, Dr. Poms has worked on the validation of rapid methods and has co-ordinated several international research projects during his employment at the Joint Research Centre of the European Commission (2001-2004) and ICC (2004 – date), e.g. he is coordinator of the MoniQA Network of Excellence www.moniqa.org. Dr. Poms is Editor in Chief of the peer-reviewed international journal QAS – Quality Assurance and Safety of Crops & Foods, he is author of some 30 scientific papers, various book chapters, and some 200 abstracts. He is involved in working groups of various international organisations like CEN, ISO, IAM, Codex Alimentarius, AOAC and AACC Int'l.

Abstract

With the rise of globalisation, more and more foods and food products are being traded around the world. Ensuring that these foods are of a high quality and safe to eat when they reach the consumer requires reliable food analysis techniques. However, different countries currently use different methods to test foods for the presence of harmful substances. Additionally, the legal requirements concerning maximum limits for contaminants and undesired substances, as well as the related sampling and monitoring schemes, differ widely between countries and global markets. ICC is involved in various harmonising initiatives which attempt to overcome global trading hurdles and to improve food quality and safety on a global basis.

MoniQA (Monitoring and Quality Assurance in the food supply chain), an EU-funded Network of Excellence, comprises 92 registered partners (core partners, advisory panel, and associated partners) from 35 countries and all continents. MoniQA is a truly global project and it is coordinated by ICC. The project started on the 1st February 2007 and it is funded with €12.3 million for a duration of 5 years. MoniQA works towards the harmonisation of monitoring and control strategies for food quality and safety assessment, and thus focuses on performance

criteria for methods used to analyse foods and food products for safety and quality. More information about MoniQA can be found at www.moniqa.org.

The main focus of the Network is on rapid methods and their applicability and reliability in routine testing for the safety of foods and food products. The work will involve validation studies, design and development of reference materials/testing materials, and validation guidelines.

Some major outputs during the first 2 years are the MoniQA database on food safety, MoniQA FST (Food Scientist Training), the international ICC/MoniQA journal QAS (Quality Assurance and Safety of Crops & Foods), an information website, and a variety of publications on food safety issues. This presentation will give an overview of MONIQA, its objectives and its achievements so far.

INVITED PRESENTATION

Using the EuroFIR BASIS on-line bioactive database – a case study on phytosterols

Plumb J[1], Rhodes MJC1, Lampi AM[2], Buchgraber M[3] and Kroon PA[1]

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Biography

Dr. Paul Kroon completed an honours degree in botany at the University of Durham and a PhD in plant secondary metabolism at the University of Hull before joining the Institute of Food Research in Norwich as a biochemist. After a few years working on the enzymology of plant cell wall-degrading enzymes, Paul started to work on flavonoids and other dietary phenolics. His early work focussed on mechanisms of absorption from the gut, including work that established that lactase was essential for small intestinal absorption of dietary flavonoids. Paul has led the Polyphenols group at IFR since 2001 and he has published >80 peer-reviewed papers concerned with flavonoid absorption and metabolism in humans, the effects of metabolism on the properties of polyphenols, the effects of food processing and food matrix on polyphenol content, composition and bioavailability, and the efficacy and mechanisms by which polyphenols affect vascular function. He has been awarded >£1.8 million to fund his research. He chairs the composition group of the EuroFIR BASIS project which is developing an online database of composition and bioactivity data for bioactive substances in foods, and has led IFRs contribution to various European research projects including FLAVO and a new project BaSeFood. Paul is an Executive Editor for a leading food science journal, Vice President of the international society Groupe Polyphénols, and regularly presents his research at international scientific conferences.

Abstract

Background: Information on the levels of plant-based bioactive compounds and their biological activity is broadly dispersed in the literature, and currently there is no central source of such data which can be used for scientific purposes such as intake studies or for supporting health claims. The European Food Information Resource Network (EuroFIR) has established a unique on-line food composition and biological effects database for plant-based bioactive compounds (EuroFIR-BASIS; (www.polytec.dk/ebasis). This database has been developed to facilitate easy sourcing and analysis of extensive compositional and biological activity data for bioactives[1]. Other databases have been developed concerned solely with composition of certain groups of bioactives (e.g. USDA database of critically evaluated data on flavonoids[2]. In addition, there are a few national databases which collect compositional information of individual classes of bioactives such as phytosterols[3] and some databases concerned solely with particular biological activities (e.g. antioxidant / radical scavenging activities[4]). The EuroFIR-BASIS database is considerably more powerful than any currently available system since it uniquely combines critically assessed compositional and biological effects data, and covers all the most important

groups of bioactive compounds which have a potentially beneficial effect on the health and well-being of consumers.

Methods: In order to demonstrate the utility of the EuroFIR-BASIS database as a useful and fully searchable source of plant bioactive compositional data, we extracted and interrogated the compositional information for one class of bioactives, the phytosterols (PS). Two types of data were extracted; (i) descriptive information for foods containing PS (e.g. levels and patterns of individual PS, distribution in food plants, variation within the plant / plant organs), and (ii) extended data sets which allowed statistical analysis of the data.

Results: As of July 2008, the EuroFIR BASIS database contained 2345 quantitative compositional data points on phytosterols derived from 40 papers published in peer-reviewed scientific journals. The composition of the individual compounds in all plant based foods, were comprised of 18 individual phytosterols in 91 different plants and plant based foods. The data closely followed a normal distribution for many plant / plant part / individual PS combinations, and facilitated the identification of outliers in the data sets which may have distorted any derived 'typical' values.

Conclusions: We have illustrated, using the available data on phytosterols, the types of data which may be generated from searches of the EuroFIR BASIS database. These approaches demonstrate the power of the EuroFIR-BASIS database in bringing together compositional data for this class of bioactive compounds, which can equally be applied to any of the 16 compound classes currently covered in the database.

Funding acknowledgment: *This work was prepared on behalf of the EuroFIR consortium and funded under the EU 6th Framework Food Quality and Safety Programme (Project Contract No: FOOD-CT-2005-513944).*

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INVITED PRESENTATION

EuroFIR BASIS Online Bioactives Database: Potential application for health claims evaluations

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Biography

Dr. Mairead Kiely graduated with a BSc (Hons) in Human Nutrition from the University of Ulster in 1992. She completed a PhD investigating antioxidant status during pregnancy and in neonates at University College Cork. Her postdoctoral post was as director of the North/South Ireland food consumption survey of Irish adults. In 2001 she joined the academic staff at the Dept. of Food and Nutritional Sciences at UCC. Mairead's main research interest is in micronutrient status, intakes and requirements, particularly vitamin D and its putative role in cardiovascular health and immune function throughout the life cycle. To date, she has published more than 60 research papers and has been awarded more than €3M in national and international funding. She has participated in several EU-funded projects, including SeafoodPLUS, Optiford and Infabio. Mairead was involved in implementing two EuroFIR objectives; to establish an on-line food composition dataset for Ireland and to develop the biological effects database for EuroFIR BASIS.

Abstract

The European Food Information Resource Network (EuroFIR) has established an on-line food composition and biological effects database for plant-based bioactive compounds. The EuroFIR BASIS database (www.polytec.dk/ebasis) is a compilation of expert-evaluated data extracted from the literature. The bio-effects database has prioritised human intervention studies investigating effects of plant-based bioactive compounds on cardio-metabolic and bone health outcomes, although data on cognition and visual function are also included. Experimental data on 346 biomarkers are currently available, 70% of which relate to cardio-metabolic health. At present, data from over 400 references are incorporated to the bio-effects database, including 144 compounds in 17 compound classes from 125 food plants.

In December 2006, rules for the use of nutrition and health claims on foods were adopted throughout the EU Regulation (EC) 1924/2006 (1). Under the Regulation, claims can be loosely grouped under "function" health claims, based on generally accepted scientific evidence and defined by article 13, "new function" health claims based on new evidence, defined by article 13(5) and claims relating to disease risk reduction or child development or health, defined by article 14. The European Food Safety Authority (EFSA) assesses whether claims made under articles 13(5) or 14 are scientifically justified based on the evidence submitted. Article 14 claims must be prepared according to the EFSA technical guidance for applicants (2), which clearly

outlines the necessity of including data collected in human studies to substantiate any applications submitted.

EuroFIR BASIS has a sophisticated data retrieval software system, searchable by compound, food or biological effect, giving users full control over the data selected for outputs, which can be downloaded as spreadsheets, allowing them to perform calculations, create graphs and manage the data as required. We carried out a preliminary analysis to establish whether the bio-effects database might be relevant to health claims evaluations. Searches for all compounds and compound classes currently included in the bio-effects database were conducted in the EFSA Register of Questions (http://registerofquestions.efsa.europa.eu/roqFrontend/questionsList.jsf).

The table shows significant overlap between the number of references currently pertaining to compound classes in the bio-effects database and the number of questions in the EFSA Register, showing the potential application of the bio-effects database to health claims evaluations. Projected developments of the bio-effects database will seek to reflect these requirements.

Table 1

Compound Class	Health Claims DB	Bio-Effects DB
Anthocyanins	12	81
Carotenoids	7	17
Flavanols	3	49
Flavones	18	43
Flavonols	3	62
Flavanones	20	23
Glucosinolates	2	101
Isoflavones	17	119
Lignans	9	25
Phytosterols	10	60
Proanthocyanidins	16	12
Capsaicinoids	6	14
Chlorogenic acid	3	5

Funding acknowledgment: *This work was prepared on behalf of the EuroFIR consortium and funded under the EU 6th Framework Food Quality and Safety Programme (Project Contract No: FOOD-CT-2005-513944).*

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INVITED PRESENTATION

Plant information in EuroFIR – what's in a name?

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Biography

Dr. Kirsten Pilegaard, D.V.M., Ph.D., is senior adviser at the Department of Toxicology and Risk Assessment, National Food Institute, Technical University of Denmark. She has a broad knowledge of plants used as foods and in food supplements and is experienced in risk assessment of natural toxins in plants used for foods and food supplements. She works as an expert for the Danish Veterinary and Food Administration and has participated in various European Food Safety Authority (EFSA) working groups on botanicals. Her research experience is within food allergy, neurotoxicology, cancer and atherosclerosis.

Abstract

The Plant List Group of the EuroFIR work package on bioactive compounds has provided botanical information on major food plants and edible mushrooms used in Europe. The data include scientific names, English vernacular names, and plant parts for food use that have been included in the EuroFIR bioactive database on bioactives from plant foods. Around 325 plants can be found in the database, but as part of its work the group prioritised approximately 100 food plants that are more commonly used. For these species it was of special importance to have good coverage of information on composition and biological activity. The group wrote descriptions and took photos of around 100 of the edible plant parts included in the EuroFIR database.

The Plant List Group published the EuroFIR-NETTOX Plant List comprising of about 325 major European food plants with vernacular names in 15 European languages and included information of plant parts used [3]. A more comprehensive list of Major European Food Plants [1] consisting of 415 plants has been collected. This list is an extension of the EuroFIR-NETTOX Plant List. Also a list of 'exotic' food plants has been developed [2]. The species in this list are mainly consumed by people outside Europe and only by a minor part of the population in Europe. The number of plant and mushroom species in this list is 435. Finally, a list of plants for food supplements and herbal teas (approximately 100 plants) has been collected [4]. All these additional plant lists can be used for future extension of the EuroFIR database on bioactives.

The selection of food plants used by Europeans is worked out in a transparent and reproducible way based on major reference works. Information collected in the EuroFIR-NETTOX Plant List has been used by national food authorities and in the EU for consideration of plants and

mushrooms that had been used to a significant degree before 1997, and are therefore not covered by the novel food regulation.
The scientific botanical name, together with information on the plant part used, is of utmost importance for the identification of a specimen. Scientists wanting to study food plants or edible mushrooms should therefore be very careful in the description of the species and plant parts. It should be kept in mind than in many languages, e.g. English, vernacular names do not uniquely identify the species studied.

Funding acknowledgment: *This work was prepared on behalf of the EuroFIR consortium and funded under the EU 6th Framework Food Quality and Safety Programme (Project Contract No: FOOD-CT-2005-513944).*

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Phenol-Explorer, a new comprehensive database on polyphenol composition in foods

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Biography

Jara Pérez-Jiménez (Madrid, 1981) conducted research on dietary antioxidants and their *in vitro* and *in vivo* effects from 2003 to 2007 at the Department of Metabolism and Nutrition of the Spanish Research Council (Instituto del Frio-CSIC), and obtained her PhD in Food Science and Technology from the Universidad Autonoma de Madrid (Spain) in 2007. She also worked as a postdoctoral researcher at the Department of Nutrition of the Universidad Complutense de Madrid (Spain) and today at the Unité de Nutrition Humaine (INRA, Clermont-Ferrand, France), in Augustin Scalbert's group.

She works on bioactive compounds present in plant foods, particularly polyphenols, and their role in the prevention of chronic diseases. She is involved in the development of Phenol-Explorer, an electronic database on the polyphenol content of foods and beverages, as well as applications of this tool to nutritional epidemiology.

Abstract

Background/aims: Polyphenols are natural antioxidants present in plant foods and they have been related to the prevention of several chronic diseases. Complete tables of polyphenol content in foods and beverages are needed by epidemiologists, and the agricultural and food industry. However, at present these content values are scattered in over 1000 literature sources. Food composition tables so far available for polyphenols are still incomplete and largely focus on a limited number of flavonoid aglycones.
Our objective was to build a comprehensive database gathering all polyphenol content values that are published in over 1,000 scientific papers. Content values of the different compounds vary widely according to variety, environment, cultivations and/or processing. These values were thus aggregated to obtain average contents representative of the different foods and beverages.

Methods: A systematic literature search was performed in Food Science and Technology Abstracts and in review articles. The relevant articles containing analytical data were analysed. Each content value was inserted in a Microsoft Access® database, together with the reference of the publication and a description of the food, the compound, and the analytical method used for

its determination. Data were evaluated (sampling, number of samples, polyphenol extraction and analytical method, disclosure of experimental details). Only those values filling specified minimal requirements were selected for aggregation (mean values). Ontologies were produced for phenolic compounds and analytical methods. Content values were aggregated separately for five different types of analytical methods.

Results: The database Phenol Explorer and the associated composition tables were completed. 63,291 polyphenol content values from 1,326 publications were implemented in the Access database. 35,837 data from 608 publications were selected for aggregation to provide average content values for 498 phenolic compounds in 429 foods and beverages belonging to the following groups: non-alcoholic beverages, alcoholic beverages, fruits and fruit products, vegetables, cereals and cereal products, seeds, cocoa, seasonings and oils. Content values for individual compounds analysed with or without glycoside and ester hydrolysis, as well as total contents of polyphenols (Folin value), proanthocyanidins and anthocyanins, are provided.
A freely available and user-friendly web interface has been developed (www.phenol-explorer.eu) to allow any user to make various queries in the database and retrieve average content values for the different compounds in the different foods. It also allows users to trace all original content values and references used for the aggregations, to obtain various graphics and to perform various calculations. Several original reports on polyphenols in the different food categories and the factors affecting their contents are also available on the website.

Conclusions: Phenol Explorer is the first comprehensive database on polyphenols in foods and beverages and should significantly contribute to improve our knowledge on the various polyphenols ingested with our diets and on their associations with health and the prevention of diseases. It has already been used in several epidemiological studies to calculate the intake of polyphenols in different populations.

Funding acknowledgment*:* Unilever, Danone and Nestlé support this work.

SHORT COMMUNICATION **4_20**

Ecuadorian Andean blackberry (*Rubus glaucus* Benth), strawberry (*Fragaria ananasa* Duch) and mortiño (*Vaccinium floribundum* Kunth) as sources of antioxidants

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Biography

Catalina Vasco will obtain her PhD in Food Science in September 2009 from the Swedish University of Agricultural Sciences (SLU) in Uppsala, Sweden. Her main area of research has been the analysis of phenolic compounds in fruits and fruit products. She has been a member of the Research group in the Department of Food Science and Biotechnology at the Escuela Politécnica Nacional in Quito, Ecuador where she has worked on food processing, analysis of different bioactive compounds and validation of analytical methods.

Abstract

Background: Berries are highly appreciated due to their nutritional properties as part of a healthy diet, with special attention to bioactive compounds[1]. Phenolic compounds are non-nutrients which have been studied for their protective role against oxidative damage[2]. The aim of this study was to evaluate the antioxidant capacity, total soluble phenolic compounds content, and identify and quantify the different phenolic compounds in three types of berry.

Methods: The berries (Andean blackberry, mortiño (a blueberry variety) and strawberry) were purchased (~1 kg) at eating ripeness from three popular markets in Quito-Ecuador on three occasions. The modified TEAC assay[3] was used to measure the antioxidant capacity and the results were expressed in mg Trolox equivalents. Total soluble phenolic compounds was measured by the Folin-Ciocalteou method[4] and compound identification was achieved by Liquid Chromatography-Diode Array Detector-Mass spectrometry[1] in three berries cultivated in Ecuador.

Results: Antioxidant capacity values for Andean blackberry, mortiño (a blueberry variety) and strawberry were 52, 48 and 22 µmol Trolox/g fresh weight, total phenolic compounds were 2167, 882, and 238 mg gallic acid equivalents/100g FW respectively. The main classes and quantification of phenolic compounds for the three berries are shown in Table 1. Andean blackberry and strawberry had ellagitannins and ellagic acid derivatives as a major class. Anthocyanins were the second major group of compounds for Andean blackberry and strawberry, while for mortiño it was the most abundant class.
Gallic acid, ellagitannins, ellagic acid and derivatives, caffeic acid ester, p-coumaric acid esters, quercetin glucuronide, kaempferol derivatives, cyanidin-3-O-glucoside and -3-O-rutinoside were identified in Andean blackberry. Mortiño, on the other hand, showed a more diverse profile.

Galloyl, vanilloyl and p-hydroxybenzoyl hexoses, chlorogenic and neochlorogenic acids, caffeic/ferulic acid derivatives, p-coumaric acid derivatives, (-)-epicatechin, proanthocyanidins, quercetin hexosides, pentosides and a deoxyhexoside, myricetin hexosides and pentosides and anthocyanins that were cyanidin and delphinidin glycosides were identified. Galloyl esters, ellagic acid derivatives, two p-coumaroyl esters, two proanthocyanidins, quercetin-3-O-glucuronide, kaempferol-3-O-glucuronide, cyanidin-3-O-glucoside and pelargonidin-3-O-glucoside and -3-O-rutinoside were found to be present in strawberry. Andean blackberry is the richest berry in phenolic compounds (mainly ellagitannins and ellagic acid derivatives). It has a similar antioxidant capacity compared with mortiño, with a phenolic profile dominated by anthocyanins but also higher in quercetin glycosides, hydroxycinnamic acids and proanthocyanidins.

Conclusions: In conclusion, the studied berries can contribute to the diet with a variety of phenolic compounds with different antioxidant activities.

Table 1. Main phenolic compounds identified and quantified in the berries as mg/kg FW.

	Andean blackberry	**Strawberry**	**Mortiño**
Gallic acid and galloyls	49	46	31
Chlorogenic acid	ND	ND	170
Caffeic/ferulic acid derivatives	ND	ND	150
p-Coumaric acid derivatives	4	18	17
(-)-Epicatechin	68	ND	80
Proanthocyanidins	58	78	400
Quercetin derivatives	59	34	350
Myricetin derivatives	ND	ND	26
Kaempferol derivatives	4	5	26
Cyanidin glycosides	508	6	1810
Pelargonidin glycosides	2	66	ND
Delphinidin glycosides	ND	ND	220
Ellagitannins & ellagic acid derivatives	3926	278	ND

ND=not detected

Funding acknowledgment: Conference attendance is supported by EuroFIR under the EU 6th Framework Food Quality & Safety Programme (FOOD-CT-2005-513944).

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Session 6 - Delivering food composition data via emerging interfaces for dietary assessment purposes

Chairs: Dr Paolo Colombani (ETHZ) and TBC

• Priv.-Doz. Dr. med. habil. Ralf Schiel *MEDIGREIF-Inselklinik Heringsdorf GmbH, Germany*	Electronic health technology for the assessment of physical activity and eating habits in children and adolescents with overweight and obesity
• Dr Angela Paleologou *University of Ioannina, Greece*	The Vitalog innovative approach to a healthy nutrition and enhanced lifestyle
• Assoc Prof Barbara Koroušić Seljak *Jožef Stefan Institute, Slovenia*	Web-based eHealth applications with reference to food composition data

INVITED PRESENTATION

Electronic health technology for the assessment of physical activity and eating habits in children and adolescents with overweight and obesity

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Biography

Dr. Ralf Schiel studied Human Medicine at the University of Saarland, Homburg/Saar, Germany, and at the University of Rostock, Germany between 1987 and 1993. In 1993 he took up post as Physician at the Department of Internal Medicine, Friedrich-Schiller-University, Jena, Germany, working there until 2004. He graduated in 1994 as “Dr. med.” with the scientific research project “Cyclosporine A in the treatment of autoimmune diseases”. He has been a member of the German Diabetes-Association (DDG) and the European Association for the Study of Diabetes (EASD) since 1994. In 1998 Dr. Schiel became a Research Fellow at Yale University School of Medicine, USA, in the Department of Internal Medicine, Endocrinology Section. He specialised and graduated in both Internal Medicine and Diabetolgy in 2001. In 2003 he graduated as “Privatdozent” (venia legendi) at the Friedrich-Schiller-University, Faculty of Internal Medicine, Jena, Germany. Since 2004, he has been Head and Medical Director of the MEDIGREIF-Inselklinik Heringsdorf GmbH, Department of Diabetes and Metabolic Diseases, Seeheilbad Heringsdorf. He has authored over 350 publications, including 64 original papers in national and international journals.

Abstract

Background: Modern electronic health technologies, such as sophisticated electronic health records, electronic technology for diagnosis and therapy, and telemedical applications, have the potential to improve health care. In some fields, such as the treatment of chronic diseases and overweight or obesity, modern electronic health technology is seen as a solution for certain problems in disease management. It has the potential to enhance care coordination and to support patients’ self-care. Moreover, it can be expected that using electronic health technology will reduce costs while maintaining high-quality health care.

During the last decades in the majority of Western European countries and the U.S., the prevalence of overweight and obesity has increased markedly. The association between overweight, obesity, impaired glucose tolerance, arterial hypertension and the risk for development of cardiovascular diseases has also been recognized. Overweight and obesity increase the risk of atherosclerotic disease and premature death.

Based on this background, a pilot trial was designed in our centre to answer the following questions:

1. Can modern electronic health technology be integrated in the therapy of children and adolescents with overweight and obesity;
2. Is there maybe a discrepancy between overweight and obese childrens' and adolescents' self-reported physical activity, eating habits and the real situation?

Methods: *Modern electronic health technology to assess physical activity and eating habits:* To assess physical activity and eating habits in children and adolescents, a modern electronic health technology was developed by the Fraunhofer Institute for Graphical Data Management, IGD Rostock, Rostock, Germany. The system consists of a mobile motion sensor board (MoSeBo) or a wireless sensor for physical activity, integrated into a mobile phone with digital camera (DiaTrace) (Figure 1).

Figure 1. Modern electronic health technology consisting of a mobile motion sensor board (MoSeBo) (in the middle) or a wireless sensor for physical activity, integrated in a mobile phone with digital camera (DiaTrace) (left and right), developed by the Fraunhofer Institute for Graphical Data Management, IGD Rostock, Rostock, Germany.

Using complex algorithms, the MoSeBo and DiaTrace analyse the kind, intensity and duration of physical activity and transfer the data wireless to a central server. To define kind, intensity and duration of physical activity, activity-units (Aktivitätseinheiten, AE) were calculated. Variation coefficients with respect to walking and cycling with an intra assay variance of 2.56% (walking) and 3.45% (cycling) were 2.67% and 2.84%. Using the mobile phone in parallel with a digital camera (DiaTrace) allows eating habits to be documented. Taking a photo of the meal, kind, quantity and energy content of nutrition can be identified in a reliable way.

Patients included in the trial: All children/adolescents with overweight/obesity (n=37, age 14.6±2.7 years, BMI 32.8±4.7 kg/m^2, BMI-SDS 2.59±0.4) admitted to our hospital, the MEDIGREIF-Inselklinik Heringsdorf GmbH, Department of Diabetes and Metabolic Diseases, Ostseebad Heringsdorf, Germany, between April and August 2008, were included in the pilot trial.

Preliminary results of the pilot trial: In the pilot trial the total follow-up period was 111 days. Total physical activity measured with MoSeBo/DiaTrace was 267.0±119.2 min/d (15.4±7.4 units/d). Patients spent 63.7 (1.5-173.3) min/d walking, 11.0 (0-42.3) min/d running, 23.8 (0.5-63.3) min/d cycling and 21.3 (0-69.7) min/d driving. In contrast, in most domains, activity documented by patients was significantly higher: Walking 317.8 min/d (p=0.001 vs MoSeBo/DiaTrace), running 104.3 min/d (p=0.01). In respect of cycling, patients' estimation (23.6 min/d) and objective documentation were comparable. Similar differences were seen concerning eating habits. Multivariate analysis: There was an association between weight reduction (R-square=0.590) and intrinsic motivation (ß=0.732, p<0.001), intrafamilial conflicts (ß=0.461, p=0.002), duration of physical activity measured with MoSeBo/DiaTrace (ß=-0.438, p=0.002) and body fat mass (ß=-0.393, p=0.005).

Conclusions: The present pilot trial promises very good and reliable results: Using modern electronic health technology allows the objective assessment of kind, intensity and quantity of physical activity and eating habits. It is able to improve the therapeutic outcome in children and adolescents with overweight and obesity.

INVITED PRESENTATION

The Vitalog innovative approach to a healthy nutrition and enhanced lifestyle

Dr. Angela Paleologou

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Biography

Dr. Angela Paleologou (BA; MA; Dip; PhD; PD) is Assist. Prof. in Clinical Psychology & Psychotherapy at the Ioannina University Hellas, and is Chief Scientific Advisor to Vitalog (http://www.vitalog.be). Dr. Paleologou acquired her major titles in Hellas, the UK, and the US, respectively, and has been teaching, researching and implementing holistic health projects since 1990, in collaboration with several bodies promoting healthy lifestyle principles and tactics and chiefly under the auspices and funding of the European Union. She has continuously provided short- and long-term individual psychotherapy, hardiness personality cognitive restructuring, crisis intervention, and consultation services to individuals and groups in need, as well as clinical supervision, training and administrative and counselling support for professional development opportunities to under- and post-graduates, prioritizing services offered by her as a Clinical Telementor and Telecounsellor. She is a member of a number of scientific associations, the writer of a considerable body of scientific articles and books especially on resilience and qualitative lifestyle and an internationally mobile speaker on adult education and adolescent boosting self-esteem and assertiveness. Dr. Paleologou is a key advisor of Vitalog.

Abstract

Vitalog (http://www.vitalog.be) is a web-plus-mobile healthy lifestyle and nutrition system of personalized multidimensional coaching that is based on a cohort of approaches to behavioral change, combined with cognitive restructuring to resolving tendencies to, and/or overweight problems. Vitalog has a long history of provisions and support for overweight and obese individuals and groups. It has lately extended its activities to become concerned with the nutritional habits of individuals and groups of individuals who are at-risk for exhibiting overeating behaviours, including youngsters. Vitalog was created for, and is functioning with, the strong incentive to steadily investigate, and fulfil the needs of individuals regarding correct food consumption and life style-related healthy attitudes. Years of ongoing Vitalog market and scientific research has revealed some quite indisputable, widely acknowledged, almost self-evident facts:

A. conventional approaches on mere diet plans have traditionally been i) rigid, ii) time-consuming for recipients, iii) not accounting for individual particularities, iv) often dehumanizing, by treating the person as a subject, v) authoritatively directive and vi) quite unadventurous – with these flaws eventually proving them ineffective;

B. more recent approaches aiding people to develop better nutrition habits still: i) retain inflexibility, ii) coerce consumers to passively follow strict dietary instructions and iii) continue to lack consideration for individual differences, iv) without increase of any attention in inducing, if not the desire, at least some interest into persons to have fun when engaging with the, admittedly difficult, diet-keeping effort. In addition, such contemporary plans v) do not manage to refute time-devouring market search for appropriate dietary ingredients on behalf of their clientele, vi) nor do they lessen patronizing consumers as to the alleged importance of fixed menu obligations of theirs – thus continuously failing to prove any more effective for consumer compliance and/or satisfaction;

C. overweight and obese persons themselves are of the most challenging individuals to effectively influence against unhealthy eating habits, in as much as their proclivity to over-consume food pertains to both, pleasure and resistance – the former almost universally indicates emotional 'gaps' inappropriately and, alas, inconsequentially 'filled' by large quantities of food (offering the fallacy of gratification), and, at the same time, the latter conceals analogous emotional conflicts compelling to undesirably irregular and indeed qualitatively noxious nutritional choices (pseudo-balancing with the fallacy of wilful differentiation from others). Taken together, these indications form a highly complex problem that becomes more difficult if one considers that overweight and obesity entail the most expensive sequelae for both the various health systems and the individuals at-risk themselves.

These findings led Vitalog to actively engage with a number of concrete strategic combinations in order to decisively address these problems in an efficient and, in fact, multidimensional way to:

1. Organize a cohort of scientific evidence into practically applicable forms to communicate with consumers;
2. Record normal-vs.-risky everyday nutritional and lifestyle habits of the individuals involved in the programme;
3. Systematically account for their behaviours on dietary matters;
4. Thoroughly scrutinize the pertinent underlying rationale perpetuating unhealthy habits;
5. Exploit psychological tenets to make the dietary effort both appropriately pleasurable and attractive by using powerful goal-setting tactics;
6. Create a pool of numerous alternative dietary programmes personalizing nutrition to the special needs of each individual;
7. Innovatively use new technologies (e-mail plus mobile phone) for immediate and efficient applications in the everyday busy agenda of recipients;
8. Closely monitor users' preferences and flexibly adopt possibilities of changes and modifications of each personalized dietary plan at any given moment;
9. Schedule parallel support for each person on a basis of approved psychological counselling standards;
10. Facilitate accessibility to the dietary components required each time – and, in a nutshell, achieving self-growth by alleviating the burden of body mass growth.
11. Develop alternative solutions that involve doctors, nutritionists, psychologists and patients.

The presentation will discuss these significant issues emphasizing alternative scenarios which are of great interest for the food market, food database editors and appealing for entrepreneurs in being actively and profitably included in this challenging Vitalog endeavor.

INVITED PRESENTATION

Web-based eHealth applications with reference to food composition data

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Biography

Dr. Barbara Koroušić Seljak was born in Ljubljana, Slovenia. She received the Ph.D. degree in Computer Science and Informatics from the University of Ljubljana in 1997. Currently, she is a Research Assistant in the Computer Systems Department at the Jožef Stefan Institute, Ljubljana. She also works as an Assistant Professor of Real-Time Embedded Systems at the Jožef Stefan International Postgraduate School. Her research focuses on software design of Real-Time and Embedded Systems. She is very interested in modern heuristic methods, which may be applied to practical optimization problems. Recently, she has been involved in several national projects on public-health and clinical nutrition. Since 2007, she has been an active member of the Slovenian Society for Clinical Nutrition and coordinates the Slovenian associate membership in the EuroFIR network.

Abstract

In the last few decades, a large number of adequate and reliable food composition data have been collected worldwide. These data are unquestionably essential for many purposes, however, there remains a question about in which way they should be provided in order to be best used. As in general, a computer database may be updated more easily and quickly, and enables faster data retrieval than a manual database. Computer-based applications offer promising ways of providing food composition data.

Web-based applications (or *webapps),* as a subset of computer-based applications that are easily accessed via a web browser over a network such as the internet, or an intranet, have become popular due to the ubiquity of web browsers. The ability to update and maintain *webapps* without distributing and installing software on potentially thousands of client computers is a key reason for their popularity. Today, a mix of information and communication (IC) technologies allows us to get rid of the ‘evil’ page reload, which represents the dead time when navigating from one page to another. As a consequence, vast possibilities are opening up for web developers to offer a better experience to their users.

This presentation will give a review of up-to-date food composition database *webapps* in the eHealth sector, encompassing an indicative range of services from the edge of medicine/healthcare and IC technologies:

- *Consumer Health Informatics* (or citizen-oriented information provision): both healthy individuals and patients want to be informed about medical topics and look for a communication venue;
- *Health knowledge management* (or specialist-oriented information provision): e.g., a review of latest medical journals, best practice guidelines or epidemiological tracking;
- *Virtual healthcare teams*: consisting of healthcare professionals who collaborate and share information on patients through digital equipment;
- *Electronic Medical Records*: enable easy communication of patient data between different healthcare professionals;
- *mHealth*: includes the use of mobile devices in collecting aggregate and patient-level health data, providing healthcare information to practitioners, researchers, and patients, real-time monitoring of patient vitals, and direct provision of care (via mobile telemedicine);
- *Telemedicine and teleconsultation*: includes all types of physical and psychological measurements that do not require a patient to travel to a specialist;
- *eHealth Grids*: used by medical research to provide powerful computing and data management capabilities to handle large amounts of heterogeneous data.

The second part of the presentation will raise several questions about what changes, intended or unintended and welcomed or unwelcomed, are brought up by the way health services based on food composition data are delivered using IC technologies.

Session 7 - Training, education and capacity building

Chairs: Assoc Prof Cornelia Witthöft (SLU) and Prof Maria Glibetic (IMR)

• Prof Hettie Schönfeldt *University of Pretoria, South Africa*	Food composition data in health communication
• Mirjana Gurinovic *Institute for Medical Research, Belgrade, Serbia*	Capacity building in food composition data base in Central and Eastern European, Middle Eastern and North African countries: Successful collaboration between EuroFIR and other networks
• Assoc Prof Peter Hollman *Wageningen University, The Netherlands*	EuroFIR's Digital Learning Material (E-learning) for education in the application of food composition data
• Paul Finglas *Institute of Food Research, UK*	The way ahead through the EuroFIR AISBL

INVITED PRESENTATION

Food composition data in health communication

Prof Hettie C. Schonfeldt

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Biography

Hettie Schönfeldt is coordinator of consumer and health professional communication campaigns regarding sheep meat for the Red Meat Producers Organization, and for dairy on behalf of Milk South Africa. Hettie is a member of three international study committees: the International Meat Secretariat Human Nutrition and Health Committee Workshop on Red Meat and Health and the Nutrition and Marketing Groups of the International Dairy Federation. She was elected AFROFOODS co-ordinator in 2001 by FAO, as part of the INFOODS (International Network of Food Data Systems) effort to improve the nutrient composition of foods from all parts of the world.

Prof. Schönfeldt is a Reviewer for Frame Work 6 programmes and Frame Work 7 proposals of the European Union. Under her guidance, the nutrient content of various South African foods such as beef, chicken, milk and milk products and green leafy vegetables, has been assessed. She is co-author of the South African Food Composition Tables.

Abstract

Alternative food quality movements globally have led to a turn from the mass consumption model toward a growing qualitative differentiation of products. Consequently other attributes such as food composition are gaining importance in product quality considerations.

This paper first presents food quality trends observed in the international context and the manifestation of these and other trends within the food industry. Specific focus on trends such as low fat animal products, bioavailability of nutrients such as iron, and the case of supplements vs food sources will be highlighted.

From a consumer perspective improved knowledge on the composition and function of foods has contributed to many of these changes. Science-driven education on health could continue these positive changes in nutritional behaviour.

Consumer education projects, often called social marketing campaigns, aim to promote awareness of health and nutritional advantages of foods, based on composition data, in an effort to change behaviour. Changing agents in this process should be seen as believable and trustworthy. In the case of health and wellbeing, health influencers, such as scientists and medical practitioners, are seen as the key towards change.

Capacity building in food composition data base in Central and Eastern European, Middle Eastern and North African countries: Successful collaboration between EuroFIR and other networks

Mirjana Gurinović[1], Maria Glibetic[1], Cornelia M Witthöft[2], Jasna Tepsic[1], Peter Hollman[3]

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Biography

Dr Mirjana Gurinovic is an experienced scientist who is actively engaged in research on nutrition, food composition, public health nutrition, and epidemiology, diet and health. Up to now, Mirjana has published over 260 papers, abstracts and reports in domestic and international peer reviewed journals. She is the author and editor of 17 published books and monographs and 11 software applications in the fields of food and nutrition and health promotion/disease prevention.

Mirjana has considerable experience in co-coordinating national projects and has led a national study of atherosclerotic risk factors, nutritional status and the nutrition quality of diet in schoolchildren, as well as dietary quality and health status in the adult population of the same area. She is National coordinator for Nutrition action plan and strategy for obesity prevention in Serbia, and has collaborated over a number of years with FAO, the regional office in Budapest.

Dr. Gurinovic is a member of a number of professional associations including: Nutrition Expert Group in European Heart Network, Steering Committee CEECFOODS network, ECOG, EANS, FENS, SCN of the UN, International Scientific Committee of Choices International Foundation and The Nutrition Society. She is a Chair of the UNU/SCN Network for Capacity development in Nutrition in CEE Countries (http://www.srbnutrition.info/?page=Network). She is the team leader for Serbia for several EC FP6 NoE projects, including EuroFIR, Eurreca and DIETS, and involved in FP 7 Base FOOD. In July 2006, Dr. Gurinovic was appointed task leader for the “Development of specific training activities for compilers in non-EuroFIR countries in Europe and specific INCO” countries in work package 3.1 EuroFIR.

Abstract

Background/aims: The European Food Information Resource Network (EuroFIR, Network of Excellence http://www.eurofir.net) aims to develop and integrate food composition data throughout Europe. EuroFIR joined forces in capacity building with the Network for Capacity Development in Nutrition in Central and Eastern Europe (NCDN-CEE http://www.srbnutrition.info/?page=Network) and with the Middle East and North Africa Capacity Building Initiative (MENANA)[1]. The aim was to establish contacts with compilers in non-EuroFIR countries in Central and Eastern Europe, Middle East and North Africa and to do an inventory on food composition data base (FCDB) status and their specific training needs and activities.

Methods: Two on-line questionnaires were created which addressed the FCDB status and the specific training needs in these countries. Data were collected and analysed during 2006-2008, published in a peer reviewed journal and presented at different conferences[2].

Results: We established contacts with the following (19) non-EuroFIR CEE countries as potential new partners of EuroFIR NoE: Albania, Armenia, Bosnia and Hercegovina, Croatia, Czech Republic, Georgia, Hungary, Macedonia, Montenegro, Romania, Slovenia, and the MENANA countries Egypt, Jordan, Iran, Lebanon, Oman, Palestine and Sudan. Several countries did not have adequate information to respond to all questions. Several had established FCDB, but none had an electronic version. Most countries indicated having national food composition tables, but the need for additional equipment for nutrient analysis seems considerable. Only two country responders were familiar with the steps required in establishing FCDB, which is a serious signal about the need for more capacity development in the area.

Education, training, workshops, networking and sharing of experiences were uniformly requested. Methods for analyses of nutrients, sampling of foods, data quality and data evaluation, food nomenclature systems, database management system and recipe calculations were identified as main training needs in all countries.

In order to support national FCDB development according to EuroFIR standards, EuroFIR has signed MoUs (Memorandum of Understanding) with Czech Republic, Hungary and Croatia, but until this moment no new data have been added, no national funding has increased, nor have those countries developed online databases[2].

By organising specific training activities and workshops with EuroFIR support, capacity improved leading to potential new partners of the NoE. On the Training in Capacity Building Workshop for non-EuroFIR CEE Countries in June 2007 (20 participants, 11 from CEE countries) and 3rd and 4th NCDN-CEE meetings held in Belgrade, Serbia in 2007 and 2008, future activities in training and capacity development for CEE non-EuroFIR countries were presented with the goal of spreading the mission of EuroFIR. After EuroFIR involvement, many professionals from non-EuroFIR countries attended a EuroFIR Food Comp course on Production and Use of Food Composition Data in Nutrition with EuroFIR support, which improved the capacity of the attendees' countries to a great extent. In addition, a web application specific for new FCDB creation was presented at this workshop as a useful training tool for the initiation of new FCDB creation under EuroFIR criteria.

Conclusions: Training needs in non-EuroFIR countries in food and nutrition have been identified. Collaborations between EuroFIR and other networks provide an excellent opportunity for capacity development in FCDB creation through EuroFIR training and exchange programs complementing national activities. Capacity development networks would be useful tools in addressing needs in various countries, streamlining regional involvement and collaboration, and would have the potential of leading to increased capacity to address the food, health and nutritional challenges, including food data-base development of the region.

Funding acknowledgement: This work was completed on behalf of the EuroFIR consortium and funded under the EU 6th Framework Food Quality and Safety Programme (FOOD-CT-2005-513944).

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INVITED PRESENTATION

EuroFIR's Digital Learning Material (E-learning) for education in the application of food composition data

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Biography

Peter Hollman is Associate Professor at the Division of Human Nutrition, Wageningen University, and senior research scientist at RIKILT – the Institute of Food Safety, an independent scientific organisation based in Wageningen. His main areas of interest are the determination, occurrence and health effects of nutrients and bioactive compounds. Special interests are quality assessment and control of food analysis, analysis of dietary polyphenols in foods and biological fluids, and research on the potential role of polyphenols in disease prevention. He has published more than 100 papers in peer-reviewed journals, citied more than 8000 times. Together with Assoc. Prof. Cornelia Witthöft, Peter leads the EuroFIR work package on training and education.

Abstract

Individuals involved in food composition data work have very diverse backgrounds and include database compilers and managers, and food analysts, but also users of food composition data such as dietitians, epidemiologists, nutritionists and medical doctors. This diverse background of people involved in food composition data work presents challenges in their training in the proper use of food composition data. For example, it is difficult to explain nutrient analysis to users who have no chemistry background. Interactive digital learning materials (also called E-learning modules) are excellent educational tools for such target groups who are heterogeneous with respect to prior background knowledge. These digital materials are based on educational principles that aim at active and personalised learning.

Within EuroFIR, we have developed an E-learning module on "Nutrient Analysis for Non-chemists". This module uses animations and visuals to assist students in understanding nutrient analysis. It deals with four cases of nutrient analysis: fats and fatty acids, proteins and amino acids, carbohydrates and fibre, and minerals and trace elements. Interactive exercises activate the students individually, and help them to digest the information presented. After studying this module, a student should be able to understand the chemical/technical principles, strengths and limitations of macronutrient analyses, to interpret laboratory results and to evaluate their quality, and to critically communicate with laboratory technicians about analytical methods and results. Preferably, these E-learning modules should be an integral part of a general course on the application of food composition data, and definitely should not replace it. Because the module helps the participant to master the core knowledge, a teacher now can focus on more advanced topics, and on discussions with individual participants. It is our experience that person to person

discussions between teacher and participants are an essential part of the learning process in this field. However, the modules can also be studied outside the context of a specific course to repair specific knowledge deficiencies or to refresh knowledge.

Funding acknowledgment: *This work was prepared on behalf of the EuroFIR consortium and funded under the EU 6th Framework Food Quality and Safety Programme (Project Contract No: FOOD-CT-2005-513944).*

Index of Poster Abstracts

Poster Abstracts

TOPIC 1 - USING FOOD COMPOSITION DATA TO ADDRESS CURRENT PUBLIC HEALTH AND NUTRITION ISSUES

1_02 Medical results of nutrient deficiencies and key actions for prevention

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Background/aims: Almost all-Georgian territory is under the risk of development of the iodine deficiency disorders. During the last 2 decades (post Soviet Union period) iodine deficiency has continually increased. The significant changes in nutrition infrastructure (consumption of seafood products decreased 3-4 times) was considered as a main reason for this increase, which considerably influenced the prevalence of iodine deficiency disorders in all age groups of Georgian population.

Methods: Clinical-epidemiological study, using: cluster sampling epidemiological method (about 30% of population in each region was involved during 2 years); clinical (thyroid size, cretinism) and biochemical (urinary iodine and thyroid-related hormones) using: ultrasonography, urinary iodine and TSH assay methods.

Results: The results of the clinical - epidemiological study (2003-2005) showed that there are some districts in Georgia with prevalence of iodine deficiency disorders of more than 70% (Kobuleti, Shuakhevi, Ambrolauri, and Tskhinvali). The prevalence of nodal goiter reached to about 1.8%. This indicates the severity of iodine deficiency. The mental and physical damage of children is very notable in some severe iodine deficiency areas of Georgia, and in some cases cretinism can be observed. Prevalence of clinical forms of goiter by age groups showed the severity of deficiency:

Table 1: Prevalence of clinical forms of goiter in Georgia by age groups

Age (years)	Sample size (n)	Prevalence of goiter (%)	Diffused nontoxic goiter (%)		Nodal goiter (%)
			II degree	III degree	
1-5	90680	36.5	7.9	0.1	0.1
6-11	93740	39.3	3.5	0.2	0.2
12-15	96630	45.6	7.4	0.6	0.5
16-50	638560	51.7	16.0	3.2	3.1
>50	364380	31.0	12.0	4.9	7.3

According to the WHO classification, if deficiency in children reached to 30% and more, it's considered as a severe deficiency.

Conclusions: Iodine deficiency is a countrywide nutritional problem requiring the involvement of the salt and food industry, educational and health sectors, community based activities, and scientific sectors to overcome it. Iodine fortification will succeed when producers are fully involved as key partners in standards formulation, regulations and resolution of marketing and technical issues. It needs intersectional actions. The most important is compiling the national food composition data base to enable understanding and managing of many nutrient deficiency problems and to help solve them at national level.

Funding acknowledgment: This study was funded by the Ministry of Health, Labour and Social Affairs of Georgia; Public Health Department; Iodine deficiency prevention State Program's participants.

1_03 Using Egyptian food composition data base for evaluation of diet quality of children and adolescents

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Background/aims: Food composition databases have been used to enable the nutrient analysis of individuals' diets to help clinicians identify nutrient intakes in order to look for trends and associations between nutrients and disease risk. The aim of our study was to use the Egyptian food composition data base and healthy eating index to assess the diet quality among Egyptian children and adolescents and the compliance with specific dietary guidelines, to give a single measure to monitor change in food consumption pattern and to develop more effective nutrition promotion messages for the public.

Methods: The Healthy Eating Index (HEI) of United State Departure of Agriculture[1] was applied with slight modifications. The data were based on a representative sample (2145) of children and adolescents (10 -18 years) from preparatory and secondary schools in 7 Governorates (El Giza, Aswan, Sohag, El-Menia, Gharbia, Kaliobia and Kafr El-Shikh).

One day of dietary intake data (24 hours recall) was collected, during an in-person interview and analyzed using Egyptian food composition tables. The HEI measures how well the studied children and adolescents' diets conform to the American Dietary Guidelines recommendations and the Food Guide Pyramid applied in our country.

Results: The average HEI score was 59.1 out of a possible 100 and it ranged from 20 to 86; only 0.5 percent of the students had HEI scores above 80, while 16.9 percent had scores below 50. The majority (82.5 percent) had scores on the HEI between 51 and 80. In an effort to provide a 'rating' of the overall student's diet, a grading scale was developed. The majority students (82.5%) had diets rated as 'Needs Improvement', only 0.5 % had diets rated as 'Good' and 16.9 % had diets rated as 'Poor'. Males achieved a slightly higher average Index than females (59.7 Vs 58.2). The average score for food groups is much lower than that for dietary guidelines: 23.5 vs. 35.6 out of a total score of 50 for each. More than 80 percent of the sample achieved the recommendations of the American Dietary Guidelines for total fat and cholesterol. Less than two-thirds of the students met the recommendations for saturated fat and almost 30 percent of the students had the maximum score for sodium. Only 1.0 percent of them reached a score of 10 for dietary fiber.

Conclusions: The majority of Egyptian children and adolescents' eating patterns, as measured by the Egyptian food composition data base and HEI, need improvement. The results of the Index are useful in targeting nutrition education and health promotion activities. The HEI is a single summary measure of diet quality that can be used to monitor changes in food consumption patterns over time.

Funding acknowledgement: This work was completed on behalf of the National Nutrition Institute, Cairo, Egypt and funded under general organization of teaching hospitals and institutes, Cairo, Egypt. Conference attendance was partly funded by the EuroFIR Consortium funded under the EU FP6 'Food Quality and Safety Programme'. Project contract nº FP6-513944.

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1_14 The French observatory of food quality

R. Goglia, M. Spiteri, C. Menard, B. Labarbe, P. Combris, L.G. Soler, J.L. Volatier

See speakers' abstracts.

1_23 Fat content and fatty acid composition of chicken meat portions and processed chicken products

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Background/aims: Fatty acid composition data for retail chicken meat is dated (Maff, 1998[1]) and no data relating to processed chicken meat products is currently available. However, poultry meat was estimated to be the greatest contributor to animal-derived intakes of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) at 27mg/d[2]. Improved estimations of the contribution of chicken fats to the diet require up to date composition data for whole poultry meats and for coated or processed chicken products. The aim of this study therefore was to analyse a range of retail chicken portions, burgers and nuggets for total fat and fatty acid composition.

Methods: Economy, standard and organic skinless chicken breast and leg portions (minimum two packs of each) and crumb coated burgers and nuggets were purchased from four different supermarkets. All samples were oven cooked and two composites of each product type were made from three breast or leg portions, six burgers or ten nuggets (with coating removed). Total fat and fatty acid profiles were determined for each composite (n=78) using Gas Chromatography-Mass Spectrometry following chloroform-methanol extraction. ANOVA and linear contrasts were used to ascertain differences in fatty acid concentrations between product types and price ranges.

Results: Fatty acid concentrations of key polyunsaturated fatty acids and results of contrasts between breasts and legs and burgers and nuggets are presented in Table 1.

Breasts and legs: Contrasts revealed no significant differences between economy, standard or organic varieties of breast or leg except for lower palmitoleic acid in organic (268.2 mg/100g) than economy (384 mg/100g) and standard (391 mg/100g) (P=0.0076) and higher DHA in organic leg compared with economy and standard.

Burgers and nuggets: No significant differences in concentrations of any fatty acids were observed between economy and standard range burgers. No differences between economy and standard nuggets were observed except for significantly higher palmitoleic acid (P=0.0006), cis oleic acid (P=0.0001) and *trans* Oleic acid (P=0.0317) in economy nuggets compared with standard nuggets. Whilst no EPA was found in burgers, and very little in nuggets, nominally more DHA was found.

Conclusions: Skinless chicken meat contains less fat but more EPA and DHA than processed chicken products. This may be due to different amounts and different cuts of meat used in different products and the dilution of chicken fat with other oils during processing. Processed

chicken products would therefore make a smaller contribution to animal-derived intakes of EPA and DHA than whole breast and leg meat.

Table 1. Summary of fat content and fatty acid composition of chicken portions and processed products

Product	**Price range**	**Fat content (g/100g cooked food)**	**Fatty acid (mg/100g cooked food)**			
			Linoleic	**Linolenic**	**EPA**	**DHA**
Breast	Economy	2.4	1349	55.6	6.9	18.1
	Standard	2.4	1715	71.9	10.3	25.9
	Organic	2.1	1756	41.1	4.5	29.7
Leg	Economy	8.0	2281	27.4	9.8	21.1
	Standard	7.2	2758	27.3	9.5	23.2
	Organic	7.2	3417	20.9	6.4	43.2
Burgers	Economy	20.5	4305	159	0	2.21
	Standard	12.3	3784	160	0	3.81
Nuggets	Economy	13.6	5835	747	0.7	7.31
	Standard	13.7	4154	66	1.9	7.42
Contrasts	*All breasts vs all legs*		*P<0.01*	*P<0.01*	*NS*	*NS*
	All burgers vs all nuggets		*NS*	*P<0.05*	*NS*	*NS*

Funding Acknowledgement: This work was funded by Lipgene, a European Union Framework Six Project.

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1_25 Carbohydrate content of selected foods offered at Bulgarian markets

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Background/aim: The current study presents the results from the analysis of 8 types of plant foods (market samples) and the variation of the total carbohydrate content and energy of the most popular Bulgarian tins of vegetables. Carbohydrates constitute approximately 55% total calories in a well balanced diet.

Methods: The current survey was accomplished during the past year and included 8 types of vegetable tins offered on Bulgarian market. For each product three individual samples were analyzed and the carbohydrate and energy content were calculated. The results are presented in Table 1 The analysis concerning energy and nutrient content were undertaken as follows: dry matter (BSS EN 12145), ash (BSS 7646), fats (BSS 6997), protein (BSS 14431; method of Kjeldahl using factor 6.25), dietary fibers (AOAC official method 985.29); available carbohydrates (by difference [100- (water (%) + ash (%) + fats (%) + protein (%) + DF (%))]), energy value (kcal) (calc [(Available Carbohydrates (%) + Protein (%)) X 4 + Fats (%) X 9]), energy value (kJ) (energy value (kcal) X 4.184). Laboratory data quality is subordinated to requirements of BSS ISO 17025:2006.

Results: The highest content of DF was found in mixture of tomato paste and peppers (3.4%) and equal quantities were observed in potatoes with scabbard and pepper relish for infants (2.3%). The greatest content of carbohydrates was found in tomato paste (17.9%) followed by mashed peppers (16.7%). The highest value of energy was calculated in pepper relish for infants (137kcal/ 572kJ) and the smallest value was observed in vegetable marrows with carrots and rice (49kcal/ 205kJ).

Table 1 Chemical composition and energy value of 8 Bulgarian vegetable tins (per 100 g)

Vegetable tin:	Dry matter, g	Protein, g	Fats, g	Ash, g	Dietary Fibre, g	CHO, g	Energy, kcal/kJ
Vegetable marrows with carrots and rice	11.6	1.0	1.7	0.5	1.0	7.4	49/205
Potatoes with scabbard	14.2	1.0	3.1	0.7	2.3	7.1	60/252
Vegetable paste of marrows	12.8	1.2	3.0	0.9	1.4	6.3	57/239
Vegetable marrows with rice	13.7	1.0	2.7	0.6	1.7	7.7	59/247
Pepper relish for infants	26.3	1.4	8.8	0.8	2.3	13.0	137/572
Mixture of tomato paste and peppers	24.3	3.5	0.6	2.5	3.4	14.3	77/322
Mashed peppers	24.0	2.9	0.5	2.1	1.8	16.7	83/347
Tomato paste	24.8	3.4	0.3	2.3	0.9	17.9	88/368

CHO=Carbohydrates

Conclusion: The analytical results reveal a rich carbohydrate and energy content of the analyzed food products. These results can be included in the national food composition database and can be used in the planning of nutrition intervention programmes, requiring the use of food composition data in order to translate specific nutrient needs into food requirements.

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1_30 Folic acid fortified foods available in Spain: target population groups, analysis and level of fortification of main food products

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Background/aims: Folic acid (FA) is a relevant factor in the prevention of a number of pathologies. Different supplementation and/or fortification strategies have been introduced worldwide in order to increase intakes. In Spain, where a growing number of voluntarily FA fortified foods are available, there is a lack of reliable data to assess their impact on the population's dietary folate intakes. The aim was to gather a better knowledge of voluntary FA food fortification practices in Spain by quantifying total folate (TF) content in the most representative fortified food products.
Methods: A food composition database was developed with data from a 2 year market study based in Madrid. Seventy three breakfast cereals and forty nine dairy products were analysed by trienzyme extraction[1] followed by microbiological assay with *L. casei* (ATCC 7469)[2]. A Standard Reference Material (SRM 1847, NIST)[3] FA fortified Infant Formula, was used for quality control throughout the assay. Results were compared to product FA label values (LV) and evaluated as percentage of folate Recommended Dietary Intakes (RDI) per recommended serving.
Results: The database included 303 FA fortified food items and was periodically updated. Main food groups included were "Cereals and derivatives" followed by "Dairy products". Most of these foodstuffs lacked a target population for their consumption or were aimed at "Weight control" and "Children", but only 2% targeted women at a reproductive age.
Children were the principal target population (45%) for breakfast cereal products. TF ranged from 232 to 300 µg/100 g (70-90 µg/30 g). According to cereal matrix categories mean TF ranged from 253 to 427 µg/100 g (76-128 µg/30 g serving size). Higher TF values were found in wheat and bran/whole wheat cereals. Average assayed values ranged from 145 to 217% of the LV. Similar overage results were previously reported in FA fortified products in the US[4, 5].
The examined dairy products represent a heterogeneous food group, they were functional products and children were the main target group. On average, functional products (e.g. omega-3 enriched) presented the highest TF values (261 µg/100ml) followed by different types of milk (68-78 µg/100ml) and yogurt (52-72 µg/100ml). Average results ranged from 160 to 260% of LV.
Conclusions: At present, the Spanish market offers a significant number of folic acid fortified products, on a voluntary basis, and at a level ≥ 15% of folate RDI per 100 g, ml or serving. Overages are a common practice as observed when obtained TF results are compared to label values. Levels of FA voluntary fortification in Spain indicate it can play an important role in increasing folate intakes depending on dietary patterns.

Funding acknowledgment: This work was funded by the Spanish Ministry of Education and Science, Project AGL2005-06957, entitled: *"Content and bioavailability of folic acid in fortified foods in Spain. Impact on vulnerable population groups intakes and evaluation as potentially functional foods"*.

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1_31 Calcium in Latvian dairy products

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Background/aims: Milk and milk products are an important source of calcium. The calcium content of cow's milk is influenced by various factors, including the stage of lactation, environmental factors and genetics. Calcium content of dairy products, particularly of fermented products, is also influenced by coagulation techniques of casein and the losses of calcium ions with whey. Latvian scientists have pointed out that the content of calcium in raw milk varies from 85 to 100 mg per 100 g and it is lower compared with the average data of calcium contents given in the literature[1]. Therefore the aim of the current study was to analyze the content of calcium in milk and dairy products.
Methods: In total 112 samples was analyzed, 16 samples of each of 7 milk types (raw milk, pasteurized milk with different fat contents, kefir and curd (cottage cheese)) product were analyzed. Samples of dairy products were bought from retailers in March 2009. The content of calcium was determined by AOAC method 975.03 and ISO standard 8070:2008.
Results: The contents of calcium in raw milk and dairy products are shown in Table 1.

Table 1 The content of calcium in dairy products

Products	Calcium content, mg/100 g
Raw milk	118±13
Pasteurized milk with 0.5 fat percent	113±14
Pasteurized milk with 2.5 fat percent	118±15
Pasteurized milk with 3.5 fat percent	148±18
Kefir with 2 fat percent	129±16
Curd with 0.5 fat percent	995±120
Curd with 9 fat percent	950±120

Conclusions: The research contradict with above mentioned statement that the content of calcium was lower in milk compared with the obtained results in this research. Statistically significant difference in the content of calcium between analyzed milk products and literature data was not found. The obtained results showed that Latvian dairy products are an excellent source of readily bioavailable calcium.
Funding acknowledgment: The project was funded by the Foundation to Support Medical Education and Scientific Research.

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1_34 EuroFIR Document Repository: a new approach to accessing the food composition literature

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Background/aims: The World Wide Web (WWW) affords new opportunities for locating and accessing documents, including both published journal articles and less readily available material such as reports and other so-called grey literature. The EuroFIR Document Repository aims to provide a framework to make documents relevant to food composition data quickly and conveniently accessible to users.
Methods: Bibliographic records (citations) for Repository documents are held in the CiteXplore database operated by the European Bioinformatics Institute (EBI). The CiteXplore system provides effective, freely available querying and retrieval of relevant material. Retrieved records include links to the full-text documents where these are available through the website of the publisher or other provider, either free of charge or by subscription as determined by the provider. CiteXplore records relating to food composition are flagged as relevant to EuroFIR, allowing search queries to be restricted to the EuroFIR Document Repository. Most CiteXplore records are for journal articles and are sourced from PubMed or Agricola. Relevant articles are selected from journals important to food composition and are flagged in CiteXplore as part of the Repository. EBI provides a facility for EuroFIR to input new CiteXplore records and this system is used to incorporate reports and book references into the Repository. Food composition data compilers have been encouraged to make analytical and other unpublished reports available online as part of the Repository. The process and criteria for selecting relevant documents are being developed by a task group of EuroFIR compilers.
Results: The CiteXplore bibliographic retrieval system is available at www.ebi.ac.uk/citexplore/ and searching is limited to the EuroFIR Document Repository by including the term “sb:eurofir” in the query. The Repository includes many of the references cited in the national databases compiled by EuroFIR partners, covering journal articles, books and reports. Selected articles from key journals have been incorporated from the beginning of 2009. It also includes reports and posters that EuroFIR partners have placed online, usually as PDF files. During this work, it became clear that a significant and increasing amount of grey literature is becoming available online, but is not covered by bibliographic search systems. Equally, many important sources of food composition data, for example analytical reports and posters, are not yet online.
Conclusions: The EuroFIR Document Repository allows users to find food composition documents and view immediately those that are available over the WWW. It provides a framework for the effective retrieval of online documents that enhances their accessibility, as well as creating new opportunities for disseminating food composition information, for example by making posters directly and permanently available.

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1_36 Food Labelling to Advance Better Education for Life

G. Chryssochoidis on behalf of FLABEL partners

See speakers' abstracts.

1_39 Consumer knowledge of omega-3 fatty acids in Hungary on the basis of a questionnaire survey

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Background/aims: Modern consumers are increasingly interested in their personal health, thus they seek ways to feel well and stay healthy by eating nutritionally designed foods and different supplements. But do they know what a particular component is useful for, which foods contain these components etc. The main objective of this study is to get information about the consumer knowledge of omega-3 fatty acids, which are polyunsaturated fatty acids also known as essential fatty acids. Marine and oily seeds are the main dietary sources of omega-3 fatty acids. Numerous studies have shown that it has beneficial effects on human health, including the prevention of cardiac and circulatory disorders (which are one of the major causes of death in the world, including in Hungary), immune dysfunction and inflammatory disorders. Because of the increasing demand for non- or low-fat foods, a number of foodstuffs are enriched with omega-3 fatty acids, like eggs, oils and margarine and there are a lot of supplements on the shops' shelves containing this healthy component. However, according to the Third Hungarian National Nutritional Survey (2003-2004), the average omega-3 fatty acid intake was insufficient.
Methods: To explore the adult Hungarian consumers' knowledge of omega-3 fatty acids a short questionnaire has been developed and will be completed in June 2009. The questionnaire contains different socio-demographic questions, which will give more detailed information about the study population. The questionnaire also contains statements related to the health effect and sources of omega-3 fatty acids. The respondents have to state whether these are true or false, or whether they do not know. Results will be analysed with SPSS 15.0 software.
Results: The results will give detailed information about the Hungarian consumers' knowledge of omega-3 fatty acids. It is expected that the answers will show that most of the consumers have heard about the omega-3 fatty acids, but do not have sufficient information about their sources and their beneficial effects on health.
Conclusions: On the basis of the questionnaire we would like to give recommendations for the more effective communication on how to provide consumers with accessible information about omega-3 fatty acids. Particularly for certain sub-groups of consumers who do not have adequate knowledge about omega-3 fatty acids and who may be at risk of cardiovascular disease. With the help of these new communication trends the risk of the cardiovascular diseases can potentially be reduced.
Funding acknowledgement: The project is funded by the Central Food Research Institute (Budapest,Hungary).

1_42 EuroFIR spreading excellence activities by individual training bursaries

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Background/aims: EuroFIR will provide the first comprehensive pan-European food information resource. The work package "Training, education and vision" (WP3.1), coordinated by the Swedish University of Agricultural Sciences and Wageningen University, aims to promote knowledge, skills development and vision in food composition databases, bringing a high level of integration between existing and new activities within the EuroFIR partnership and beyond.
Methods: Besides organising specialised workshops and courses, EuroFIR offers individual training bursaries to PhD students, junior scientists and other staff categories of the EuroFIR partnership for both, training exchange visits at other EuroFIR partners, and participation at workshops and conferences linked to food composition research and food information. Since 2007, these bursaries are also available for staff at non-EuroFIR institutions, which are involved in food composition research, from European countries and target countries for specific measures in support of international co-operation.
Results: To date 25 individual training bursaries have enabled the exchange of specific knowledge, models, tools and facilities within the EuroFIR partnership, e.g. by acquisition of analytical or quality assurance skills, the use of advanced equipment not available at own laboratory, joint standardized analyses, the application of specific statistical or nutrient database tools to data sets, the establishment of an on-line version of existing nutrient database, the formulation of standards for joint research and quality assessment. Training visits ranged from one or a few days to several months, and, besides skills exchange, joint publications will be or have derived as deliverables. Also submission of "host" applications with the aim to support specific work-package deliverables is possible. Furthermore, 23 conference visits were so far supported from the training budget from about twice as many applications. In 2007 and 2009, two strategic calls were made for specific bursaries for the 7th and 8th International Food Data Bank Conferences in Brazil and Thailand. Nine individuals from non-EuroFIR partners from several Balkan countries, Georgia, Estonia, Spain and the Philippines received individual training bursaries supporting participation in courses, e.g. the Australian/Oceania food composition course, or training exchange visits to acquire analytical and quality assurance skills. Training activities were evaluated positively supporting national management of food composition and information, and resulted in New Zealand and Balkan partners Czech Republic, Hungary and Croatia in MoUs (Memorandum of Understanding) with EuroFIR.
Conclusions: Training activities were highly integrative involving several partners within and beyond the Network of Excellence. According to trainees' reports, training activities were considered as successful, both with respect to reaching individual/national aims and EuroFIR goals.

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1_48 Calculate or analyse? Estimation of folate content in intervention foods

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Background/Aims: Food composition databases (FCDB) are useful to estimate nutrient intake from the freely chosen diet in intervention trials. However, occasionally also nutrient intakes from foods given in intervention studies need to be calculated using FCDB data. For the vitamin folate this can be misleading since folates "show wide natural variation and are particularly unstable", as stated on the EuroFIR website[1]. Our aim was to illustrate the importance of determining the folate content of intervention foods by analysis rather than calculation.
Methods: This was demonstrated using a breakfast meal, which after 3 months of consumption significantly improved folate status in healthy women[2]. The composite breakfast sample consisted of orange juice, wholemeal bread, liver pâté, breakfast cereals, fermented milk (filmjölk ®) and one kiwi fruit. The folate content of the individual breakfast ingredients (except for the milk and breakfast cereals) was determined, taking into account batch and brand variation and the effect of storage. The individual foods and the composite breakfast sample were analysed in duplicate by liquid chromatography with mass spectrometry detection after mono- (orange juice, kiwifruit, liver pâté) or di-enzyme (breads, complete breakfast) treatment and purification on strong anion exchange columns[2]. To control method quality, folate content in the composite breakfast sample was also determined with an accredited microbiological assay by the Swedish National Food Administration (EuroFIR partner 29).
Results: The variation in folate content was below 30%, based on the co-efficient of variation (CV) in all foods. Analytical variation was affected by the food matrix, being 10-15% CV for bread, complete breakfast and kiwi fruit, and around 5% for liver pâté and orange juice (see Figure 1).
With respect to brand, the variation of folate content was highest in bread (29%), but also observed in orange juice in autumn (16%), but not spring (4%). High variation was also observed in different batches of orange juice, kiwi fruit and liver pâté (see Figure 1). No variation in folate content occurred as a result of household and long-term storage of orange juice. Moreover, the calculated folate content of the breakfast using FCDB values was 25-35% lower than the analysed content by microbiological assay and liquid chromatography with mass spectrometry detection.
Conclusions: To obtain an accurate estimate of the amount of folate when using intervention foods, we recommend determination by analysis rather than calculation of the folate content using FCDB data. Furthermore, these analyses should be repeated during the trial to account for batch variation. However, for estimations of folate intake from the freely chosen diet, FCDB data are useful.

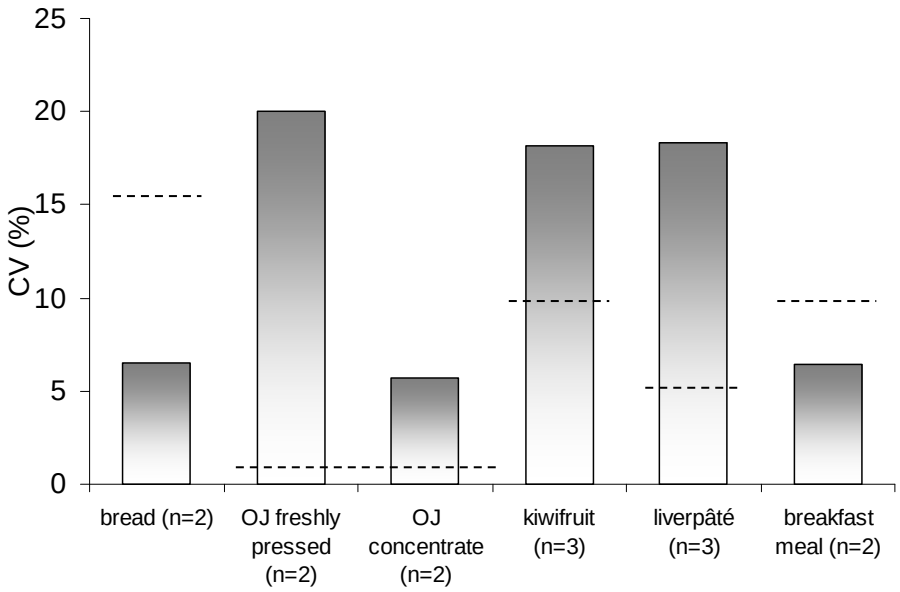

Figure 1: Batch variation (staples, n = 2-3) and analytical variation (based on intra-assay CV, n = 3-4) in individual breakfast ingredients and a breakfast meal.

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1_61 *Trans* fatty acids content in commercial samples of potato crisps in Portugal

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Background/aims: *Trans* fatty acids (TFA) are associated with cardiovascular disease (CVD) and cancer among other diseases. TFA are generated in the hydrogenation process where vegetable oils undergo a process of partial saturation. This process may have adverse consequences because natural essential fatty acids are destroyed and the new artificial isomers are structurally similar to saturated fats. The food industry has been advised by FAO and WHO to reduce the presence of *trans* fats in food products to less than 4% of total fat. As a consequence, the intake of TFA in Europe has decreased in the last decade. The aim of the study was to determine the levels of TFA in potato crisps commercialized in Portugal.
Methods: Eight different potato crisps brands were bought in supermarkets in the Lisbon area, Portugal, in two different seasons, December 2008 and March 2009. The samples from the two different seasons were analysed separately. Elaidic acid (C18:1,*trans*-9) and linolelaidic acid (C18:2,*trans*-9,12) were derivatized to their correspondent methyl esters (FAMEs) using a methanolic solution of potassium hydroxide. Analyses were performed in a gas chromatograph (HP 6890 series) equipped with a flame ionisation detector. A Supelco 2380 capillary column (60 m x 0.25 mm, 0.2 µm film thickness) was used with the following oven ramp: begin at 60 °C, hold for 1 min, increase to 168 °C at 17 °C/min, hold for 28 min, increase to 235 °C at 4 °C/min and hold for 15 min. The injector and detector temperatures were 260 °C and 290 °C, respectively. Identification of chromatographic peaks was carried out by comparison of their retention times with appropriate standards of FAMEs. In order to guarantee quality, a commercial standard mixture was used (FAMES, Fatty Acid Methyl Esters Mixture C4:0-C24:1, reference 18919 from Supelco).
Results: According to the potato crisps labels, the selected brands were fried in vegetable fat or vegetable oil. TFA content of all potato crisps was higher than 0.1 g/100 g of sample and the major TFA was C18:2,*trans*-9,12.
The lowest level of TFA (mean = 0.10 g/100 g sample) was found in brand 1, while brand 3 had the highest value (mean = 0.28 g/100 g sample). Brands 5 -7 had similar TFA contents, in the range of 0.20 - 0.23 g/100 g sample.
Conclusions: Food and Drug Administration (FDA) requires that the amount of TFA should be listed on a separate line under saturated fat in the nutrition label, when the total fat is higher than 0.5 g per serving. In Portugal, there is still no regulation that imposes TFA content in the label. Because the worldwide use of hydrogenated oils is considerable, consumers should be able to find the levels of TFA on labels, in order to better select the products containing partially hydrogenated oils and avoid their harmful health effects. The level of TFA found in the selected potato crisps was always lower than 1%, which is the TFA intake goal of World Health Organization.

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1_63 Study of fatty acids profile in different frying oils from the Portuguese market

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Background/aims: The frying process has several disadvantages such as hydrolytic degradation due to water loss, oxidative degradation due to reaction of atmospheric oxygen with lipid molecules at the surface, and thermal degradation because of the high temperature required. This last drawback is important because it results in a decrease of nutritional value, due to the loss of polyunsaturated fatty acids (PUFAs), which are essential in the human diet. The major use of cooking oil is in frying. During this process, cooking oils should be stable because of abusive conditions of deep-fat frying, like high temperatures and moisture. The aim of this work was to study the fatty acids profile in six frying oils.

Methods: Samples were selected based on the most commonly consumed oils used for frying (olive, corn, soybean, peanut, sunflower and cooking oil). Six different vegetable oils were bought in local supermarkets and the fatty acids (FA) profile was determined for each individual sample. Fatty acid methyl esters (FAMEs) were prepared from lipid extracts by transesterification using a methanolic solution of potassium hydroxide. In order to guarantee quality, a commercial standard mixture was used (FAMES, Fatty Acid Methyl Esters Mixture C4:0-C24:1, reference 18919 from Supelco). Gas chromatography analysis was performed with a HP 6890 series equipped with a flame ionisation detector (FID, 290 °C), an autosampler and a split-splitless injector. FAMEs were separated on a Supelco 2380 capillary column (60 m x 0.25 mm, 0.2 µm film thickness). The injector temperature was 260 °C and the split-ratio was 1:50. Helium was used as carrier gas. The column temperature was held at 160 °C for 1 min, then increased at 2 °C/min to 230 °C and held for 14 mins.

Results: Thirty six FAMEs were identified by comparison of their retention times with those of a standard mix. The major FA found in all samples was linoleic acid, except for olive and peanut oils, where oleic acid was the major FA.

The FA profile was in agreement with that found in the legislation for the corresponding type of oil. For the cooking oil, the FA content was similar to sunflower oil. The oils under study have not been submitted to high temperatures; however, low contents of *trans* fatty acids were detected.

Conclusions: Oils with a high content of linolenic acid, such as soybean oil, are more susceptible to undesirable changes during the frying process. In contrast, oils like corn oil with higher saturated fatty acids content are more stable. Frying oils made from sunflower are less stable because of its high polyunsaturated fatty acids content. Recently, genetically modified sunflower oils with high-oleic can be found in the market, and we hope to extend this study to this new type of oil in order to confirm if they are more stable and also suitable for frying processes. The determination of FA profile in frying oils is of great importance due to their possible health implications, especially on cardiovascular diseases.

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1_78 Intense sweeteners in beverages: reduced label information

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Background/aims: Artificial sweeteners are being increasingly used in a wide range of food products, mostly beverages. Several consumers buy these products without the knowledge that they are artificially sweetened. Each EU Member State must carry out national surveys to ensure proper compliance with existing legislation regarding types, amounts, and label information. The objective of the present work was to evaluate artificially sweetened beverages, commercially available in Portugal, for label compliance and amount of artificial sweeteners present.
Methods: A total of 50 brands were examined, selecting one flavour from each. The samples were of several origins within the EU. Labels were analysed for accurate sweetener declaration in the ingredients list and visibility of the information, namely the font size. The samples were analysed by SPE/HPLC/ELSD[1] for nine high-intensity (non-nutritive) sweeteners, including six approved (acessulfame-K, aspartame, cyclamic acid, saccharin, sucralose, neohesperidine dihydrochalcone) and three non-authorised sweeteners (alitame, dulcin and neotame).
Results: Only approved sweeteners were found and all were within the EU maximum concentration limit. Nevertheless, the level of cyclamic acid was often on the borderline of the maximum amount permitted. Aspartame was the most frequently found additive (65% of the samples), followed by acessulfame-K (53%), cyclamates and saccharine (38% each). Sucralose and neo-hesperidine dihydrochalcone were only detected in only two samples each. Several irregularities were noted in the labels, including the presence of additional sweeteners that had not been declared and the use of different strategies to reduce the perception of their presence, namely reduced font size (up to Arial 5). Of particular concern is the increasing number of non-carbonated juice brands traditionally consumed by children with new formulations, with artificial sweeteners added that have not been declared on the front label.
Conclusions: Accurate labelling control should be implemented throughout the EU, together with more information from manufacturers, to make sure that all artificial sweeteners are clearly labelled and avoid the use of these additives in products specifically designed for children.
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1_79 Isoflavones in roasted coffee

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Background/aims: Isoflavones are widely known as bioactive compounds with estrogenic activity and antioxidant properties. They are also able to inhibit protein tyrosine kinases and modulate many other enzymes [1]. Several epidemiological studies associate isoflavones intake with beneficial effects on human health, especially concerning the incidence of certain types of cancer, cardiovascular diseases and osteoporosis [2]. Soy and derivates are important sources of isoflavones. Although in lower amounts, these compounds are also found in other products, as legumes, cereals, nuts and oilseeds [3]. The aim of this work was to evaluate isoflavones levels in roasted coffee, embracing the two coffee species with higher economical importance, *Coffea arabica* and *Coffea canephora* var. *robusta*, and commercial samples (usually blends of both coffee species).
Methods: Samples of ground roasted coffee were individually analysed: 100% arabica (*n*=2, medium roast), 100% robusta (*n*=2, medium roast) and commercial blends of arabica and robusta (*n*=8). A ground roasted coffee aliquot of 200 mg was spiked with antioxidant (butylated hydroxytoluene), 2'-methoxyflavone (internal standard), methanol and hydrochloric acid 3.4 N. The acid hydrolysis was performed at 75 ºC, during 2.5 h. After that 1 mL of the hydrolysate was spiked with sodium hydroxide 10 M and preserved at 4 ºC until chromatographic analysis in the same day. Analyses were performed in duplicate. The compounds were analysed by reversed-phase HPLC with diode-array detection, using a Mediterranea Sea_{18} column 5 µm, 15 cm x 4.6 mm i.d. (Teknokroma, Barcelona, Spain) and a gradient solvent system of acetonitrile and formic acid 0.1%, at a flow rate of 1 mL/min. Analytes were monitored at 254 nm and peaks were scanned between 200 and 400 nm for identification purposes (UV spectra). Quantification was based on the internal standard method.
Results: Medium roasted arabicas contained 10.1±0. 9 µg of daidzein/ g (dwb), 1.4±0. 7µg of genistein/ g (dwb) and 11.0±4.3 µg of formononetin/g (dwb). For 100% robusta coffees the levels were 20.6±3.3 µg/g (dwb), 3.0±1.4 µg/g (dwb) and 64.0±15.9 µg/ g (dwb), respectively. A high variability was found in isoflavones contents of commercial coffee samples (*n*=8): 4.6-15.0 µg of daidzein/ g (dwb), 0.4-6.8 µg of genistein/ g (dwb) and 11.4-55.1 µg of formononetin/ g (dwb). These differences might be especially due to the blend composition, since pure robusta samples contained superior amounts of isoflavones. However, one should also consider the influence of the roast degree achieved by each brand that might be responsible for some degradation of these compounds.
Conclusions: All the analysed samples contained daidzein, genistein and formononetin. Highly variable levels were found in commercial coffee blends. Medium roasted robustas contained significantly higher levels of isoflavones, when compared with arabica ones.
Funding acknowledgement: The authors thank to BICAFÉ for providing the coffee samples. Rita. C. Alves is grateful to Fundação para a Ciência e a Tecnologia for a PhD grant (SFRH/BD/22449/2005).

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1_82 Nutritional value of enriched food products available in Poland

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Background/aims: A wide range of foods with added vitamins and minerals is nowadays present on the Polish market and, consequently data regarding nutritional value of numerous enriched food products (both obligatory and voluntarily) are included in Polish food composition tables (FCT). The aim of this study was to give an overview of enriched food products listed in Polish FCT, and to compare analytical values with those declared on labels in calcium and vitamin C enriched foods. Taking into consideration prevention of deficiencies, products enriched with vitamin C and folic acid, as well as calcium play a special role in our diet. In Polish FCT values for vitamins and minerals in enriched food products are based on data provided by producers.

Methods: Information on the nutrient content of enriched foods in Polish FCT as stated by the producers was collected. Furthermore, the content of calcium was determined in 74 calcium enriched food samples such as milk products, breakfast cereals, multi-fruit and carrot drink, instant foods and confectionery. Calcium was analysed by ASA (UNICAM 939 spectrometer) method with air/acetylene flame and 422,7 nm wavelength. Vitamin C was analysed in 92 samples of fruit and vegetables juices and drinks, breakfast cereals, instant food products and sweets with added vitamin C. Vitamin C was measured by titration or spectrometry according to Polish standard PN-A-04019:1998. Analytical values were compared with those given on the labels.

Results: In Polish FCT, nutritional values are given for 8 obligatory enriched foods and 31 foods for which enrichment is voluntary. The analytical part of this work showed that in 27% of samples, detected amounts of vitamin C were more than 100% higher in comparison with declaration given in nutrition labelling of these products. Such situation was caused by overdose of that nutrient for technological reasons in enrichment process. In case of calcium enriched foods for 89% of examined samples differences between analytical values and those stated on the labels did not exceed 20%[1,2]. Detailed results will be shown as tables in our poster.

Conclusions: Because of great variety of products on the market it is necessary to increase the number in Polish FCT. To ensure high quality data for vitamin and mineral contents for food labelling purpose, it is planned to set acceptable tolerance ranges between declared and measured quantity of nutrients in food products. In order to improve estimation of actual intake of micronutrients in epidemiological studies continuation of activities to identify and to examine enriched products available on the market to extend information in FCT is necessary.

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Conflict of interest: All authors have no conflict of interest.

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TOPIC 2 - MAJOR PUBLIC HEALTH/NUTRITION EDUCATION TOOLS AND SOFTWARE THAT UTILIZE FOOD COMPOSITION DATA AND DATABASES

2_06 Study effects of education on nutritional behaviors in Iranian military personnel

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Background/aims: A healthy diet plays an important role in the wellbeing of military personnel, and can increase physical and mental functions. Educational programs are one of the most important methods to improve nutrition and nutritional behaviors**.** Adequate nutrition education can have an effect on nutritional knowledge, attitude and practice. The aim of this study was to determine of effects of education on nutritional behaviors in Iranian military personnel using an educational software program.
Methods: This semi-experimental study was carried out on 422 people from military centers in Iran, with an age range of 19-55 years. Data was collected using a questionnaire that consisted of 56 questions, including: demographic (8 questions (Q.)), knowledge related (12 Q.), attitude related (18 Q.), and practice related (18 Q.) questions, as used in previous studies. Before applying the questionnaire it was sent to six experts in nutrition education domains to confirm its validity. The reliability of the questionnaire was tested by test-retest technique (r=0.8). A face-to-face interview, as well as completion of the questionnaire, was used to collect data. The subject's practice was measured in three different levels: low (<30%), moderate (30-75%) and good (>75%). After determining levels of dietary habits, an educational program (software) was designed and distributed among the study participants. Then, four weeks following the first stage, the participants were tested again using the same questionnaire, to find out whether the educational program influenced nutrition knowledge, attitude and practice in the military personnel. The collected data before and after intervention was analyzed using the SPSS package and Paired t-test.
Results: The score mean of knowledge, attitudes, and practice (KAP) was raised significantly following the intervention ($p<0.001$) as compared to baseline. That is, the score mean and SD of the subjects' KAP was changed from 62.99% (17.09%), 44.54% (6.32%), and 38.36% (11.48%) to 73.47% (18.53%), 58.04% (14.35%), and 55.57% (25.65%) respectively. These differences as mentioned, were statistically significant ($p<0.001$).
Conclusions: The educational intervention has a significant effect on correcting the nutritional model in military centers personnel. According to the study results, it is recommended that such educational intervention may be applied to other military centers.
Funding acknowledgement: This research was funded by Health Research Center of Baqiyatallah University of Medical Sciences, Tehran, Iran.

2_24 Assessment of consumer exposure to nutrition information on food labels: Penetration study across the EU-27 plus Turkey

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Background/aims: FLABEL (Food Labelling to Advance Better Education for Life, www.flabel.org) is a project funded under the European Commission's 7th Framework Programme. Its objective is to understand how nutrition information on food labels affects dietary choices and consumer habits. Fundamental to this objective is the assessment of current exposure of consumers to nutrition information on food labels. At present, few data exist on the penetration of nutrition information on food labels in Europe, with previous studies involving only a small subset of countries and not looking at all products within a product category[1].
The present study aimed at designing and conducting a reproducible audit, assessing the current penetration of nutrition information on food labels in various product categories in the EU-27 plus Turkey, and to identify the major ways in which nutrition information is provided on labels.
Methods: In each of the 27 EU countries plus Turkey, three types of retailers were chosen for a physical audit: a retailer within the top 5 in terms of market share, a national retailer or consumer cooperative, and a discounter. The product categories examined were sweet biscuits, breakfast cereals, ready meals, carbonated soft drinks and yoghurts. A data collection grid was designed to record where nutrition information occurred on the pack (front-of-pack vs. elsewhere), in which format it was given (e.g., nutrition table), which nutrients were covered and whether nutrition or health claims were present.
Results: More than 37,000 products were audited. The majority of products - on average 85% - in the 5 categories in all countries contained nutrition information of some kind (highest in Ireland, UK and The Netherlands at > 95%, lowest in Cyprus and Slovenia at < 75%). By far the most wide-spread format across all countries was the nutrition table on back of pack, stating either the main 4 (calories, protein, carbohydrates, fat) or the main 8 (main 4 plus sugar, saturated fat, fibre and sodium/salt). Overall, breakfast cereals was the category with the highest penetration of nutrition information, displaying some kind of nutrition information back of pack on 94% of products and front of pack on 70% of products. Nutrition claims and Guideline Daily Amounts (GDA) were the most prevalent front-of-pack forms of nutrition information with up to 37% and 63% penetration, respectively.
Conclusions: Nutrition information was found on a large majority of products audited and its presence seems higher than reported previously. These findings provide a solid starting ground for subsequent studies involving attention, reading, liking, understanding and use by consumers of different nutrition labelling formats.
Funding Acknowledgment: FLABEL - Food Labelling to Advance Better Education for Life - receives research funding from the European Community's Seventh Framework Programme (Contract n° 211905).

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2_32 Disaggregating composite food codes in the UK National Diet and Nutrition Survey food composition databank

E. Fitt, T. Mak, A.M. Stephen, C. Prynne, B. Teucher, M. Farron-Wilson, G. Swan, C. Roberts

See speakers' abstracts.

2_58 Functional foods availability in Spain and the Netherlands: similarities and disparities

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Background/aims: The market for foods fortified with different compounds, such as vitamins or minerals, is growing rapidly in both traditional Mediterranean countries such as Spain and in Western countries such as The Netherlands. However, there is a lack of updated information about functional foods, which makes comparison between countries with theoretical different dietary patterns difficult. It is also important to determine whether the seemingly globalized food market responds to the real nutrient needs of the Spanish and Dutch populations. The aim of this study was to compare the availability of functional food products in Spain and the Netherlands and to analyse the similarities and differences between average Spanish and Dutch functional food consumption. The product availability, legislation, cultural and demographical differences, epidemiology and trends were examined.
Methods: A database of both Dutch and Spanish functional foods was designed. A total of 555 products were included, of which 296 were from the Dutch market and 259 from the Spanish one. The database was accomplished by visiting a representative sample of supermarkets for a period of six months. The following information is included: food groups, brand, product name and product photograph, serving size, potential beneficial effects as indicated by the manufacturer, functional ingredient(s) and the nutrition facts label. Additionally, updated scientific literature was used in order to evaluate the accomplishments of the products according to the legislation in both countries, to compare the Recommended Daily Intake of vitamins and minerals, and to observe the coverage of nutrients to evaluate the need of functional food products.
Results: A new and useful Functional Food Database has been created. The largest difference between the two markets is shown for the cereals and cereal products food group (Spain has 64 more fortified products), whereas fortified drinks are more available in the Netherlands. Another remarkable outcome was the unavailability of fortified meat & meat derivatives in the Netherlands and the lack of fortified sweets in Spain. Dutch dairy products and cereal and cereal

products show a lower percentage of added vitamins and minerals compared to Spanish products. Calcium is the most frequent mineral added in Spanish dairy products, with 44.8% of products having added calcium compared to only 10.7% of Dutch products. All food substitutes were enriched with all the vitamins (except for vitamin K) in Spain whereas for the Netherlands only 71.4% of the food substitutes were vitamin enriched. Vitamin A is less often used for enrichment/fortification practices in the Netherlands compared to Spain. Except for food substitutes, the Dutch database has no functional foods enriched with iodine. In general, more products are fortified with fatty acids in Spain, with differences also for the type of fatty acids included. Non-digestible carbohydrates are not added to functional foods in Spain. Remarkable differences were also observed for pre-, pro- and synbiotics per food group between the countries.

Conclusions: The largest difference in functional foods availability is seen in cereal and cereal products and drinks fortification practices. Type and amount of nutrients used for food fortification differ to a great extent between Spain and The Netherlands. The evaluation of the functional foods market is not always appropriate to avoid potential nutrient deficiencies. Moreover, for some nutrients, a globalization trend in functional food supply is observed regardless of specific population needs either in Spain or in The Netherlands.

Funding acknowledgement: This work was partially funded by the Regional Government of Madrid under contract CAM 186/2007, entitled: “Functional Foods Database in Madrid´s market. Evaluation of adequacy by food groups and nutrient content”.

2_68 Evaluation of food consumption and dietary patterns in Spain according to the Spanish Food Consumption Survey: an updated information

G. Varela-Moreiras, J.M. Ávila, C. Cuadrado, S. del Pozo, E. Ruiz, O. Moreiras

See speakers' abstracts.

2_80 EuroFIR spreading of excellence activities by specialised courses and training workshops

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Background/aims: The specific objective of the 'Training, education and vision to postgraduates and young scientists' work package (WP3.1) is to promote knowledge and skills development in food composition research within the EuroFIR network and across Europe through a coherent set of closely inter-related training and education.
Methods: From 2005 until 2008 this work package has offered various specialised courses and training workshops to all professionals occupied with the development, management and use of food composition data. Topics covered were "Value Documentation & Data Quality" of food composition data; "Production and Use of Food Composition Data in Nutrition", the basics of food composition data bases; "Food Indexing" a course on unambiguous description of foods; "Recipe calculation" how to select and use nutrient retention factors in recipe calculation; "Evaluation on Revised Composition Input Form", a workshop for evaluators of e-BASIS; "Capacity Building in CEE countries"; dissemination of knowledge to Central and Eastern European Countries; "Media & Communication", a workshop on science communication; and "Plant Food Analysis & Data Handling". To support the training activities an E-learning course on nutritional analysis is under development.
Results: In this period a total of 347 persons participated in the above mentioned EuroFIR training activities divided into 92 persons on Value Documentation & Data Quality, 83 persons on Production and Use of Food Composition Data in Nutrition, 62 persons on Food Indexing, 53 persons on Recipe calculation & Selection and use of nutrient retention factors for recipe calculation, 18 persons on Evaluation on Revised Composition Input Form, 17 persons on Capacity Building CEE countries, 12 on Media & Communication, and 10 persons on Plant Food Analysis & Data Handling. The Fat & Fatty acids, Protein, Carbohydrates and Minerals cases of the E-learning course are almost finalised. The quality of the courses and workshops is evaluated by the participants directly after an event and after 6-9 months. In this way information

on the applicability for EuroFIR's purposes are gathered, as well as ways to improve the courses.
In the first two years approximately 60% of the partners participated. In 2007 this increased to 90%. Partners from Portugal, Bulgaria, Serbia & Macedonia and Germany most frequently joined the training activities (>15 participants). There was also a steady increase in non-EuroFIR participation from less than 10% in 2005 and 2006 to 17% in 2007 and 23% in 2008.
Conclusions: The increase of participation of partners in the first years showed that the training activities of the Network of Excellence (NoE) really contributed to the integration activities between partners. The steady increase in non-EuroFIR participation demonstrates the growth potential of EuroFIR training activities beyond the current consortium.
Funding acknowledgement: This work was completed on behalf of the EuroFIR consortium and funded under the EU 6th Framework Food Quality and Safety Programme (FOOD-CT-2005-513944).

2_85 Management of the UK nutrient analysis programme

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Background/aims: Food composition data is required by the UK Food Standard Agency (FSA) as part of its evidence base, and, in particular, in support of its dietary survey programme. With the increasing globalisation and diversity of our food supply and changes in product formulation, it is more important than ever that nutritional data is regularly updated. A new four-year project to manage the FSA's nutrient analysis programme and its dissemination through the *McCance and Widdowson's The Composition of Foods* series has therefore been commissioned.
Methods: The first stage of the project is to comprehensively review the current UK food composition dataset. The main objective of this review is to identify and prioritise food groups that should be included in the planned analytical surveys. Three new analytical surveys will be undertaken, providing new data on approximately 150 foods. In addition, the project will identify and evaluate additional data sources (especially from industry and other European countries) that might be used to supplement the analytical surveys, in order to maximise the amount of good quality information available to users. In particular, dialogue with the food industry will be an early priority, to consider options for the generation and sharing of data. The project will also consider the long-term sustainability of this important food composition work. The potential for additional funding (e.g. through funding of analytical work or increased commercial licensing of data) will be explored. A range of dissemination outputs will be considered, focussing on adding value to and enhancing the electronic data, including the provision of user-friendly interfaces. Stakeholder engagement will be a key part of the project, through an Expert User Group comprising representatives of the main stakeholder and user groups for food composition data, and through a series of stakeholder events and consultations.
Results: The results of the analytical surveys, together with data from other sources, will be widely disseminated. The new *Composition of Foods Integrated Dataset (CoF IDS)*, launched in 2008 and available online (http://www.food.gov.uk/science/dietarysurveys/dietsurveys/) will enable more frequent updating of data, and this will be carried out throughout the project. The project will culminate in the production of a new (7th) summary edition of the popular printed version of *The Composition of Foods*, with publication scheduled for 2013.
Conclusions: This important new project will update and extend the UK food composition dataset, as well as considering how this work might be sustained in the future.
Funding acknowledgement: This project is funded by the UK Food Standards Agency.

2_86 EuroFIR AISBL – Facts and aims about the new food information provider

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Background/aims: EuroFIR AISBL (*Association Internationale Sans But Lucratif*) is a member-based, non-profit association based in Belgium, which builds upon scientifically based development, publication and exploitation of food composition data (FCD) as well as accompanying information in order to support and underpin research into food quality and safety, and into nutrition. The establishment of the new EuroFIR AISBL is one of the most important areas for the long-term sustainability of the EuroFIR project, which aims to harmonise European food composition databases (FCDB). Acting as an international food information provider, EuroFIR AISBL aims to become an interface between the national FCD compiler organisations, laboratories producing nutrient data, and users of food information from academia, industry and regulators. In addition, the promotion and development of quality assurance and traceability principles, taking into consideration the implementation of relevant international standards, are essential tasks of the association.
Results: Non-profit, governmental and policy bodies, academia, industry as well as researchers and students will be encouraged to join the AISBL as new Ordinary Members and will have access to a wide range of food information (including data on nutrients and bioactive compounds with putative health benefits), technical services, training opportunities, conferences, EuroFIR technical reports and publications, and a European-wide network of FCD compilers, stakeholders, food industry and other international contacts.
Conclusions: The new association EuroFIR AISBL presents a single and unique food information resource which will be of use to industry, public sector funding bodies and regulators for any of the technology, know-how and data access in the food composition area throughout and beyond Europe. Closely linked to nutritionists, dietitians and public health professionals, the AISBL can support pan-European nutritional and epidemiological studies investigating diet and health relationships. It's state-of-the-art knowledge related to the methods of analysis for a diverse range of nutrients and other bioactive compounds, as well as its expert knowledge about FCDBs and its innovative data interfaces offer modern solutions for various data applications in a broad spectrum of food and health topics.
Funding acknowledgement: This work was performed on behalf of the EuroFIR Consortium and funded under the EU FP6 'Food Quality and Safety Programme'. Project contract nº FP6-513944.

TOPIC 3 - NEW FOOD COMPOSITION DATA/DATABASES – THE NEED FOR QUALITY STANDARDS

3_10 Bioactive non-nutrient compounds – matching EuroFIR-BASIS and a national FCDB

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Background/aims: Food composition databases comprise different levels of compositional data: 1) For reference purposes, databases with systematic full analytical data are needed. 2) For user-based purposes, completed sets of component values are constructed in user databases in order to minimize missing values. This study compared data structure, the content of data and selected values in two differently oriented databases. We selected as examples the EuroFIR-BASIS database (eBASIS) as a reference and a national food composition database as a user database. We studied the compatibility of selected matching bioactive compounds and classification between the reference database and the user-based database.
Methods: eBASIS is a reference database including detailed analytical data and compositional values for 250 bioactive compounds present in food items (http://www.polytec.dk/ebasis). Fineli® is the Finnish food composition database (www.fineli.fi) which is built and completed for applications in dietary surveys. The identification and matching of bioactive substances and compound classes within two databases was analysed. For selected 8 matching compounds, the coverage of analysed values in Fineli was compared with the range of eBASIS values. The hypothesis is that the averaged values of Fineli are covered by the value range of bioactive substances in eBASIS.
Results: eBASIS contains 250 compounds in 18 compound classes while Fineli contains 70 bioactive compounds in 8 classes. The different number of compounds between databases is explained by the varying expression of compounds. Polyphenols for instance are analysed and expressed as glucosides in eBASIS while they are expressed as a-glucones in Fineli. Other differences existed in the compound classification, e.g. if caffeic acid belongs to cinnamic acid derivatives or phenolic acids. The comparison and fitting of values for selected compounds in Fineli within the range of eBASIS database will be presented.
Conclusions: A user-based food composition database has been completed with averaged or imputed values in addition to original analysed values. On the contrary, the reference database has its values as original analytical data with all the indicative information. When enlarging the national food composition database in the area of bioactive compounds, it is important to test the compatibility of data structure and values against the extended compositional database eBASIS.
Funding acknowledgement: This work was completed on behalf of the EuroFIR consortium and funded under the EU 6th Framework Food Quality and Safety Programme (FOOD-CT-2005-513944).
Conflict of interest: None of the authors declare any conflict of interest

3_11 Levels of zinc and copper in Iranian key foods

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Background/aims: Zinc is needed for the metabolism of nucleic acids and the synthesis of proteins, and it is an integral part of the human DNA for cell division and synthesis. Therefore, a lack of zinc in pregnant women can result in numerous birth defects. Zinc deficiency is associated with decreases in bone density. Likewise, copper is an important mineral for normal growth and development of the skeletal system. Copper is usually found in foods containing iron. It is important to maintain adequate levels of zinc and copper in the diet to prevent and/or treat osteoporosis. Because there was little information on zinc and copper concentrations of Iranian foods, we determined these minerals in fifty Iranian key foods.
Methods: Fifty key foods commonly found in the Iranian diet were selected based on National Comprehensive Study on Household Food Consumption Pattern and Nutritional Status, Iran, 2001-2003. Horwitz procedure (1990) was used to identify the key foods[1,2]. Three samples of each food were collected from different supermarkets reflecting the distribution of food products throughout the regions which may include variations in the composition of individual ingredients sourced from different regions. A pooled sample was analyzed in triplicate for proximate zinc and copper levels. The methods of analysis used in this study are described in Table 1.
Results: Data on the concentrations of zinc and copper in foods were presented per 100 g. The key foods selected were mainly cereals { Iranian flat breads like (sangak, lavash, taftoon and barbari), rice and pasta}, vegetables (potatoes, onions, root vegetables, leafy vegetables), fruits (citrus fruits and melons), pulses (lentils, beans and chick peas), meat (lamb, beef, veal, chicken and fish), eggs and dairy products (milk, yogurt and cheese). Foods containing the highest amounts of zinc in the Iranian diet were red meat (5.2-4.3mg/100g), legumes (4.1-2.9mg/100g) chicken (2.8-1.6mg/100g), and those containing the highest amounts of copper were legumes (0.47-0.36mg/100g), Iranian flat breads (0.31-0.17mg/100g), eggs (0.14mg/100g) and minced meat (0.12mg/100g).

Table 1 List of analytical methods used for the analysis

Nutrient group	Methods and references
Water	Oven drying (AOAC 925.10), microwave (PNTA0081)
Ash	Muffle furnace; ash furnace, gravimetric drying (AOAC 930.30,1990)
Total fat	Soxhlet (A 08/09/77, PNT A0075)
Carbohydrate	Calculated by difference
Zinc and copper	Flame-atomic absorption spectroscopy after ashing (AOAC 965.09 PNT A 0017)
Nitrogen	Kjeldal- Dumas (AOAC 976.05, PNTA0100)

Conclusions: Legumes are rich sources of zinc and copper. Also, legumes are a good source of protein. Therefore, consumption of these food items is recommended for a healthy balanced diet.

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3_12 Magnesium content of Iranian food items

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Background: Magnesium is important for normal functioning of the human body. This mineral is involved in metabolism and water balance, and it is important for muscles, bones and teeth. Magnesium deficiency significantly increases the risk of type 2 diabetes, as magnesium plays an important role in carbohydrate metabolism. It may influence the release and activity of insulin, the hormone that helps control blood glucose (sugar) levels. Low blood levels of magnesium (hypomagnesaemia) are frequently seen in individuals with type 2 diabetes[1,2]. The purpose of this study was to determine the magnesium content of fifty commonly consumed food items in the Iranian diet.

Methods: Based on the National Study on Household Food Consumption Pattern and Nutritional Status, I.R. Iran, 2001-2003 and Hawteiz procedure (2002)[3,4], fifty key foods were selected. Three samples of each were collected from different supermarkets reflecting the distribution of food products throughout the regions which may include variations in the composition of individual ingredients sourced from different regions. A pooled sample was analyzed in triplicate for proximate magnesium levels. The methods of analysis used in this study are described in Table 1.

Table 1 List of analytical methods used for the analysis

Nutrient group	Methods and references
Water	Oven drying (AOAC 925.10), microwave (PNTA0081)
Ash	Muffle furnace; ash furnace, gravimetric drying (AOAC 930.30,1990)
Total fat	Soxhlet (A 08/09/77, PNT A0075)
Carbohydrate	Calculated by difference
Magnesium	Flame-atomic absorption spectroscopy after ashing (AOAC 965.09 PNT A 0017)
Nitorgen	Kjeldal- Dumas (AOAC 976.05, PNTA0100)

Results: The protein contents of legumes varied from 17- 20g/100g. Hence they are rich source of protein in the Iranian diet. Also, legumes like chick peas, lentils, red beans, navy beans and spilt peas had the highest levels of magnesium (100-160mg/100g) and traditional flat breads (Sangak, Taftoon, Barbari and Lavash) are also good sources of magnesium in the Iranian diet (40-60mg/100g).

Conclusions: Legumes are great sources of magnesium in the Iranian diet and should be a part of a healthy balanced diet to ensure adequate magnesium intakes. Based on earlier findings showing a higher risk of type 2 diabetes in people with low magnesium intakes, these magnesium rich foods could play a role in decreasing the incidence of type 2 diabetes in the Iranian population.

Funding acknowledgement: This work was funded by the National Nutrition and Food Technology Research Institute, Tehran, Iran.

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3_17 Production of modified amaranth, emmer and maize starches

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Background/aims: Starch is a valuable ingredient to the food industry; the characteristics of native, unmodified starches are undesirable for many applications. One of the most important methods to overcome these problems and expand the usefulness of starch is production of physically modified starch.
Methods: Prior to making modified starches, the starches (50g) were suspended in distilled water (1L) (5% w/v) and heated in boiling water bath for 15 min to obtain gelatinized starch paste. The mixture was then homogenized to obtain an aqueous emulsion (feed liquid) and immediately fed to the spray-dryer. The pressure of compressed air for the flow of the spray was adjusted to 1 bar with the feed rate at 900 g/h. The inlet and outlet air temperature were maintained at 180±5 ºC and 87±5 ºC, respectively. To prepare modified starch by pregelatinized process, a sample of 100 g of starch was suspended in 1 L of distilled water and heated in boiling water bath for 15 min with slow mixing. Pregelatinized starch was placed into a stainless steel tray in form of thin film (1-2 mm) and dried in a convection oven at 60 °C for 48 h. The changes in water binding capacity (WBC), swelling power (SP) and solubility (25 ºC and 95 ºC), cold water solubility (CWS), paste clarity, colorimetric properties and viscosity (Brabender viscograph) were investigated.
Results: Emmer spray dried starch (ESS) had the highest water binding capacity (WBC) among starches that were studied. The cold water solubility of amaranth spray dried starch (ASS) was 40 % and was between 7 and 6 % for emmer and maize spray dried starches, respectively. Spray dried and pregelatinized amaranth starch showed the highest cold water solubility. All modified starches showed increasing swelling power due to damage to starch granular structure with modification. Turbidity of starch gels during cold storage at 4 ºC for one week increased as storage time increased.
Conclusions: It was concluded that modified amaranth, emmer and maize starches could be useful to consider as thickener agents in food industry
Funding acknowledgment: This work was funded by the Ministry of Science, Research and Technology of Iran (scholarship) and the University of Natural resources and Applied Life Sciences - Department of Food Science and Technology - Division of Food Technology, Vienna, Austria.

3_18 Effect of intensive vs. free range production on the fat and fatty acid composition of whole birds and edible portions of UK retail chickens

D. I. Givens, R.A Gibbs, R. H. Brown

See speakers' abstracts.

3_19 Updating the Bulgarian database for food chemical composition of traditional and new bread brands

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Background/aims: Bread is one of the oldest prepared foods, dating back to the Neolithic era. As a foodstuff of great historical and contemporary importance bread has significance beyond mere nutrition in many countries The aim of this study was to illustrate the chemical composition of 9 bread brands (6 new brands on the Bulgarian market and 3 traditional bread types, consumed by the Bulgarian population) to update the national database for food chemical composition.

Methods: Six bread brands (three packs of each brand) with original trade name were analyzed for total protein, fats, ash, dietary fiber, sodium chloride, invert sugar and fatty acid (FA) content. The samples were: sample 1 – bread "Milk-Protein Breakfast", sample 2 – bread "Apple Breakfast", sample 3 – bread "Bagelino", sample 4 – bread "Vienna Corn", sample 5 – bread "Dobrudzha", sample 6 – wholegrain bread, sample 7 – white toaster bread, sample 8 – bread "Vita 6 cereals" and sample 9 – bread "Vita wheat germs". Three individual samples of each product were analyzed. Fatty acid composition was analyzed by gas chromatography using Pye Unicam chromatograph; series 104. The analysis for energy, sodium chloride and invert sugar were undertaken based on the soft part and crust of the bread in compliance with the requirements of the relevant standards: dry matter (BSS 3412-92), ash (BSS ISO 2171), fats (BSS 3412-92), protein (AOAC official method 979.09), invert sugar (BSS 3412-92), sodium chloride (BSS 3412-92), dietary fiber (AOAC official method 985.29), fatty acid composition (BSS EN ISO 5508 and BSS EN ISO 5509), available carbohydrates (by difference: [100- (water (%) + ash (%) + fats (%) + protein (%) + DF (%)]), energy value (kcal) (calculated [(available carbohydrates (%) + protein (%)) X 4 + Fats (%) X 9]), and energy value (kJ) (energy value (kcal) X 4.184). Laboratory data quality is subordinated to requirements of BSS ISO 17025:2006.

Results: The results of this study showed that the highest content of dietary fiber is found in "Vita 6 cereals" (43.2%) and "Vita wheat germs" (42.8%) bread brands, while the lowest content of dietary fiber (8.0%) was found in white toaster bread. Almost equal ash values were found in all but one - wholegrain bread (1.8%); respectively for sodium chloride content (< 0.1%) in white toaster bread brand. "Dobrudzha", "Vita 6 cereals" and "Vita wheat germs" bread brands had

identical values for miristic and palmitoleic fatty acids content while there were small differences in the values for linolenic acid and carbohydrates. The most abundant FA fraction was linoleic acid (C 18:2); palmitic (C 16:0) and oleic acids (C 18:1) were present at moderate levels while miristic acid (C 14:0) was barely detected.

Table 1 Basic Composition and energy value of bread brands (per 100g)

	Dry matter (g)	Ash (g)	Fats (g)	Pro-tein (g)	Invert sugar (g)	DF (g)	NaCl (g)	CHO (g)	E kcal/kJ
Bread “Milk-Protein”	73.7	1.2	4.0	8.7	6.4	9.5	1.3	50.3	272/1138
Bread “Apple Breakfast”	71.6	1.3	3.2	9.4	2.6	20.7	1.1	37.0	214/895
Bread “Bagelino”	68.0	1.2	1.8	9.2	2.9	14.9	1.4	40.9	216/906
Bread “Vienna Corn”	66.3	1.3	1.3	8.7	-	16.9	-	61.9	294/1231
Bread “Dobrudzha”	63.1	1.0	1.1	7.7	4.8	12.2	1.0	41.1	205/858
Wholegrain bread	62.3	1.8	1.7	7.5	4.2	24.6	1.1	26.7	152/636
White toast bread	73.0	1.0	1.2	8.1	2.5	8.0	< 0.1	54.7	262/1096
Bread “Vita 6 cereals”	64.2	1.2	1.5	7.8	-	43.2	-	10.5	87/363
Bread “Vita wheat germs”	65.6	1.3	3.2	8.7	-	42.8	-	9.6	102/427

‘-’ = not analysed; CHO=carbohydrates

Conclusion: These results will be used to update the Bulgarian Food Composition Table with new data on frequently consumed typical and new Bulgarian bread brands. The knowledge of the exact nutrient content of different foodstuffs is essential for the correct implementation of the national nutritional policy and for the exchange of data and information at regional and international level.

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3_21 Harmonised information exchange between decentralised food composition database systems

H. Pakkala, A. Møller, T. Christensen, I. Martínez de Victoria, K. Presser, E. Nørby, J. Ireland

See speakers' abstracts.

3_22 Compositional analysis of commercialized breads manufactured in Turkey

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Backround/aims: Bread is a fundamental staple for Turkish people and has a very important role in our diet. One of the easiest ways of adding nutritional components to the public diet is the addition of these components to bread formulations. The objective of this study was to collect compositional data for commercialised breads in Turkey. 15 commercially-produced bread samples with different formulations (mostly having high dietary fibre content) were analysed to obtain compositional data required by different companies for quality assurance and food composition analysis for food labeling purposes.

Methods: 15 commercially produced bread samples (breads formulated with different nuts, seeds, and plant parts, white wheat bread, whole wheat bread, bran added light bread, hamburger bread, prebiotic bread, doner bread, energy reduced bread, breads made of different cereal flours, etc.) were analyzed in the laboratories of TUBITAK MRC FI. Validated and, mostly, accredited international methods were used in the analysis. Moisture, protein, ash, fat and dietary fibre content of samples were determined. Total carbohydrate and energy levels were calculated and reported. The applied methods were as follows: moisture, oven drying method (AOAC, 1995); protein, Kjeldahl method (AOAC, 1995); ash, 550°C ashing method (AOAC, 1995); fat, acid hydrolysis method (AOAC 996.06, 1996); total carbohydrate, by difference, Atwater method (Watt, B.K., Merill, A.L., 1975, Composition of foods, Agriculture Hand Book); total dietary fibre, enzymatic-gravimetric method (AOAC 991.43, 1994); energy, Atwater method (Watt, B. K., Merill, A.L., 1975, Composition of foods, Agriculture Hand Book).
Results: The minimum and maximum values for compositional analysis of bread samples were as follows: 31.2 and 43.1 g/100g for moisture content, 5.9 and 9.4 g/100g for protein content, 1.1 and 2.5 g/100g for ash content, 1.2 and 6.6 g/100g for fat content, 38.2 and 54.8 g/100g for carbohydrate content and 1.1 and 8.1 g/100g for dietary fibre content of the samples, The range for the energy values of samples was 196-283 kcal/100g (820-1184 kJ/100g). The results demonstrated that the dietary fibre content of samples (except doner and hamburger bread samples) were 4 to 7 fold higher than that of white wheat bread. When energy values of samples

were considered, it was seen that energy values of all samples were lower than that of white wheat bread.

Conclusions: Consumer demand for healthy foods force companies to produce foods with better nutritional quality and change their product formulations through improvement of nutritional value of their products. One of the most important nutritional components is dietary fibre. Different flours or whole cereal flours or different nuts, seeds and plant parts are added to bread formulations to increase dietary fibre content. On the other hand, the other important consideration is the consumption of energy reduced food products for a healthier life. The commercially produced bread samples analysed in this study had high dietary fibre contents and low energy values, which make these food products an important contribution to a healthy diet.

In addition, our national 'Turkish food composition database' project has started. In the context of this project, individual membership and national private label membership systems for private sector in food industry will be formed. It will be possible for private companies to introduce their products in national and international platforms.

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3_26 Full value documentation in the Czech Food Composition Database

M. Machackova, M. Holasova, E. Maskova

See speakers' abstracts.

3_29 Turkish national food composition data base (T-FCDB)

G. Löker, B. Amoutzopoulos, S.O. (Keskin) Özkoç

See speakers' abstracts.

3_33 Methodology for adding glycemic index values to the Finnish food composition database

N. Ylönen, M. Similä, H. Pakkala, T. Korhonen, S. Männistö, L. Valsta

See speakers' abstracts.

3_35 New food composition data from Slovakia

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Background/aims: The aim of this study was to include new food composition data into the Slovak Food Composition Data Bank (SFCDB). We have focused on foods which are produced in Slovakia or are typical for the Slovak cuisine.
Methods: The source of new food composition data were scientific, peer reviewed publications mostly from Slovak analysts and scientists. We have focused on the following foods: bee honey, hard cheeses (Emmental and Edam), sheep's cheese "Bryndza", salami "Malokarpatska" and fruit juices (apple juice, apple-pear juice, blackcurrant juice etc.) which were originated in Slovakia and are well-known on the Slovak market. All data was compiled according to the EuroFIR standard proposal on food composition data. The procedure of data collection and documentation was followed with the use of a general flow chart of the compilation process. New data were entered manually in the system for documentation. Currently the system for documentation and data repository is a set of Excel spreadsheets developed by SFCDB according to the EuroFIR recommendations.
Results: Up to now we have described selected foods, identified components, documented values and references and other background information such as sampling strategy, analytical method, etc. It is difficult to find complete nutrition analyses of food and create detailed nutritional profiles of foods. In many cases scientific literature is focused only on particular components e.g. organic acids, sugar profile, minerals etc. This means that imputation procedures have to be applied on data to get required and compact composition profile ready for publishing. On the other hand the advantage of scientific publications is precision and accuracy of analytical data.
Conclusions: New data comprised a new foundation for the SFCDB standardized reference database, and data could be in future accessible for EuroFIR partners. This data also can be aggregated to create compiled data and update the Alimenta software for end users. Alimenta is a nutritional software, which can be used for nutrient intake assessment, for menu planning, labelling and as an electronic food composition tables.
Funding acknowledgement: This work was completed on behalf of the EuroFIR Consortium and funded under the EU 6th Framework Food Quality and Safety Program (FOOD-CT-2005-513944).

3_43 Nutritional values and fatty acid profile of commonly consumed fish in Iran and its importance in a diabetic diet

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Background: Diabetes is the leading cause of end-stage kidney disease. Abnormal amounts of protein appear in the urine when the kidneys are damaged; it's a key indicator of kidney disease. Some studies have shown that fish and fish oil consumption decrease protein in the urine, increase glucose tolerance, decrease fats in the blood, and lower blood pressure, all of which are beneficial to people with diabetes. Also, fish has been considered a healthy food, with many studies demonstrating low rates of death from coronary heart disease (CHD) among Greenland Eskimos. In addition, animal-experimental, observational, and clinical studies support this hypothesis and have identified two long-chain n-3 polyunsaturated fatty acids (n-3 PUFAs), eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), as the likely active constituents. DHA also appears important for neurodevelopment during gestation and infancy[1]. The aim of this study was to determine the nutrient values of some kinds of commonly consumed fish in Iranian diet.
Methods: Based on a National Study on Household Food Consumption Pattern and Nutritional Status, I.R. Iran, 2001-2003[2] and Horwitz procedure (1990)[3], commonly consumed fish were selected. Carp raw fresh, mackerel raw fresh, rainbow raw fresh fish and tuna canned in oil were chosen. Three samples of each fish were collected from different supermarkets reflecting the distribution of food products throughout the regions, and may include variations in the composition of individual ingredients sourced from different regions. A pooled sample was analyzed in triplicate for proximate. Minerals and fatty acid profiles were measured by AOAC methods. The quality assurance included the validation of analytical methods and routine internal quality control procedures.
Results: The protein content of fish was 19.3% in mackerel fish to 25.34% in tuna canned in oil. Rainbow fish had the highest fat (8.5%) and carp fish had the lowest fat content (3.65%). Canned tuna fish had the lowest EPA content (0.009g/100g).
Conclusions: Fish is a good source of protein. As fish protein and its components can lower abnormal levels of protein in the urine, fat in blood and increase glucose tolerance in diabetic patients, consumption of fish is suggested.
Funding acknowledgement: This work was supported by funds from the National Nutrition and Food Technology Research Institute.
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3_44 Quality evaluation of enriched chocolate products

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Background/aims: Chocolate products have been delicacies for hundreds of years all over the world and now, the most important trends in food manufacturing originate from consumers' demand for functional or health-promoting foods. The aim of this research was to assess the feasibility of the addition of sunflower seed, flax seed, puffed oat/rice and dried damson plum into milk, dark and white chocolate and to determine the shelf-life of these new chocolate products. To establish the quality of the new chocolate samples, physical, chemical and organoleptic properties were determined regularly over one year.

Methods: Milk, bitter and white chocolate was enriched with different amounts and different particle sizes of sunflower seed, flax seed, puffed oat/rice and dried damson plum. A number of trained panellists evaluated the chocolate samples i.e. for colour, texture, flavour and overall acceptability by using a 7-point hedonic scale (1 = dislike extremely, 4 = like moderately, 7 = like extremely). After the preliminary formulation experiments, the amount and particle size were optimised. The production was carried out in Nestle Turkey Food Industry, Karacabey, Bursa, Turkey, and all samples stored at 18^0 C. Moisture, ash, crude protein and total fat contents of the chocolate samples were determined according to AOAC methods. Physical and chemical properties and organoleptic quality were investigated on day 0, and then at months 1, 3, 6, 9 and 12. Hardness was measured using a TA-XT plus Texture Analyzer, colour measurements were done using a Minolta Chroma-Meter CR-300 reflectance colorimeter, and melting point was measured using a Buchi 510 Melting point determinator. Cold extraction method was carried out to evaluate free fatty acids, peroxide value, p-anisidine value, totox index, and UV-absorbance spectrum of all the chocolate samples. The new chocolate products were evaluated by 9 trained panellists using a scoring scale. Each panellist was to score on a scale of 1-5 on the colour, texture, flavour and overall acceptability. Physical measurements and/or experiments were conducted in quintuplicate and chemical measurements and/or experiments were conducted in triplicates. Data were analysed using SPSS 15.0. The results were expressed as mean values ± SD. The variance and degree of significance were used to separate means at $p<0.05$.

Results: In the sensory analysis, most sensory attributes of the chocolate samples were given 5 points on the 7-point scale. This indicates that enrichment of chocolate samples with sunflower seed, flax seed, oat and dried damson plum was possible. After a longer storage time, the sensory scores of chocolate with sunflower seed were decreased and also, it was not preferred to consume by the panellists because of the effect of lipid oxidation on the taste and flavor. Chemical composition, hardness and colour were significantly affected by the enrichment material. The chemical composition results showed that, in all types of enriched chocolate, ash content was between 1.75 and 3.88%, with white chocolate with damson plum having highest and puffed oat/rice dark chocolate the lowest ash value. Addition of damson plum increased the mineral content of the chocolate. Protein values were between 5.89 and 9.75 g/100 g. The protein value was highest in white chocolate with sunflower seed, and lowest in milk chocolate with damson plum. Fat content was between 24.56 and 37.40 g/100 g. The fat value was

highest in dark chocolate with sunflower seed and lowest in milk chocolate with damson plum. Sunflower seed increased both the protein and fat values. The energy content was between 495 and 573 kcal /100g, with dark chocolate with sunflower seed having the highest and dark chocolate with damson plum the lowest energy value.

Conclusions: The new chocolate products had an improved nutritional value. By the addition of sunflower seed, the protein value was increased and by addition of damson plum, the mineral content was increased and a scoring scale was developed for the sensory evaluation of the new chocolate products. It was demonstrated that chocolate with added sunflower seed, flax seed, puffed oat/rice and dried damson plum may be a useful vehicle for delivering essential nutrients to consumers.

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3_46 Critical evaluation of folate data in European and international databases

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See speakers' abstracts.

3_51 Fatty acid content of commonly consumed oils present on the Serbian market

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Background/aims: It has been suggested that man evolved on a diet with n-6:n-3 ratio of approximately 1:1, whereas current diets ranges from 10:1 to 25:1[1]. It is a concern that today's diet may be insufficient to meet n-3 essential fatty acids (FA) requirements. Therefore, the importance of determining FA composition of commonly used oils is indispensable for nutrition and health improvement. In addition, FA composition of certain oils present on the market, was not at all or was incompletely given in on-line available European and United States Department of Agriculture food composition databases (FCDB). The aim of this study was to determine the FA profile of commonly consumed sunflower oil and other oils present on the Serbian market using EuroFIR guidelines for sample collection and analysis. In addition, these data were to be included in Serbian FCDB.
Methods: Eight different types of oil (rapeseed oil, linseed oil, cold pressed sunflower oil, processed sunflower oil, cold pressed olive oil, light sesame oil, pumpkin seed oil and grape seed oil) were purchased in supermarkets and health food stores. All oils were bottled in dark bottles and were not exposed to direct light. All bottles were opened prior to experiment. Three samples of each type of oil bought in different stores were pooled and 0.5ml was taken for further analysis. The FA composition was analysed by gas chromatography using Shimadzu gas chromatograph 2014. All analyses were performed in triplicate. The individual FA methyl esters were identified from the retention times of Supelco® 37 component FAME Mix standard.
Results: The results in this study show that the content of oleic acid was highest in olive oil (66.8%) and grape seed oil (64.3%), while the content in other oils ranged from 18.3% to 45.3 %. The highest content of linoleic acid was found in grape seed oil (70.7%). Both cold pressed and processed sunflower oil had practically identical contents (62.0% and 62.5 %, respectively) of linoleic acid. Light sesame oil and pumpkin seed oil had linoleic contents of 47.3% and 35.2%, respectively, while its content in other oils was <20%. α-Linolenic acid was present in linseed oil (53.3%) and rapeseed oil (7.1%).
Conclusions: Many studies have shown numerous health benefits of α-linolenic acid. Given the generally inadequate intake of n-3 FA in our population it would be highly recommendable to increase the consumption of linseed oil since the most consumed oil in this region is processed

sunflower oil with no n-3 content. The inclusion of the obtained data in national FCDB is also of great importance given their quality sampling and laboratory analyses.

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3_52 Assessment of almond composition data in European databases

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Background/aims: Almonds are nutrient dense—rich in vitamin E, magnesium and other minerals, riboflavin, dietary fibre, protein and monounsaturated fatty acids. Over 80% of the world's almond supply is produced in the state of California (USA), and Europe is the largest export market for these almonds. Almonds are consumed in traditional foods and diets, and also increasingly as a healthy snack. Studies on the health benefits of almonds are extensive and ongoing. In 2007, the US Department of Agriculture (USDA) National Nutrient Database for Standard Reference released an extensive update of composition data for whole natural almonds. The update incorporated over 70 complete nutrient datasets obtained from USDA-certified laboratory analyses and represents comprehensive sampling of major almond varieties from the entire growing region in California. The Almond Board of California is actively working to increase awareness of this almond data (now available as Release 21 or USDA SR21), especially in countries where California-grown almonds are consumed. To effectively promote the use of this data in Europe, a better understanding of almond data in the national databases is needed.
Methods: National nutrient databases in Europe were searched for composition data on whole natural almonds. The databases included those from many major almond market countries, including Belgium, France, Germany, Italy, Netherlands, Spain and the United Kingdom, as well as the databases from Denmark, Finland, Iceland and Switzerland. Data was compared with USDA SR21 almond data and assessed for nutrient values, variability, completeness, sampling, source(s), calculation factors and analytical methods, where documentation was available.
Results: Availability and quality of almond composition data vary among national nutrient databases in Europe. Databases from many countries have data that compares reasonably well with USDA SR21 values for whole natural almonds, although the data has typically been compiled from multiple sources and is commonly based on smaller sample sizes. However, some databases have major data discrepancies, especially with regard to lipid and fatty acid content. In the Finnish database, the total fat value of 54g/100g almonds is not consistent with the low fatty acid component values (<33g total/100g almonds). In the Danish database, a low total fat value (39g/100g almonds) obtained from analysis of two samples was used in calculations for correspondingly low fatty acid component values. Other databases have missing values for key almond mineral nutrients, or data sources, where provided, are often several decades old and may not represent the best available data.
Conclusions: Whole natural almond data in the current version of the USDA National Nutrient Database (USDA SR21) is representative, complete, accurate, well documented, and readily accessible for adoption or adaptation by other databases. Dietitians, nutrition researchers, and policy makers need good quality almond composition data. California-grown almonds are a major component of the almond supply throughout Europe. Countries are encouraged to adopt or adapt the high quality and updated USDA almond data for their own nutrient databases.
Funding acknowledgement: This study was funded by the Almond Board of California.

3_57 Evaluation and inputting of compositional data on flavanones in plant food in EuroFIR BASIS database

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Background/aims: Food consists of a complex mixture of a wide variety of components, many of which are biologically active. One such class of bioactives is flavanones, which are a subclass of flavonoids, present in citrus fruits and juices. Basic research, animal model and human studies suggest flavonoid intake may reduce the risk of several age-related diseases. Information on food sources and concentrations of flavanones is not always quick or easy to find and data are often inconsistent and incomplete. In the course of developing EuroFIR BASIS – BioActive Substances in Foods Information System, a systematic method has been developed to search and document the literature for composition papers on flavanones in foods.
Methods: Both ISI Web of Knowledge and PubMed research databases were searched (since 1979), this resulted in 88 papers considering flavanones composition in different foods. The reference information has been included into EuroFIR BASIS with DOI (digital object identifier) links to their abstracts. The evaluation process includes entering quality assessed, detailed compositional data on the food plant, processing, sampling, analytical method and compositional information.
Results: To date the evaluated papers show that the most examined flavanones glycosides in different citrus varieties are eriocitrin, neoeriocitrin, narirutin, naringin, hesperidin, neohesperidin, neoponcirin and poncirin. The most commonly used analytical method was reverse-phase HPLC technique with photodiode array detector allowing flavanones identification and quantification. Typical of bioactive composition publications are the lack of detailed information on sampling plan, processing and comprehensive plant/food description. Flavonones are generally determined in whole fruit and in addition also in selected parts of the fruit such as peel, albedo, flavedo and juice.
Conclusions: After completing the evaluation process and data entry the database will provide a unique system that combines flavanone compositional data with biological effects information also included in EuroFIR BASIS. BASIS database has expanded with a lot of data considering flavanone composition in different varieties of citrus fruits and juices which are in wide-spread everyday use. The flavanones references searched for, sourced and coded will be of great help for further evaluators to continue the evaluation process. This data could also help the European evidence based healthier food production.
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3_59 Identification of the type of fat used in the frying process by evaluation of the fatty acids profile in potato crisps

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Background/aims: One of the most commonly consumed snack foods is potato crisps. The variety of this product in the market has greatly increased in the last few years. Nowadays, potato crisps found on the market are fried in different types of fat, with or without added salt or new flavours. Potato crisps usually have a high fat content and most of the fat comes from the fat/oil used during the frying process. The aim of this work was to identify the fat/oil used in the frying process based on the fatty acids (FA) profile of potato crisps and by comparing it with those of different oils and fats.
Methods: Eighteen samples of potato crisps, acquired in local supermarkets at two different seasons (December 2008 and March 2009), were analysed in order to study their profile regarding thirty six fatty acids. Preparation of fatty acid methyl esters (FAMEs) was performed by transesterification using a methanolic solution of potassium hydroxide. In order to guarantee quality, a commercial standard mixture was used (FAMES, Fatty Acid Methyl Esters Mixture C4:0-C24:1, reference 18919 from Supelco). Chromatographic analysis was performed with a HP 6890 series gas chromatograph equipped with a flame ionisation detector. A Supelco 2380 capillary column (60 m x 0.25 mm, 0.2 µm film thickness) was used. The oven temperature was held at 60 °C for 1 min, then increased at 17 °C/min to 168 °C (28 min) and finally increased at 4 °C/min to 235 °C (15 min).
Results: In order to identify the fat/oil used in the frying process, the FA profile in potato crisps was analysed. The eighteen samples were divided into three groups according to the major FA.
Group 1 (brands 2, 3, 10, 15, 17 and 18) has C18:1 as the major FA. Brands 2 and 15 have C16:1 lower than 0.1% and in the other brands, C16:1 content is higher than 0.5%. This is in line with the FA profile of olive oil and high oleic acid sunflower oil.
In Group 2 (brands 1, 4, 5, 6 and 13), the major FA is C18:2. Therefore, the fat/oil used for frying was either sunflower or soybean oil. Comparison between the FA profile in potato crisps and in the oils lead to the conclusion that brands 1, 4 and 5 used soybean oil and brands 6 and 13 used sunflower oil to fry the potato crisps. The main FA used to distinguish them was C16:0. In the case of sunflower oil, C16:0 values are in the range of 5.0-7.6% of total FA, whereas in the case of soybean oil, they are in a higher range (8.0 -13.5%).
Group 3 has similar profiles of C16:0 and C18:1 (brands 7-9, 11, 12, 14 and 16). The FA profile is very similar among all these brands and it corresponds to the profile of palm fat.
Conclusions: From the results, it was possible to identify that two brands of potato crisps were fried in sunflower oil, two in high oleic acid sunflower oil, three in soybean oil, four in olive oil and seven in palm fat. Most of the potato crisps labels do not indicate the type of fat/oil, with the exception of those fried in high oleic acid sunflower oil and olive oil, which also correspond to the most expensive brands.

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3_64 Impact of heat-moisture-treatment on rapidly-digestible-starch, slowly-digestible-starch, and resistant-starch of genetically modified (GM) cassava

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Background/aims: There is a growing interest in the cultivation of cassava in developing countries, and it is also in high demand in the highly industrialised countries. This has provoked a significant breeding effort on cassava in relation to resistance to diseases, early maturity, enhanced nutritive values and high yield. Therefore, it is necessary to investigate the impact of genetic modification (GM) on the crop as a source of functional food for human health because of the frequency of consumption of cassava-based foods. The aim of this study was to determine the effect of heat-moisture-treatment (HMT) on rapidly-digestible-starch (RDS), slowly-digestible-starch (SDS), and resistant-starch types 2 and 3 (RS_2 & RS_3) of genetically modified cassava starch.
Methods: Starch was extracted from two cultivars of GM cassava (TMS 97/4763 and TMS 98/0510) through a validated combined process of: peeling, grating, 'washing', sieving and drying. The starch granules were modified by adjusting moisture content (20 - 45%, dry basis) and being oven-dried at 40 or 55^{o}C for 16 h. The RDS, SDS, RS_2 & RS_3 were determined by enzymatic hydrolysis. Mastersizer 2000 Laser Particle Size Analyser (Malvern Company, U.K) was used to determine the effect of HMT on particle size distribution whilst amylase activity was measured with Ceralpha Amylase Kit.
Results: The data obtained in this study showed genotypic and HMT impact on all parameters. RDS (20.4 - 49.3g/100g), RS_2 (24.0 - 38.0g/100g) & RS_3 (5.4 - 12.9g/100g) increased whilst SDS was reduced from 58.8 down to 16.6 mg/100mg. The particle size also increased from 15.3 up to 19.7 µm whilst there was a decline in values of amylase activity from 0.48 down to 0.02 Farrands.
Conclusions: The increase in functional ingredients, RS_2 & RS_3, suggests that cassava starch with desirable characteristics may be produced from a fairly simple heat-moisture process. Therefore, it is concluded that HMT-starch from GM cassava may be used as a functional ingredient for wider populations because of potential health benefits.
Funding acknowledgement: O.J Oyelade is grateful to Commonwealth Scholarships for PhD sponsorship and to EuroFIR for integrated studentship.

3_67 Using systematic food description to aggregate foods for nutritional surveys: example of the INRAN database

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Background/aims: One of the most important uses of systematic food description, other than for matching consumption data with composition data, is the possibility to categorise food items for processing data in nutritional surveys. This is necessary in order to reduce the number of quantitative variables representing the dietary profile, during interpretation of the results, which can be very difficult when a very long list of foods is provided. Moreover, the sample size is usually not sufficient when intake estimates are performed at a very detailed food level. Coding consumption data implies a certain degree of subjectiveness because of the "fuzzy" nature of food. Therefore, developing algorithms to facilitate and standardize aggregated food coding using faceted food description could be an optimal way to reduce the burden for fieldworkers and data entry operators and to create software on microcomputer to record a food consumption survey with sampled subjects.
Methods: Food items in INRAN's Food Composition Tables were indexed using the LanguaL thesaurus (www.langual.org), and then the list and the associated descriptors were examined to discover patterns that could be used to develop an automated food aggregation system.
Results: The most evident result was the percentage of "not known" characteristics in each LanguaL facet. This concerned food contact surface (N) (98%), container or wrapping (M) (92%), geographical region (R) (88%), preservation method (J) (69%), extent of heat treatment (F), cooking method (G) (4%), and packing medium (K) (2%) per food composition item. Food type had no generic categorisation. Lower rates of the "unknown" category were due to easy to identify sub-categories in some facets: e.g. not heat treated/heat treated for facet F. Further analyses will be carried out to highlight characteristic combinations (more than 16000 cases were observed by combining foods and facets).
Conclusions: The results concern food categories from a food composition database, i.e. each item refers to a sample of different food products (varieties for fresh/raw foods or brands for packed foods). When coding foods recorded in a food consumption survey the coding must necessarily refer to single food products with different degrees of transformation (raw, fresh, primary transformation, advanced transformation, level of convenience) and home treatment (clean, preparation/preservation, cooking). Moreover, some additional aspects should be added to the coded foods in a consumption survey, e.g. novel and functional foods, organic, use of claims, and so on, including all variables that could qualify the habitual dietary profile possibly affecting nutritional quality.
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3_76 The process of food compilation in the context of the Spanish food information resources

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Background/aims: The compilation of food composition data is divided into two sub tasks. The first one consists of gathering food composition data from different sources and adapting them to meet the requirements and recommendations given by EuroFIR (1); the second one implies the revision and selection of this gathered data in order to obtain food composition data that match quality parameters in terms of documentation. This is the final step before publishing the Spanish food composition database. Our aims are to provide our users with quality food information and to study what the best guidelines would be for documenting and selecting food composition data obtained from sources that do not always offer quality food information, due to several reasons. Based on the aforementioned, we also aim to expand our food information system in order to provide some basic compilation processes that help compilers document and compile food data.
Methods: Sources of data included 1) a list of 658 candidate foods documented with LanguaL software and one list of candidate foods per BDECA participant group; 2) different food information sources based on other food composition tables and food composition data obtained by analytical methods; 3) Thesaurus LanguaL (2008 version), which is a multilingual system using facetted classification (http://www.langual.org). Software and Systems used included 1) BEDCA food information system to help compilers gather and document tasks, and 2) LanguaL software (2008 version).
Results: We have understood how important is to deepen documentation information when food sources are of poor quality. Deepening documentation also helps to identify different types of documentation errors that involve incorrect or inconsistent information (2). Further, we created the design of a comprehensive documentation process (group of food, food component, associated reference and method etc.) for the unification and collection of different composition data (658 foods) of the foods provided by BDECA members, taking the concept of "generic food" based on composition data of candidate foods (3). We have continued a process of compilation of these foods (4) for the subsequent documentation and compilation. The main problem was that it started from a generic food from different sources, with a variety of information for the same food, so we emphasize the importance of the quality of the new information, based on analytical data and available references.
Conclusions: Depending on the quality of food information sources, different compilation tasks have to be designed with the objective of obtaining quality food composition data and identifying possible errors in the source. Compilation task should be supported by a food information system, in order to help compilers and speed up this process.
Funding acknowledgment: This work was supported by EuroFIR PROJECT (EU 6th Framework Programme "Food Quality and Safety Programme" (FOOD-CT-2005-513944)

http://www.eurofir.net) and BDECA Network, supported by AESAN (Spanish Agency of Food Safety and Nutrition of Ministry of Health of Spain).
M.A. Martinez Burgos works in the project “Food Quality and Safety Programme”, with a research contract from University of Granada. I. Martínez-Victoria works in the project “Development of the Spanish Food Composition Database” with a contract from BDECA Network.

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3_83 A functional snack food product with high nutritive value by extrusion method

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Background/aims: The purpose of this work was to obtain a functional, fortified, extruded snack food using different raw materials (chickpea flour, oat flour, corn flour, corn starch, carrot powder, ground hazelnut) and to determine the effect of extrusion cooking on food composition of the mixture.
Methods: Chickpea flour, oat flour, corn flour, corn starch, carrot powder, ground hazelnut were mixed at levels 30%, 20%, 20%, 15%, 10%, 5% and submitted to extrusion cooking for production of fortified puffed snacks. A Werner and Pfleiderer Continua 37 co-rotating twin-screw extruder (Stuttgart, Germany) was used to produce the functional snack food product. The temperature of the extruder barrel was kept constant at 110^{0}C. Moisture content (11.0–15.0%, wet base), screw speed (220–340 rpm) and feed rate (22.0–26.0 kg/h, wet base) were independent process variables. Response surface methodology was applied to the experimental data using a commercial statistical package, Design-Expert version 6.01 (Statease, Minneapolis, USA). The extruded products were cut by a sharp knife by hand (approx. 40 cm long) as they emerged from the die and left for cooling at room temperature for about 30 min, packaged in plastic bags and stored at 5 ^{0}C until analyzed.
Results: The average values before extrusion for mixture were found as follows for moisture 10.0%, ash 2.6%, protein 11.7%, fat 6.7%, carbohydrate 69.1% and energy value 380 kcal/100 g. The values for fibre were 14.8% total dietary fibre, 3.2% soluble fibre and 11.1% insoluble fibre (dry base). Extruded products were analysed for moisture, ash, protein, fat, carbohydrate and dietary fibre. Among products the average values were 7.3% moisture, 1.8% ash, 14.5% protein, 4.8% fat, 71.6% carbohydrate, and the energy content was 338 kcal/100 g. Percentage of total energy (kcal) coming from protein, fat and carbohydrate were 15%, 11.2%, and 73.8%, respectively. Protein quality score was found to be 73.7 %. Total dietary fibre, soluble dietary fibre and insoluble dietary fibre were determined as follows respectively 14.3%, 3.6%, 10.6% (dry base). Fat, carbohydrate and energy value were significantly different between the mixture and the extrude products ($P<0.01$).
Conclusions: This study will guide the production of other ready to consume, nutritious and healthy functional foods. In terms of nutrient components, this product is healthier and nutritious than other snacks that contain cereal-grain. It will be beneficial to determine micronutrients and bio-availability of nutrient components of this developed product in vivo medium.
Funding acknowledgement: The authors would like to thank DEFRA and the partners of the LINK Eating, Food and Health Programme (EFH 11) in their support of this research.

3_84 The fatty acid composition and nutrient and salt content of European ready meals

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Background/aims: An increasing number of consumers are purchasing ready meals mainly due to scarcity of time. In order to be able to prevent nutrition-related non-communicable diseases, it is particularly important to determine the nutrient content of various ready meals. However, studies focusing on the nutrient composition of these meals are rare, particularly at the European level. The aim of this study was to evaluate the nutrient composition of chilled, frozen or heat-treated all-in-one ready meals and to identify key nutritional concerns. These data can also be included in food composition databases (FCDBs) and therefore used to calculate the nutrient intake of different population groups.
Methods: Within our study, a total of 34 all-in-one meals from various European regions were prepared according to the instructions on the packages. The fat, protein and salt content, as well as the fatty acid composition were analysed, while the energy and total carbohydrate content were also calculated.
Results: The total energy content of the tested ready meals ranged from 265 - 945 kcal/serving. The fat content varied from 2.46 - 34.0 g/serving and the total carbohydrate content from 25.4 - 143 g/serving. The percentage energy from fat (based on total energy) varied from 6.1 - 59.0 E%, whereby 17 out of 34 meals contained more than the recommended 30 E%[1]. Regarding the fat quality, saturated fatty acids (SFA) varied widely from 1.5 to 22.7 E% and polyunsaturated fatty acids (PUFA) from 1.0 to 14.8 E%. More than the recommended 10 E%[1] from SFA was found in 16 out of 34 meals. Only meals containing salmon yielded significant amounts of long-chain omega-3 PUFAs (20:5 *n*-3, 22:6 *n*-3), ranging from 0.4 to 2.2 g/serving depending on the fish size. Salt content ranged from 3.4 to 7.7 g/serving. Hence, all meals contained more salt than recommended for one serving (> 1.8 g), some meals even exceeded the recommendation for one day (> 6.0 g).
Conclusions: The energy content of most of the tested ready meals is adequate for male and female adults. However, only half of the tested meals contained less than 30 E% from fat and less than 10 E% from SFAs. On the other hand, the total carbohydrate content of about half of the tested meals was lower than 50 E%. The salt content of all the analysed meals exceeded the recommendation for one meal (> 1.8 g/portion), in most cases by even more than 100 %. [1, 2]
Funding acknowledgement: This work was completed within the Double Fresh project and funded under the EU 6th Framework Programme, priority 5 “Food quality and safety” (FOOD-CT-2006-23182).

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TOPIC 4 - NEW OR NOVEL METHODS OF ANALYSES FOR NUTRIENTS AND NON-NUTRIENT BIOACTIVE COMPOUNDS IN FOODS AND SUPPLEMENTS

4_09 Phenol-Explorer, a new comprehensive database on polyphenol composition in foods

J. Pérez-Jiménez, V. Neveu, F. Vos, L. du Chaffaut, L. Mennen, A. Scalbert

See speakers' abstracts.

4_20 Ecuadorian Andean blackberry (*Rubus glaucus* Benth), strawberry (*Fragaria ananasa* Duch) and mortiño (*Vaccinium floribundum* Kunth) as sources of antioxidants

C. Vasco, K. Riihinen, A. Kamal-Eldin

See speakers' abstracts.

4_28 Full in-house validation of a HPLC method for analysis of vitamin C in fruits and vegetables

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Background/aims: Ascorbic acid is a water soluble vitamin that plays a determinant role in the defense against cellular damage through its antioxidant activity. Fresh fruits (especially blackcurrants and citrus fruits) and vegetables are the main natural sources of vitamin C. Regular consumption of these foods have been related with healthy habits and with the prevention of chronic diseases. Reliable dietary intake estimates depend on a high-quality nutrient database. Cheap, rapid, accurate and sensitive methods for laboratory analysis are needed to improve the quality of analytical data included in food composition databases.
The aim of the present study was to validate a high-performance liquid chromatography (HPLC) method with UV detection for the determination of vitamin C in fruits and vegetables.
Methods: The analysis procedure involved three major steps: a simultaneous deproteinization and stabilization with an extraction solution of perchloric acid and metaphosphoric acid; dilution with mobile phase and finally two consecutive filtrations. Chromatographic separation was performed on an Alliance 2695 equipment with UV detection at 246 nm, using a Phenomenex,

Synergi™ Hydro-RP (150 x 4.6 mm, 4.0 µm) column protected with a SecurityGuard Cartridge AQ C18 (4.0 x 2.0 mm). The isocratic mobile phase consisted of 20 mM ammonium dihydrogenphosphate with 0.015% of metaphosphoric acid and the flow-rate was 0.6 ml/min. The analytical method was validated with respect to parameters such as sensitivity, specificity, limit of detection (LOD), limit of quantification (LOQ), linearity, range, precision, matrix effect, accuracy and robustness. Validation procedure was performed according to Food and Drug Administration (FDA) or International Conference on Harmonization (ICH) guidelines.

Results: The method was linear over the range of 1-100 µg/ml with a LOD of 0.035 µg/ml and a LOQ of 0.090 µg/ml. The within-day and between-day precision were 0.58% and 3.67%. The overall recoveries at three spiking levels (20, 60 and 100 µg/ml) were 117.1%, 118.7% and 120.7%, respectively. Reproducibility was achieved by successful participation in four Proficiency Testing schemes. The method was proven to be robust and no matrix effect was observed (R = 0.96). A sample short- and long-term stability study was also performed and the results showed that samples can be kept at -80 ºC for at least nine months after initial treatment with the extraction and stabilization solution.

Conclusions: A full validation of a highly sensitive, rapid (R_t = 4.5 min), precise (CVs < 4%) and accurate (recovery between 112.3 - 122.3%) HPLC method was performed for laboratory routine use. This HPLC method is an excellent choice for quantification of vitamin C in foods, and to generate high quality analytical data to be included in Food Composition Databases.

4_41 The re-launch of the Swiss Food Composition Database: more than just imputing data

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Background/aims: The first Swiss Food Composition Table was published in 1944 and contained 250 foods and 920 data points[1]. 20 years later, an updated version with a reduced number of 180 foods but increased number of 2,150 data points was issued[2]. Unfortunately, these undertakings were discontinued and only resumed in 1998 with a project leading to the Swiss Food Composition Database (FCDB) V1.0, published in 2003 and containing 867 foods with 28,160 data points. Work was again discontinued and only resumed in 2006. A main goal of this relaunch of the FCDB, which was transferred to the ETH project Swiss Food Information Resource "SwissFIR", was the establishment of a FCDB programme.
Methods: The approach chosen was to compare V1.0 with the guidelines of a FCDB programme [3] including food composition standards, in order to establish a programme that fulfilled requirements for a national database, improved data quality and respected available resources.
Results: The analysis of V1.0 revealed a lack of documentation related to its development. Although much time was spent to uncover what was done, the development could only be partly reconstructed. To avoid a similar situation in the future, a system was set up to log relevant decisions taken and operational steps performed. Standard Operation Procedures were defined (following EuroFIR's approach for quality assurance [4]) for simple tasks such as the definition of data file naming to complex tasks such as the entire data compilation process. Furthermore, the database architecture was adapted to new standards defined by EuroFIR, thus enabling a standardised data interchange with data requesters. A FCDB management system is currently being developed that not only will support the compilers with data management tasks, but also will enable them to control different data quality aspects. Further time consuming efforts were the establishment of a national network of food data providers and the implementation of an online access to the FCDB to promote and increase its visibility. After setting up the entire programme, works on the data were started. Foods containing substantial data infringing copyrights and foods with missing data for the proximates were removed, resulting in V2.0 containing 676 foods with 23,750 data points. The latest V3.0 contains 940 foods (+40 %) and 30,500 data points (+28 %) with a substantial number of new data provided by the food industries/retailers and originating from laboratory reports/original papers.
Conclusions: The existence and use of Standard Operation Procedures including logging of all relevant aspects are considered a mandatory basis for a traceable FCDB programme. It is further estimated that with a small team of about 1.5 person-years capacity at least one third of the work time should be reserved for non-data-imputing tasks.
Funding acknowledgement: The establishment of the FCDB programme would not have been possible without the large support provided by the EuroFIR consortium (EU 6th Framework Food Quality and Safety Programme, FOOD-CT-2005-513944) and the generous contribution of the

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4_70 Evaluation of three HPLC analytical methods for food carotenoid quantification

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Background/aims: The assumed positive health effects of carotenoids – natural, fat-soluble pigments found in foods of plant origin such as yellow, orange and red fruits and vegetables - make them key compounds in the human diet[1]. To support epidemiological/intervention work there is a need for comprehensive and reliable data on the levels of these compounds in foods. Nevertheless, the reliability and completeness of a substantial amount of the current data on food carotenoids is still questionable[2]. The inherent difficulty of carotenoid analysis may contribute to this lack of consistency, mainly because of the large numbers of these compounds, their similarity and also their susceptibility to isomerisation and oxidation during analysis. To try to improve carotenoid analytical methods, three different extraction/saponification/HPLC settings were compared.
Methods: Samples were chosen according to their carotenoid HPLC (High Performance Liquid Chromatography) profile. Two samples representing each of the three major groups: green vegetables containing xanthophylls and hydrocarbon carotenoids (kale and leaf beet); yellow/red fruits containing mostly hydrocarbon carotenoids (pumpkin and tomato); and yellow/orange fruits with complex profiles containing also xanthophyll esters (orange and peach) were analysed in triplicate by three methods: A[3,4], B[5] and C, a newly developed method based on the combination of A and B. Moreover, certified reference material (CRM) and an in-house baby food control sample were also analysed. Different extraction and partition organic solvents, saponification conditions, mobile and stationary phases, and HPLC conditions were used. Quantification was done by external calibration using internal standards in methods A and C; *cis*-carotenoids were determined from all-*trans* counterpart standard curves.
Results: The three methods were able to successfully quantify α-carotene, β-carotene, β-cryptoxanthin, lycopene, lutein and zeaxanthin in all studied matrices. Analysis of the CRM, NIST 2383, gave *z*-scores between -2 and 2, attesting to the good performance of the three methods. Also, results from the baby food control sample, analysed in another laboratory, gave similar results ($p < 0.05$, based on the measurement uncertainty). Method A was more time and solvent consuming and saponification recovery was lower; method B showed poorer separation for matrices with complex HPLC profiles, but reduced the time taken by 28% and 50% solvents in the HPLC system; method C appeared to be the best for all matrices, with regard to extraction, saponification, and identification of carotenoids in the samples studied, but used more HPLC mobile phase.
Conclusions: In spite of the good performance of the three methods in the analysis of the CRM, if we take into account economic factors, then method A is the least favourable and method B is the best. Nevertheless, if we consider analytical performance, then method C seems to be the

most efficient for all food matrices, because method B could not effectively separate complex matrices and/or some *cis*-isomers.

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TOPIC 5 - NEW DATA ON TRADITIONAL AND ETHNIC FOODS IN EUROPE

5_13 Differences in dietary consumption patterns between Israeli immigrants from the former USSR and native Israeli population

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Background/aims: Israel is a typical nation of immigrants, characterized by a multi-ethnic society. The largest ethnic group is from the former USSR (13%). In the south, this group comprises approximately 25% of the population. These immigrants are characterized by high prevalence of overweight and chronic diseases and their traditional diet is high in refined carbohydrates, meats and dairy products, and low in vegetables and fruits[1,2,3]. The aim was to compare the dietary intake, particularly fruits and vegetables as well as the prevalence of selected chronic diseases of immigrants from the former USSR with those of native Israelis.
Methods: We surveyed a random sample of adults, age 35 and older in Southern Israel. Participants were interviewed for dietary intake using a 24-hour food questionnaire with additional questions regarding health and eating habits. Dietary intake was compared between the former USSR immigrants (migrated after 1970) and native Israelis.
Results: A total of 1017 people were interviewed for the current study, 254 (25%) were immigrants from the former USSR and 764 (75%) native Israelis. The immigrant group had significantly higher BMI (27.6 ± 5.0 vs. 26.5 ± 4.7) despite lower reported daily energy intake (1548 ± 684kcal vs. 1714± 782kcal). They reported significantly less frequently 'good' health status (51% vs. 74%), higher prevalence of heart disease (17% vs. 9%) and hypertension (37% vs. 24%). The immigrants consumed significantly less vitamin C, D and E, folate, vitamin B6, calcium, iron, selenium, zinc and magnesium but had a higher intake of beta carotene. The immigrants tended to consume fewer vegetables, with significantly lower daily intake of green vegetables (43 ± 79g vs. 59 ± 102g) and higher intake of potatoes (21 ± 65g vs. 14 ± 55g). In a multivariate analysis to predict the prevalence of at least one chronic disease, only age and percent protein intake came out significant (OR=1.07, CI: 1.05-1.09 for age and OR=1.05, CI: 1.01-1.1 for percent protein intake). No association was shown between immigration status and chronic diseases.
Conclusions: In this comparison of dietary intake between immigrants from the former USSR and native Israelis we found that immigrants had a higher BMI and higher prevalence of chronic diseases. They tended to consume fewer vegetables and had a lower intake of vitamins and minerals compared with native Israelis. Russian immigrants should be encouraged to consume more vegetables in order to increase their vitamin and mineral intake and improve their diet quality.
Funding acknowledgement: This study was funded by EuroFIR, proposal number 513944-WP 2.3.2.

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5_15 The Influence of Various Production Methods on the Composition of Shalgam (Salgam)

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Background/aims: Shalgam, is a Turkish traditional lactic acid fermented beverage made from black carrot (*Daucus carota* L.), bulgur flour, sourdough, rock salt, turnip (*Brassica rapa* L.) and water. It is a red coloured, cloudy and sour soft beverage, in which mainly lactic acid bacteria (LAB) play an important role. Shalgam is mainly made at home, but it is also produced on industrial scale. In commercial production of shalgam, there are two main processing methods: the traditional method and the direct method. The traditional method consists of two stages; first fermentation (Sourdough fermentation) and second fermentation (carrot or main fermentation), whereas in the direct method the first step is not performed. Inoculation with selected strains of lactic acid bacteria is not used by commercial shalgam producers because there are no commercial cultures available for fermentation[1, 2]. In this study, the effect of various shalgam production techniques (Traditional method (A), direct method (B) and also using indigenous three LAB (*Lb. plantarum 1* (C), *Lb. fermentum* (D) and *Lb. paracasei* subsp. *paracasei 2* (E)) isolated from various previous shalgam fermentations) on shalgam proximate composition was examined.

Methods: Black carrot, salt and bulgur flour used in the experiments were kindly provided from Hacinin Salgami, baker's yeast was obtained from Migros market and shalgam was obtained from a covered vegetable market place, (Adana, Turkey). These production methods are given in our previous publication[2].

Total solids, salt and protein were determined according to Deyaoglu[3]. The pH value was measured using a digital pHmeter (WTWInolab pH-L1, Germany). Total acidity was analysed by titration with 0.1 N NaOH solution[4]. Volatile acidity was determined by steam distillation[3]. Total phenols and anthocyanins were analysed according to Canbas[5] and Wrolstad[6], respectively. Absorbance of the beverages was measured at 420, 520 and 620 nm using Shimadzu UV-1201 model spectrophotometer (Kyoto-Japan).

Results: The composition of shalgam beverages are given in Table 1. Shalgam produced using three indigenous LAB showed higher levels of total acidity, total solids, protein, colour intensity, total anthocyanins and phenolics compared to others.

On the other hand, shalgam produced by direct method showed the lowest levels of total acidity, total solids, protein, salt, colour intensity, total anthocyanins and phenolics. The results for shalgam A and shalgam C samples in this study are similar to results found in previous studies[2, 3, 7, 8].

Conclusions: This study shows that the production method of shalgam has an impact on the composition of this food product.

Table 1. The composition of shalgam beverages

	Shalgams				
	A	**B**	**C**	**D**	**E**
Total acidity (g/L as lactic acid)	7.39	6.36	9.27	8.53	7.31
pH	3.45	3.52	3.43	3.49	3.55
Density (20ºC)	1.0128	1.0115	1.0147	1.0143	1.0136
Volatile acid (g/L as acetic acid)	0.76	0.86	1.0	1.06	0.77
Total solids (g/L)	26.39	24.56	31.55	29.07	28.86
Protein (g/L)	1.95	1.85	2.65	2.25	2.50
NaCl (g/L)	10.05	9.55	11.30	11.55	9.80
Colour intensity	1.86	1.59	2.34	2.04	2.22
Total anthocyanins (mg/L)	133.2	104	168.2	137.5	162.1
Total phenolics (280 index)	23.75	21.5	31.85	29.5	31.0
Tint	0.30	0.33	0.33	0.34	0.34

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5_16 Traditional Turkish Fermented Cereal Based Food: Tarhana

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Background/aims: Fermented foods are an important part of total food consumption in many countries throughout the world. Bread and beer are the most popular cereal-based fermented foods, but there are also many other indigenous cereal-based fermented foods prepared in different parts of the world, such as tempeh, pito, sekete, kwass, boza and tarhana. Tarhana is an old and a popular traditional Turkish fermented cereal product. It is prepared by mixing yoghurt, wheat flour, baker's yeast, salt, vegetables and spices, and followed by lactic acid and alcoholic fermentation. There are some other food products similar to tarhana such as kishk/kushuk, trahana/trahanas/kapostoes, trahana, tarana, goce, tahonya/thanu, talkuna and atole in the Middle East, Asia and Europe. In this study, production methods and composition of tarhana were reviewed.

Tarhana is produced both in the home and commercially. There is a growing commercial interest in producing tarhana on an industrial scale, especially in a ready-to-use form[1]. Production methods may vary from one region to another. In particular, ingredients and their quantity used for preparation of tarhana may vary but cereals and yoghurt are always the major components[2,3]. There are two main methods for tarhana production on a commercial scale: direct method and sour dough method[1].

Methods: *Direct method:* Onion is chopped and blended in a blender. Then, it is mixed with wheat flour, durum wheat semolina, tomato paste, red pepper paste, lentil flour, vegetable oil, salt, bakers' yeast, yoghurt and citric acid and kneaded at 50 rpm for 15 minutes into a dough with the addition of water, or yoghurt serum, if necessary. The obtained dough is spread over a stainless steel tray to a depth of 1-1.5 cm and then subjected to fermentation at 35ºC[1]. During dough fermentation, the characteristic taste, flavour and odour of tarhana develop[1,3].

Sour dough method: There are three different production recipes in sourdough method, each one with a different amount and type of ingredients. For each method, all ingredients in the recipe are mixed and kneaded. The obtained dough is spread over a stainless steel tray and then fermented at 40-42ºC[1]. The duration of fermentation varies from one to seven days depending on the desired properties[4].

During fermentation, lactic acid bacteria (*Streptococcus thermophilus, Lactococcus lactis, Lactobacillus plantarum etc.*) and yeast (*Saccharomyces cerevisiae*) are responsible for the formation of organic acids, CO_2 and other fermentation products[1,2]. After fermentation, the dough is called 'wet tarhana'[2,5]. It is sun-dried or artificially dried using various drying techniques[3,4], and subsequently called 'dry tarhana'[5]. In the final product low pH and low moisture content inhibit the growth of pathogen and spoilage microorganisms[2,3,4]. Its shelf life varies according to moisture content[5], but generally it can be stored for 2-3 years without any sign of deterioration[6]. After drying and reaching a certain particle size (<800µm), tarhana is sold in packages[1,2].

Results/Conclusions: As a result of fermentation, tarhana has an acidic and sour taste with a strong yeasty flavour. Tarhana is a good source of proteins, vitamins (B_1 and B_2), minerals (calcium, iron, sodium, potassium, magnesium, zinc and copper) and therefore is used largely for children and elderly people in the form of a thick soup[3,6]. The nutritional content and

organoleptic properties of tarhana may be controlled by varying the type and quantity of ingredients[7].

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5_27 Increasing folate content in Egyptian baladi bread using germinated wheat flour

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Background/aims: In Egypt, baladi bread is a major food consumed with each meal. This bread is a flat, circular loaf consisting of two layers with almost no crumb and produced from high extraction wheat flour (type pita bread). Bio-processing, such as germination and fermentation, has been reported to increase folate content in cereal foods. Aim of this study is to increase folate content in Egyptian baladi bread by using germinated wheat flour (GWF).
Methods: Whole wheat grains were soaked in tap water (1:3 w/v, 5 h, 30 ºC) and incubated in a plastic sieve (19 h, 30 ºC, 80-90% relative humidity). Grains were again soaked (30 ºC, 4 h) and incubated (30 ºC, 20 h). After germination, grains were dried (50 ºC, 4 h), milled and sieved. Wheat flour was substituted with sieved GWF to 0, 25, 50 and 100%. Baking was performed using a standardized sponge method. Three criteria were used to evaluate the bread: folate content (determined by RP-HPLC-FL according to Jastrebova et al., 2003), rheological properties of the dough (determined by farinograph), and bread colour (preferred white) and layer separation (easy to separate).
Results: Germination of wheat grains increased folate content 4-fold. After replacement with GWF, folate content in both, flour and bread increased 0.5- to 2-fold depending on the level of replacement (Figure 1). Rheological properties of dough were adversely affected by increasing replacement level. While the folate content increased 2-fold at 100% replacement, the bread was dark and layers were not separated. Using 50% GWF, baladi bread acceptable with respect to colour and layer separation was prepared. Folate content in this bread increased to 52 µg/100g DM compared to 31 µg/100g DM in bread without GWF (0%).

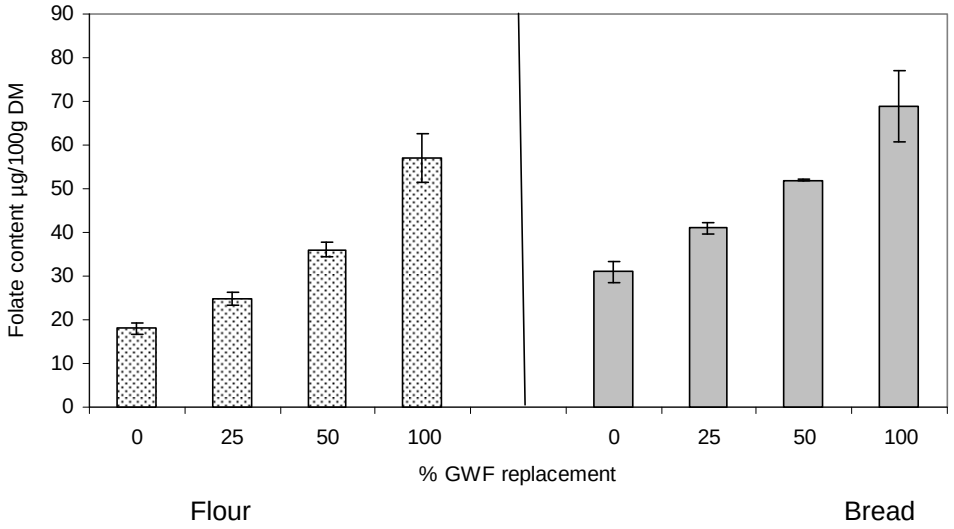

Figure 1. Folate content (µg/100g DM, ± SD, n=4) in flour and bread after replacement with germinated wheat flour (GWF)

Conclusions: Folate content increased in bread baked with GWF. A bread acceptable for the Egyptian consumer could be produced using 50% GWF as a partial replacement. Consumption of this bio-fortified bread could increase folate intake by approximately 75 µg/d based on the average wheat consumption of 363 g/d.

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5_37 Investigation of fatty acid profiles of olive oil produced in Marmara and West Anatolia areas of Turkey

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Background/aims: Olive oil is fruit oil obtained from the olive, a traditional tree crop of the Mediterranean Basin, and it is one of the most commonly used dressing and cooking fats in Mediterranean countries. The main components of olive oil are mixed triglyceride esters of oleic acid and palmitic acid and of other fatty acids, along with traces of squalene (up to 0.70%) and sterols (about 0.20% phytosterol and tocosterols). One of the most important characteristics of olive oils is the presence of a high content of oleic acid, which accounts for 60–80% of the total fatty acids (FA) and for approximately 90% of the mono-unsaturated fatty acids (MUFA). This study is performed in order to evaluate variations in fatty acid composition of olive oil produced in Marmara and West Anatolia areas of Turkey.
Methods: A total of 116 olive oil samples (2 L) were collected at different periods between the years of 2008-2009 processing season from 55 small- and medium-size olive oil processing enterprises and 3 large-size cooperatives, and the analyses are ongoing for the following year. Cold esterification was carried out to obtain fatty acids methyl esters (FAMES) according to IUPAC (International Union of Applied and Pure Chemistry) method (Commission Regulation (EC) No 796/2002 of 6 May 2002). The FAMEs were analysed using a gas chromatograph (Agilent 6890N Series, Hewlett-Packard Co., Avondale, PA, USA) equipped with flame ionization detector and a capillary column (Agilent DB23 column; 60 m, 0.25 mm i.d, J&W Scientific Co., Folsom, CA, USA) on a split mode. The oven temperature was programmed as follows: the initial temperature (130^{o}C) was raised to 170^{o}C at a rate of 6.5^{o}C/min and was held at this temperature for 1 min, then was increased at 2.15^{o}C/min to 215^{o}C and was held at this temperature for 12 min, and then was increased to 230^{o}C and was held at this temperature for 3 min. Nitrogen was the carrier gas and sample injection volume was 1 µL. The identification of the peaks was achieved by retention times and by comparing them with authentic standards analysed under the same conditions. Peak areas of triplicate injections were measured with an HP computing integrator. Results were expressed as (%) total fatty acids.
Results: The preliminary investigations of fatty acid composition of olive oils produced in Marmara and West Anatolia areas of Turkey showed that the most abundant FAs were oleic, palmitic, linoleic and stearic. The average values (% of total fatty acids) for the major acids were in the range of 69.75 to 75.42 for oleic acid, 11.11 to 13.11 for palmitic acid, 6.55 to 12.37 for linoleic acid, and 2.59 to 3.90 for stearic acid. The data in Table 1 revealed that mono-unsaturated fatty acids were predominant (average of 73.88%) in analysed olive oil samples from Marmara and West Anatolia areas of Turkey. The medium-chain FAs (C16 & 17) represented 13.19 % of total FAs in olive oil samples, respectively, while longer-chain FAs accounted for the rest (86.81%).

Table 1. Variation in fatty acid profiles of olive oil samples

Fatty Acid	Minimum (%)	Maximum (%)	Mean (%)
Palmitic (C16:0)	11.11	13.11	12.11
Palmitoleic (C16:1)	0.52	1.05	0.79
Heptadecanoic (C17:0)	0.02	0.20	0.11
Cis-10-Heptadecanoic (C17:1)	0.06	0.29	0.18
Stearic (C18:0)	2.59	3.90	3.25
Oleic (C18:1)	69.75	75.42	72.59
Linoleic (C18:2)	6.55	12.37	9.46
Linolenic (C18:3)	0.52	0.74	0.63
Arachidic (C20:0)	0.42	0.56	0.49
Eicosenoic (C20:1)	0.24	0.40	0.32
Behenic (C22:0)	0.09	0.18	0.14
Lignoseric (C24:0)	0.00	0.09	0.05

Conclusions: The fatty acid composition of olive oil varies by cultivar, region, altitude, time of harvest, and extraction process. For the consumers the important factor when choosing an olive oil to consume is the quality, purity and nutritive composition, in particular, the fatty acid content, of the product as it is a major component of Mediterranean diet. Therefore, it is important to investigate the fatty acid composition in relation to health and olive oil quality.

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5_38 Evaluation of fatty acid composition of raw milk produced in Marmara and West Anatolia areas of Turkey

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Background/aims: Turkey has a huge capacity for producing milk. However, as production is highly seasonal most milk is processed by mobile, small-scale, traditional processors, with less than 15% processed in modern plants. This study is one of the first authorized researches to determine fatty acid composition of raw milk produced in Marmara and West Anatolia areas of Turkey.
Methods: A total of 140 raw milk samples (1 L) were collected from randomly chosen 30 farms, which were consisted of small-size (less than 25 cows/farm) to large-size (>100 cows/farm), and 5 major dairy processing companies. The milk from each farm was individually sampled at the delivery site of the firms in the morning and from companies as a mix from collection tanks. Milk data were compiled at different seasonal periods between the years of 2008–2009, and the analysis will continue for the following season. Milk fat was extracted according to Bligh and Dyer (1959) and cold esterification was carried out to obtain fatty acids methyl esters (FAMES) according to IUPAC (International Union of Applied and Pure Chemistry) method (Commission Regulation (EC) No 796/2002 of 6 May 2002). The FAMEs were analysed using a gas chromatograph (Agilent 6890N Series , Hewlett-Packard Co., Avondale, PA, USA) equipped with flame ionization detector and a capillary column (Agilent DB23 column; 60 m, 0.25 mm i.d, J&W Scientific Co., Folsom, CA, USA) on a split mode. The oven temperature was programmed as follows: the initial temperature (130^{o}C) was raised to 170^{o}C at a rate of 6.5^{o}C/min and was held at this temperature for 1 min, then was increased at 2.15^{o}C/min to 215^{o}C and was held at this temperature for 12 min, and then was increased to 230^{o}C and was held at this temperature for 3 min. Nitrogen was the carrier gas and sample injection volume was 1 µL. The identification of the peaks was achieved by retention times and by comparing them with authentic standards analysed under the same conditions. Peak areas of triplicate injections were measured with an HP computing integrator. Results were expressed as (%) total fatty acids.
Results: The preliminary investigations of fatty acid composition of raw milk produced in Marmara and West Anatolia areas of Turkey showed that the most abundant FAs were palmitic, oleic, myristic and stearic acid. The average values (% of total fatty acids) for the major acids were in the range of 27.82 to 38.81 for palmitic acid, 21.83 to 29.68 for oleic acid, 9.71 to 12.72 for myristic acid, and 7.53 to 12.98 for stearic acid. The data in Table 1 revealed that saturated fatty acids were predominant (average of 63.17%) in analysed raw milk samples from Marmara and West Anatolia areas of Turkey.

Table 1. Variation in fatty acid profiles of raw milk samples

Fatty Acid	Minimum (%)	Maximum (%)	Mean (%)
Butyric (C4:0)	2.09	3.23	2.66
Caproic (C6:0)	1.56	2.01	1.79
Caprylic (C8:0)	1.00	1.28	1.14
Capric (C10:0)	2.24	3.17	2.71
Myristic (14:0)	9.71	12.72	11.22
Myristoleic (C14:1)	0.03	0.23	0.16
Palmitic (C16:0)	27.82	38.81	33.32
Palmitoleic(C16:1)	1.44	3.22	2.33
Stearic (C18:0)	7.53	12,98	10.26
Oleic (C18:1)	21.83	29.68	25.76
Linoleic (C18:2)	2.20	5.04	3.62
Linolenic (C18:3)	0.14	0.38	0.26
Arachidic (C20:0)	0.11	0.23	0.17

Conclusions: The fatty acid composition of milk has a solid connection with breeding, feeding strategies and cattle management. The results of the present investigation on fatty acid composition will be utilised as a reference manual to emphasize variations in fatty acids from different milk production regions. In addition, the current information will help to demonstrate dairy manufacturers the importance of quality assessment of raw milk that fluctuates with season and supplement feeding.

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5_40 Evaluation of the nutritional quality of ethnic foods consumed in Italy

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Background/aims: Ethnic groups are a significant part of the population in Italy, influencing eating habits of the whole Italian population. A wide variety of ethnic foods have become more and more available in supermarkets, restaurants, shops, takeaways; their market is increasing to a great extent. Some studies have been carried out by INRAN in the different frameworks to provide information on the nutritional composition of ethnic foods. The objects of the present work are the dissemination of composition data of thirteen ethnic foods commonly consumed in Italy (dishes or composite foods); their nutritional evaluation will be carried out by comparing the energy intake provided by macronutrients with recommended energy allowances.

Methods: The activity has been carried out according to the guidelines developed by Greenfield & Southgate and within the Network of Excellence EuroFIR (www.eurofir.net): 1.) Ten dishes (*spring rolls, shrimp chips, steam ravioli, fried spaghetti, chicken with pineapple, chicken with almonds, sweet and sour pork, shrimps with mushrooms and bamboo, mixed fruits with burnt sugar, mixed fried ice cream*) were selected among the most frequently consumed ethnic foods in Italy and commonly served in *Chinese* restaurants; their sampling was carried out collecting five samples of each dish from five different restaurants[1]; 2.) Five ethnic foods were selected, collected and analyzed taking into account the EuroFIR working protocols (WP 2.3.2 Ethnic Foods): *Cantonese rice (5 samples), nachos (9 samples), falafel (6 samples), kebab (10 samples), sarmale (4 samples)*; 3.) Three ethnic preparations (*taboule, tajine, hummus*) were selected within the WP Ethnic Foods, using the EuroFIR procedures[2]; for these dishes, the nutritional data were calculated taking into account one “standard recipe”, the nutrient contents of every ingredient (data from FCDB INRAN[3]) and the EuroFIR recipe calculation method (http://www.eurofir.net/uploads/documents/ Final_recipe_calc_harmonisation.pdf).
The following nutrients were selected for nutritional evaluation: water, protein, fat, available carbohydrates, starch, sugars, total ash, dietary fibre and cholesterol; the energy intake derived from each macronutrient was also evaluated. Samples were combined into composites for analysis and analytical methods were in agreement with the EuroFIR guidelines[2].

Results: *Shrimp chips* (559 kcal/100g) and *nachos* (478 kcal/100g) showed the highest energy values predominantly from the high carbohydrate and lipid content, but these foods are considered appetizers and would be consumed in smaller portion sizes. Among meat dishes, *kebab* and *chicken with almonds* provided the highest protein (29.7g/100g and 16.5g/100g) and cholesterol values; the vegetable dishes*, falafel*, *taboule, hummus*, contained a good quantity of all macronutrients while *fried spaghetti* showed a high fat content because of the cooking method (frying). *Sarmale,* consists in rolled cabbage leaves with minced meat, rice, onions and tomato, is the best nutritionally completed preparation with proteins (5.7%), starch (5.7%), fat (5.2%) and dietary fibre (1.9%). Desserts*, mixed fruits with burnt sugar* and *mixed fried ice cream* had the highest sugars contents.

Conclusions: Knowing the composition of these ethnic foods will allow their correct inclusion in a balanced diet.

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5_45 BIAMFOOD - Controlling biogenic amines in traditional food fermentations in European regions

G. Spano, J.S. Lolkema and the BIAMFOOD Consortium

See speakers' abstracts.

5_49 EuroFIR - Ethnic foods in Belgium

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Background/aims: More information on ethnic foods is needed since the consumption of ethnic foods by the mainstream population is becoming increasingly popular. The work package "Ethnic foods" is part of the platform "Joint Research Activities" within EuroFIR (European Food Information Resource Network of Excellence). EuroFIR aims to develop and integrate a comprehensive, coherent and validated databank providing a single, authoritative source of food composition data in Europe. Identifying and providing new information for missing data for nutrients and biologically active compounds is one of the goals.
Defining the term "ethnic food" and more specific "authentic ethnic food" and "modified ethnic food" was one of the objectives in the ethnic foods work package.
Other objectives were to provide new data on nutritional composition for inclusion in national food composition tables and the development of dissemination material.
Methods: 1) *Documentation and Prioritisation* (listing and describing ethnic foods and recipes): The size and the significance of the ethnic populations and their food consumption were important. Not taking into account European immigrants, Turkish, Moroccan and Congolese immigrants are the three mayor groups of immigrants in Belgium. Belgium selected the ethnic foods from the Democratic Republic Congo.
68 food items were listed and described in this EuroFIR pilot study. Prioritisation was carried out by ranking food items on composition data availability and consumption data availability. 2) *Selection of five food items:* The five selected food items were frequently eaten foods with no available specific nutrient composition data. Instead of recipes, ingredients were selected to be analysed. The selected ethnic foods were *Biteku-teku* (amaranthus leaves), *Saka-saka* (cassava leaves), *Chikwangue* (cassava bread), *Mbinzo* (larva/worms) and *Makayabo* (salted cod). 3) *Analysis*: The analysis was based on a composite sampling approach, where no duplicate analysis was required.
The sub-samples were purchased in small food shops in the typical "Congolese" Matonge neighbourhood in Brussels. Each composite sample was composed by a minimum of five sub-samples bought in five different retail shops.
The selected food items were prepared "as eaten" before being analysed. Within the foreseen budget the five food items could be analysed. Data on energy, protein, fat and carbohydrate content of the selected foods were analysed. The analysis of specific biologically active

compounds was not possible. The food samples were analysed in laboratories with accreditation or with excellent proficiency testing schemes. Additional checks were performed by checking the values with comparable food items and on coherency.

Results: The results of the analysis can be found in table 1.

Table1: Nutritional value per 100g edible portion, cooked

	Biteku-teku	Saka-saka	Chikwangue	Mbinzo	Makayabo
Energy (kcal/kJ)	24/100	35/145	139/589	140/585	111/469
Proteins (g)	3.6	5.4	0.7	18.5	24.1
Fat (g)	1.0	1.3	0.3	7.0	1.6
Carbohydrates (g)	0.1	0.3	33.3	0.7	0

Conclusions: New food composition information on ethnic foods is available for inclusion in national food composition tables. Further, procedures to select and analyse ethnic foods have been developed.

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5_50 EuroFIR - Traditional foods in Belgium

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Background/aims: The work package "Traditional Foods" is part of the platform "Joint Research Activities" within EuroFIR (European Food Information Resource network). EuroFIR aims to develop and integrate a comprehensive, coherent and validated databank providing a single, authoritative source of food composition data in Europe. Identifying and providing new information for missing data for nutrients and biologically active compounds is one of the goals. Defining the term "traditional food" was one of the objectives in the traditional foods work package. Other objectives were to provide new data on nutritional composition for inclusion in national food composition tables and the development of dissemination material. The search for a common methodology for systematic investigation of traditional foods was also very important.
Methods: 1) *Documentation and Prioritisation:* Listing and describing traditional Belgian foods and recipes. Foods with European registration labels PDO (protected designation of origin), PGI (protected geographical indication) and TSG (traditional speciality guaranteed) were identified. 85 Belgian food items were listed in this EuroFIR pilot study. Prioritisation was done by ranking food items on composition data availability and consumption data availability. 2) *Selection of five food items:* The five selected Belgian food items were items without available specific nutrient composition data, and were frequently eaten. At least one of the items had to be a starter, one a dessert and two had to be main dishes. The selected traditional Belgian foods were *Gratin of Belgian endives with ham and cheese sauce*, *Waffles*, *Shrimp croquette*, *Flemish stew* and *Meat loaf*. 3) *Analysis:* The analysis was based on a composite sampling approach, duplicate analysis was required. Within the foreseen budget only two food items could be analysed: *Waffles* and *Gratin of Belgian endives with ham and cheese sauce*. The multiple sample of "Gratin of Belgian endives with ham and cheese sauce" was composed of five sub-samples. This traditional recipe was prepared with the aid of an elderly women, as recommended. The recipe was reproduced four times. The multiple sample of "waffles" was composed of six sub-samples. Two fresh waffles were bought in six different tea rooms in Flanders. The food samples were analysed in laboratories with accreditation or with excellent proficiency testing schemes. Additional checks were performed by checking the values with comparable food items and on coherency. 3) *Dissemination:* Pamphlets for the five selected food items, including ingredients, preparation, nutrient information, historical background and photographs were prepared. The origin of the nutrient information was declared on the pamphlets, as well as values from analysis or recipe calculation.
Results: The results of the analysis can be found in table 1.
Conclusions: New food composition information on traditional foods is available for inclusion in national food composition tables. Further, procedures to select and analyse traditional foods have been developed.

Table1: Nutritional value per 100g edible portion, cooked

	Waffles	Gratin of Belgian endives with ham and cheese sauce
Energy (kcal/kJ)	356/1488	122/508
Proteins (g)	7.9	7.1
Fat (g)	21.6	8.3
Carbohydrates (g)	32.6	4.7

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5_53 Developing a habitual ethnic specific multi-nutrient intake scale (H-MNIS) using food composition tables, to assess the association between diet and adverse birth outcomes of minority women in Israel

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See speakers' abstracts.

5_54 Boza: A Traditional Turkish Fermented Cereal Based Beverage

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Backgrounds/aims: Fermented beverages are produced in different parts of the world. Boza is a highly viscous and low-alcoholic traditional Turkish fermented cereal beverage[1]. It is also consumed widely in some balkan, middle east, asia and african countries[3]. Boza is produced mainly at homes and also commercially in industry. However, there is a growing interest in producing boza on a large scale[4]. Production methods for preparation may have some differences from one region to another but, cereals are always the major component. In this paper, boza production method is reviewed.
Methods: This review was prepared from several papers published previously in different journals and presented at symposiums. The main outcome of this paper was to give some information on the production of boza.
Results: Boza is made by fermentation of cereals such as maize, barley, oat, millet, rice, wheat and their flours[1,2,5]. For the preparation of boza, selected and cleaned cereal, or a combination of two or more cereals, is broken into the size of semolina (300-800µm) and cooked at 2-8 hours in an open or steam jacketed stainless steel boiler after drinkable water addition[6,7]. During the boiling process, the mixture absorbs water and therefore hot water is added several times, until a homogenous pulp is obtained. Then, the cooked material is transferred into suitable vessels for cooling. The cooled pulp is strained to remove bran, hull and other foreign materials. The sieved material is called sugarless raw boza. After sugar (15-20% sucrose) addition, the broth is fermented by adding previously fermented boza (2-3%), sourdough or yoghurt as a starter culture. The ratio of the starter culture depends on the season and temperature[3,6].
Fermentation is in general carried out at 15-30ºC for 24 hours in wooden barrels. During the fermentation, two different kinds of fermentation happen concurrently: alcohol fermentation and lactic acid fermentation[6,8]. Microorganisms responsible for alcohol fermentation in boza are yeasts (*Saccharomyces cerevisiae, Saccharomyces carlsbergensis*, *Candida tropicalis* and *Rhodotorula araucariae)* and lactic acid bacteria (*Lactobacillus confusus*, *Lactobacillus fermentum, Lactobacillus plantarum, Leuconostoc mesenteroides, Lactococcus lactis* or *Weissella confusa*)[1,2,3,5,].

Fermentation is not completely terminated during the boza production. After 24 hours of fermentation, partially fermented boza is cooled to refrigeration temperature and bottled in plastic containers. It should be consumed within 3-5 days[6,8]. Boza is consumed especially in winter season but, nowadays it is also preferred in summer[4]. It is served pure or with cinnamon and/or roasted chickpeas sprinkled over[2,7].

Conclusions: Boza is a healthy and nutritious fermented food because it contains an important concentration of protein, carbohydrates, fibre, vitamins and minerals. Boza could be marketed as a functional food product when produced by probiotic lactic acid bacteria[9]. Studies on boza are scarce in Turkey, therefore detailed studies have to be carried out on boza produced in Turkey.

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5_56 Characterization of aroma-active compounds in cv. Hacihaliloglu apricot produced in Malatya province of Turkey

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Background/aims: Turkey is one of the largest fresh and dried apricot producing country in the World. The Turkish province of Malatya has become the center of the world's dried apricot industry. 7-10 % of the world's table apricots and 80-85 % of dried apricots are produced in Malatya province. The climate, structure of soil and other environmental conditions in this region enable the production of quality apricots with high dry matter and sugar content. Apart from sugar level, acid content, colour and texture, apricots are particularly popular for their characteristic aroma. Aroma is one of the most important criteria in the evaluation of apricot fruit quality. Although some compositional properties of Hacihaliloglu apricot cultivar were investigated, there have been no studies on the aroma compounds and, in particular, the aroma-active compounds of Hacihaliloglu cultivar. The aim of this study was to determine the aroma-active compounds of cv. Hacihaliloglu apricot, which is the most important drying apricot cultivar of Malatya-Turkey, by GC-MS-O technique.
Methods: The aroma-active compounds of cv. Hacihaliloglu apricot were analyzed by sensory and instrumental analyses. Liquid-liquid extraction with pentane/dichloromethane (2/1 v/v) was used for extraction of volatile compounds. The organic extract was concentrated to a volume of 1 ml with a Vigreux distillation column prior to GC/MS analysis. Panelists were first selected and trained for GC-MS-O. Intensity and similarity tests were performed for the aromatic extract to evaluate their respective representativeness.
Results: According to sensory analysis, the aromatic extract obtained by liquid-liquid extraction was representative of apricot odour. In Hacihalioglu apricot, 6 norisoprenoids *(α-ionone, β-ionone, norisoprenoid, megastigma-4,6-(E)-8-(E)-triene, megastigma-4,6-(E)-8-(Z)-triene, megastigma-4,6-(Z)-8-(Z)-triene*), 5 terpenes (*limonene, theaspirane A, theaspirane B, linalool, α-terpineol*), 3 lactones *(γ-decalactone, γ-hexalactone, γ-octadecalactone*), 3 esters *(hexyl acetate, methyl hexadecanoate, 2-2-hydroxyethoxy-ethyl octadecanoate*), 3 aldehydes (*E-2-hexenal, 2-ethyl-2-butenal, benzaldehyde*), 2 ketones, 3 acids, 2 phenols, 2 hydrocarbons and 1 alcohol compounds were identified by GC-MS. Of these, 15 aromatic compounds are mainly responsible for odour of this variety were determined.
Conclusions: Among the aroma-active compounds, γ-decalactone (fruity, apricot, sweet), γ-hexalactone (fruity, floral), β-ionone (floral) and α-ionone (fruity, floral) were the most important contributors to the aroma of Hacihaliloglu apricot.
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5_65 Analytical analysis of traditional foods: Filling the gap in Serbian FCDB information

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Background/aims: Adding new traditional food analytical values is an ongoing requirement for the development and updating of food composition databases (FCDB). A list of commonly consumed Serbian traditional foods was identified in the course of the EuroFIR Traditional Foods work package: *gibanica* (filo pastry with cheese fill), *prebranac* (beans, first boiled and then baked), *ajvar* (cooked pepper and aubergine spread), fresh cheese, *kajmak* (creamy dairy product), and *vanilice* (cookies) .The aims of our study were; 1) to obtain analytical values of representative traditional foods following EuroFIR criteria, 2) to fill the gap in traditional food composition knowledge and 3) to get high quality analytical data for inclusion in Serbian FCDB.
Methods: Three samples of each, fresh cheese, *kajmak* and *ajvar,* were bought in three different stores and 100g of each were pooled and 200g was taken for further analysis. *Gibanica*, *vanilice* and *prebranac (three samples of each)* were homemade using the most common recipe.
Nutritional analysis was carried out by two accredited laboratories and included determination of water, ash, protein, fat, vitamin A, vitamin E and minerals (zinc, copper, manganese, iron). The samples were collected, prepared and distributed to the laboratories according to instructions given by the EuroFIR Traditional Foods work package.
Results: Analytical determination showed the following nutritional features:see Table 1.

Table 1. Moisture, ash, protein, fat, vitamin and mineral content of Serbian traditional foods.

	Fresh cheese	Kajmak	Ajvar	Gibanica	Prebranac	Vanilice
Moisture (g/100g)	70.96	35.82	79.74	51.39	67.24	13.29
Ash (g/100g)	3.54	1.81	2.48	2.25	1.86	0.51
Proteins (g/100g)	16.20	3.35	1.85	11.28	5.77	7.16
Fat (g/100g)	2.86	60.53	2.80	10.77	1.70	25.05
Vitamin A (µg/100g)	70.0	120.0	-	-	-	54.0
Vitamin E (µg/100g)	230.0	-	-	-	-	-
Zn (mg/kg)	12.32	2.55	3.44	8.56	7.76	4.46
Cu (mg/kg)	0.28	0.19	0.96	0.65	1.81	0.69
Mn (mg/kg)	0.20	0.06	1.42	1.53	3.60	3.54
Fe (mg/kg)	1.16	0.38	5.40	8.46	14.16	8.52

Conclusions: Six traditional foods were selected for analyses on account of their importance and frequent consumption in Serbian cuisine. By using standardised procedures for sample collections, preparation and conducting analyses in accredited laboratories, high quality data were produced and included in national FCDB.

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5_72 Nutritional value of Portuguese selected Traditional Foods for the National Food Composition Database

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Background/aims: There are many different cultures within Europe and each has its own and distinct dietary habits. The Portuguese cuisine is characterized by a variety of rich, filling and fully-flavoured dishes. It is a Mediterranean cuisine, with Atlantic characteristics and influences from different places of the world.
Traditional foods are part of the cultural heritage of a region or country and are key elements for the dietary patterns of each country. Traditional foods are commonly perceived as foods that have been consumed locally or regionally for a long time and the methods of preparation of such foods have been passed from generation to generation.
In the Traditional foods work package within EuroFIR, a consensus based method with standardised procedures was implemented for the systematic study of traditional foods or recipes from 13 European countries. A pilot study was conducted on a restricted number of 5 food samples per country. The recipe preparation was recorded and the nutritional composition of traditional foods/recipes was determined.
The aim of this study was to provide new and reliable data on the nutritional composition of traditional foods/recipes from Portugal for inclusion in the national food composition database.
Methods: For the selection and prioritisation of traditional foods, the following criteria have been applied: documentation of traditional character; compositional data; consumption data; health implications and marketing potential. Based on this procedure, 5 Portuguese Traditional Foods were selected: Green kale soup; Codfish with chickpeas; Portuguese boiled dinner; Roasted goat kid, and Egg sweet from Murça.
Sampling: A composite sample of each traditional food was obtained by collecting at least 5 individual samples.
Chemical analyses: Water, ash, total N - proteins, total fat, individual fatty acids, cholesterol, total sugars, individual sugars (glucose, fructose, sucrose), total dietary fibre, minerals (Na, K, Ca, Mg, Mn, Fe, Cu, P, Zn) and carotenoids (α- and β-carotene, β-cryptoxanthin, lycopene, lutein, zeaxanthin) have been performed according to EuroFIR established quality requirements.
Results: Analytical values for the nutritional composition of the five selected Portuguese traditional foods are shown in Table 1.

Table 1. Nutritional information per 100 g of edible portion on the five Portuguese Traditional Foods

Components	Green kale soup	Codfish with chickpeas	Portuguese boiled dinner	Roasted goat kid	Egg sweet from Murça
Energy (kcal / kJ), calculated	61 / 256	136 / 571	175 / 725	183 / 768	326 / 1374
Protein (g) (N x 6.25)	2.8	12.9	13.5	14.0	7.3
Total fat (g)	3.6	6.9	13.1	6.9	10.2
Available carbohydrates (g)	4.4	5.7	0.7	16.2	51.6
Total dietary fibre (g)	0.6	4.6	6.4	3.0	1.9
Sodium (mg)	301	548	428	691	52

Conclusions: It is expected that this methodology for the investigation of traditional foods will be gradually established across Europe, enabling further investigation of traditional foods at national level and thus the national food composition tables can continuously be updated with reliable and comparable new data on Traditional Foods.

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5_73 Macronutrient composition of ethnic foods commonly consumed in Europe

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Background/aims: Currently there is a gap in the data on the composition of ethnic foods consumed by both mainstream and ethnic populations in Europe. The increase in popularity of ethnic foods means that they make an important contribution towards dietary intakes of nutrients, naturally-occurring compounds and contaminants for both ethnic and mainstream populations. Therefore, new and reliable nutritional data is required for inclusion in the national databases for monitoring nutrient intakes and development and implementation of nutritional policies at European level. The aim of the EuroFIR Ethnic Foods work package is to determine the macronutrient composition of commonly consumed ethnic foods in Europe using harmonised procedures for analysis.
Methods: A list of 40 commonly consumed foods was prioritised for analysis in 7 selected countries in Europe and Israel (Belgium, Denmark, France, Italy, Netherlands, Spain, United Kingdom and Israel). The macronutrient composition of these foods was determined by undertaking composite sampling and accredited methods of analysis. The new data obtained from this study has been fully documented for inclusion in the national databases.
Results: Macronutrient content was determined and reported per 100g edible portion. Foods analysed in this study represented a diverse range of food groups, preparation and cooking methods and cuisines, resulting in varying values for all macronutrients. Salted meat (Netherlands) had the highest ash content (8.2g), whilst the least ash content was found in *roti* (Netherlands) (0.3g). Carbohydrate content of the *brik* pastry sheet, baked (France) was highest (78.2 g) followed by *nachos* (58.1g), *frik*, dry (56.2g) and *roti* (50.8g). The energy value was highest for *nachos* popular in Italy (478 kcal or 1981 kJ,) and least for *biteku-teku* from Belgium

(24 kcal or 99 kJ). Protein content varied between 1.1 g and 29.7 g for *meloukhia* sauce (France) and *kebab* (Italy). Foods containing ≥ 20 % total fat content included *meloukhia* sauce, commercially produced *hummus, pitta* sandwich with *kebab* and *nachos,* from France, Israel, Denmark and Italy, respectively.

Conclusions: The new ethnic foods data was produced using harmonised methods of analysis and is fully documented for inclusion in the national databases. As expected, the macronutrient content varied to a great extent among all the 40 foods analysed in this study. The new data obtained in this study can be used in food consumption surveys and in the planning of appropriate responses for providing useful dietary advice.

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5_74 Carotenoid content of selected South Asian vegetarian dishes commonly consumed in the UK

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Background: Ethnic groups form a significant part of the population in European countries with South Asians being the most widely represented minority group in the UK. Due to the heterogeneity of this group, dietary and food preparation practices are also varied and present current gaps in information on ethnic food composition. Such incomplete information severely inhibits effective interventions and limits the provision of dietary advice. Additionally, the consumption of both authentic and modified South Asian foods in the UK has increased considerably due to the growing number of migrant population as well as an augment by mainstream consumers. This increased consumption of South Asian foods will affect the dietary intake of nutrients, including carotenoids. Commonly consumed vegetarian dishes can vary significantly in carotenoid content and therefore required analysis. The objective was therefore to determine the carotenoid content of selected South Asian vegetarian dishes commonly consumed in the UK.
Methods: A list of authentic and modified South Asian foods was prioritized using defined criteria including their nutritional importance, sale and popularity in the UK. Food considered authentic was homemade by volunteers or acquired from ethnic food shops whereas modified foods were those available from supermarkets, restaurants and takeaways. Selected foods included *bhindi subji, chick pea curry, mung dhal* and other vegetarian dishes The carotenoid composition of these foods was determined by undertaking composite sampling (4-11 subsamples per dish) and harmonized methods for analysis. Carotenoids including β-carotene, lutein, lycopene and zeaxanthin in the selected vegetarian dishes (n=12, 10 authentic, 2 modified) were measured using HPLC. Analysis was performed by a UKAS accredited lab (ISO 17025).
Results: Carotenoid content was determined and reported per 100g edible portion. β-carotene contents ranged from 5.3 to 151µg/100g, lutein from 76 to 4070µg/100g, lycopene from <10 to 281µg/100mg and zeaxanthin from <10 to 267µg/100g. The most abundant carotenoid found was lutein with a mean content of 853µg/100g per dish. The least abundant carotenoid found was β-carotene. All dishes were found to contain all the carotenoids measured to some extent with *saag* being the richest dish in total carotenoid content.
Conclusions: The new data generated using harmonized methods can be used in food consumption surveys in the future, and to identify carotenoid-rich foods that can be implemented as part of dietary programs focused on the use of ethnic foods.
Funding acknowledgment: This work was funded by the Food Standards Agency [Project; N10038].

5_77 Nutritional characterization of a traditional Portuguese meat puff pastry: *Pastel de Chaves*

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Backgrounds/aims: *Pastel de Chaves* is a traditional meat puff pastry from Chaves municipality, in the north of Portugal, and has been a key product in the gastronomic tourism of the region for more than 140 years. Due to its popularity, this product is tentatively produced all around the Portuguese territory and probably also abroad. The original producers claim for their recognition and a tentative "Protected Geographical Indication" (PGI) is being implemented. The aim of this work was to characterize the original *Pastel de Chaves* and similar products commercialized under the same designation, but produced in other regions.
Methods: For this purpose a total of 12 genuine products from different producers, and an equivalent number of products bought in other regions were analyzed. The evaluated parameters were protein, fat, salt and water content. Taking into account a predictable high fat content, by puff dough and meat, special attention was devoted to the fat composition (fatty acids and cholesterol).
Results: The appearance between local products and products from other regions was significantly different, mostly by their size. While the genuine presented a mean weight around 60g, the others were almost doubled (115g). Total caloric content was, in accordance, the main difference among them. While the genuine can be regarded as a complementary snack (250±33 kcal), the others presented mean caloric values of 450±100 kcal, and lower homogeneity.
The protein content was lower in the genuine group (8.8±1.0% *vs* 11.1±1.2%). This situation can be explained by a higher dough/meat stuffing ratio imposed by their reduced size. When expressed by unit, the differences are substantially increased. The cholesterol content was also lower in the genuine group, again probably related to the same ratio.
The total fat content was similar in both groups (24%) as well as their fatty acids profile, characterized by a high content in saturated fatty acids and *trans* isomers (2g/unit). This reflects the quality of the fats used in the puff pastry, a situation observed in all samples, independently of their genuineness.
The salt amount was lower in the genuine group (600 *vs* 1200 mg/unit), directly proportionally to their size.
Conclusions: The genuine *Pastel de Chaves* are characterized by a high homogeneity in both size and nutritional constituents. The products from other regions sold under the same designation represent a product with distinct characteristics.

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TOPIC 6 - DELIVERING FOOD COMPOSITION DATA VIA EMERGING INTERFACES FOR DIETARY ASSESSMENT AND HEALTH APPLICATIONS

6_47 Nutritional evaluation of hazelnuts growing in Turkey

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Background/aims: Turkey is the main producer and exporter of hazelnut in the world. It meets 68.8 % of world hazelnut production due to climate advantages of the area. In Turkey, hazelnut export increased from 195.600 tones to 247.000 tones between 1990 and 2006, and most of it was exported to European countries (80-85 % of exports, 204.000 tones in 2008).
Hazelnuts are an important part of the traditional Mediterranean diet. Several studies have focused on hazelnuts and health, mostly heart diseases, because of its special fatty acid composition and antioxidant profile. The aim of this work was to evaluate the food composition of hazelnut varieties growing in Turkey (acı, incekara, kan, kargalak, kuş, yuvarlak badem, uzunmusa, cavcava, kara, çakıldak, mincane, foşa, palaz, sivri, tombul, kalınkara, akçakoca, giresun) by reviewing the literature.
Methods: This research was announced to the food related departments of universities in Turkey and they were requested to forward their studies related to Turkish food composition data. The received journals and articles were collected in a data file. The data file involved 66 parameters for each study to be filled with the information about food (name, taxonomy etc), sampling (origin, harvest season etc), transport conditions, storage conditions, analysis (laboratory name, date etc.), methods (type, detail etc.), values and statistical properties (unit, standard deviation, max/min etc), reference details (reference type, authors etc.) and quality assessment of these publications.
Results: The nutritional composition of hazelnut varieties in this review includes data of proximate analysis, dietary fiber, individual sugars, fatty acid and amino acid composition. The general nutrient profile of one of the most commonly consumed Turkish hazelnuts, Tombul is given in Table 1.

Table 1. Nutritional properties of Tombul Hazelnut (100g)

Component name	Mean±SD	Unit	Number of literature
Energy	640±20	kcal	3
Energy	2678±84	kJ	3
Water	5.09 ±1.61	g	5
Ash	4.83±5.69	g	5
Protein	16.76±2.72	g	5
Fat, total	55.06 ±19.89	g	6
Carbohydrate	15.70±4.76	g	4
Vitamin C	4.21±1.88	mg	2
Thiamin	0.30±0.09	mg	4
Riboflavin	0.091±0.016	mg	4
Vitamin B_6	0.35±0.20	mg	4
Niacin, available	1.72±0.17	mg	4
Vitamin E (α-tocopherol)	35.4±10.1	mg	4
Potassium	604±128	mg	7
Calcium	176±54	mg	7
Magnesium	157±22	mg	7
Iron	3.70±1.14	mg	7
Zinc	2.25±0.79	mg	7
Selenium	1.09±0.76	mg	11
Fatty acid, 16:0 palmitic acid	6.30±1.11	%	4
Fatty acid, 18:0 stearic acid	2.65±0.86	%	4
Fatty acid, 18:1 n-9 cis oleic acid	78.0±1.90	%	4
Fatty acid, 18:2 n-6 trans, trans	12.8±1.95	%	4
Fatty acids, total saturated	7.78±1.24	g	2
Fatty acids, total polyunsaturated	6.21±5.76	%	2

Conclusions: Hazelnut is an important nutrient source according to its fatty acid and antioxidant profile (especially α-tocopherol). Therefore it is necessary to have more reliable data on its nutrient composition.

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6_55 Developments in food composition data management and user software in Iceland

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Background/aims: The Icelandic Food Composition Data Management System (ISGEM) has been in operation since 1988. Data have been delivered for research, food labelling, education and food composition tables. Since 2007 the publication of food composition data on the Internet has replaced printed tables. Matis ohf (Icelandic Food Research) is responsible for food composition data management in Iceland and participates in the EuroFIR project. Matis plans further development to make food composition data more accessible to users on the Matis website (www.matis.is). New software for data management was designed in 2008 and phase one was put into operation in April, 2009. Current developments for users include new software to calculate nutrient intake applying the Facebook framework. The popularity of Facebook, the free-access social networking website, should promote the use of food composition data since one third of the Icelandic population are active users.

Methods: The new ISGEM data management system has been designed according to the proposed EuroFIR standard. The system is a Web application which was created using Microsoft tools (ASP.NET / MS-SQL / IIS). The database is deployed on a pre-existing database server (MS-SQL) which also runs the necessary web server (IIS). The nutrient calculations and graphical presentation application is a Java applet incorporated into the Facebook framework. Facebook Connect technology is used for user authentication and data management. For optimal performance a compressed and encrypted version of the ISGEM database is deployed within the application.

Results: The current development stage of the ISGEM food management system now holds a one level database reporting a single value for each food/component combination. The system includes connected tables for references, components, foods and component values. The possibilities to document data have been enhanced by including entity specifications from the EuroFIR Technical Annex. EuroFIR thesauri are incorporated into the system as dropdown lists. Quality evaluation of data and LanguaL coding of foods are carried out outside the system and incorporated manually. Data are exported as Excel files, printouts or directly by software to the Matis website. The planned second phase of the implementation of the ISGEM system includes another data level (original values), quality assurance issues, recipe calculations, and data logging. The new software which is developed at Matis for consumers will calculate nutrient intake and present the data graphically. Matis will make the Facebook application available in summer 2009. Further Facebook tools are currently being designed to allow users to share information regarding their health and dietary habits. Among the planned tools are a recipe system, a food image database and a food price awareness system created and maintained through the Facebook user community.

Conclusions: The proposed EuroFIR standard has been successfully incorporated into the first phase of the Icelandic database management system. Food composition data will provide great opportunities for the development of software for users, including the use of emerging interfaces.

The EuroFIR project has been very important for the development of food composition database work in Iceland.

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6_66 Capacity building in food composition data base in Central and Eastern European, Middle Eastern and North African countries: Successful collaboration between EuroFIR and other networks

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See speakers' abstracts.

6_69 Determination of element content in a traditional Turkish food, Pekmez

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Background/aims: Pekmez, a thick syrup made by boiling down grape juice, is one of the mostly consumed traditional Turkish foods. The aim of the study was to determine the element content and metal contamination of pekmez that may have occurred during production and/or during the agricultural production of grapes, mulberries, figs and apricots, which are raw materials of pekmez.
Methods: In this study, 105 pekmez samples, which were collected by the Ministry of Health from 11 cities located in different geographical regions of Turkey, were analyzed for amounts of arsenic, lead, iron, zinc, copper and tin contamination. The research was performed in the laboratories of Food and Nutrition Research Department of Refik Saydam National Public Health Agency within 12 months. Samples were digested by using microwave equipment and the analyses were performed by Inductively Coupled Plasma-Optic Emission Spectrophotometer. The results of the analyses were evaluated by comparing with Turkish Standards numbered TS 3792 and TS 12001.
Results: The results obtained by analyzing 105 different pekmez samples are summarized in Table 1. As given in Table 1, none of the pekmez samples was found to contain arsenic at more than the limit value of 0.2 ppm. Out of 105 pekmez samples, 1 contained more than 0.3 ppm lead. In terms of iron content, 16 out of 105 pekmez samples (15.2%) were not suitable according to the Turkish standards, since the iron content was over the limit value of 20 ppm. 11 pekmez samples contained zinc over the 5 ppm limit value and 2 pekmez samples contained copper over the 5 ppm limit value. None of the samples were found to contain tin at more than 150 ppm, the limit value for tin.

In addition, evaluation was done in terms of the total value for iron, copper and zinc due to the requirements of the Turkish legislations. 25 pekmez samples were found to contain over 20 ppm iron, copper and zinc, and were coded as unsuitable.

Table 1.Evaluation of 105 pekmez samples in terms of element content

Element tested	Limit level (ppm)	Number of pekmez samples which contain the element above the upper level	Proportion of pekmez samples that contain the element above the upper level out of the total 105 pekmez samples (%)
Arsenic	0.2	0	0
Lead	0.3	1	1
Iron	20	16	15.2
Zinc	5	11	10.5
Copper	5	2	1.9
Tin	150	0	0
Iron+Zinc+Copper	20	25	23.8

Conclusions: In the present study, some pekmez samples produced in different cities of Turkey were found to be subject to metal contamination, which we assume to be due to unsuitable production conditions of pekmez. As the nutritional value of pekmez is very high and because it is a very important carbohydrate source, especially for children, pregnant women and patients, pekmez production techniques must be improved to prevent metal contamination. All of the results of the present study were declared to the Ministry of Health.

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6_75 Nutritional evaluation of traditional Czech dishes made from potatoes

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Background/aims: Traditional foods express the culture, history and lifestyle and, despite globalization, contribute to eating differences among respective countries. Food tables mostly lack nutritional data on traditional foods. Potatoes are a frequent raw material for traditional Czech dishes. This was also the opinion of 98% respondents to a survey conducted by the Czech Academy of Sciences. The annual per capita consumption of potatoes in the Czech Republic amounted to 69.5 kg in 2007. Traditional potato meals, either ready to cook or mixes for their preparation, are offered by a number of food producers. The aim of the project was to generate new analytical data describing the nutritional composition of selected traditional Czech dishes based on potatoes, in order to complete the National Database of Food Composition. The following meals were prepared and analyzed: potato soup, pancakes from raw potatoes (*bramborak*), thin pancakes from cooked potatoes (*bramborove placky*), potato dumplings, dumplings from raw potatoes (*chlupate knedliky*) and mashed potatoes with poppy seed and sugar (*skubanky*).
Methods: For assessment purposes the characteristics of the procedure of dish preparation were recorded, namely the origin of raw materials used, preparation of raw materials prior to cooking, quantity of waste from preparing raw materials, raw materials quantities required by the recipe and actually used, food preparation methods, and weight of the final product (yield). A photographic documentation of dish preparation was also obtained. To acquire objective data, the samples were prepared and analyzed twice a year, i.e., from potatoes shortly after harvest and from stored potatoes. Each sample was a homogenate of two cooking replicates. Two parallel analyses of each homogenized sample were conducted. The analyses were aimed at the following factors: water, ash, proteins, amino acids, fat, cholesterol, fatty acids, carbohydrate, food fibre, vitamins C, B1, B2, B6, niacin, pantothenic acid, vitamin E, vitamin A and beta-carotene, calcium, iron, potassium, magnesium, sodium, phosphorus and zinc.
Results: Except for potato soup, the meals tested contained carbohydrate ranging from 20 to 30%. The content of proteins was between 4 and 8%. The representation of amino acids corresponded to the protein of wheat flour. Fried dishes and *skubanky* showed a higher fat content (8-10%). They were high in energy, containing up to 1000 kJ per 100 g. Neither vitamins nor minerals contained in the potato foods tested significantly contributed to the recommended daily intake. The vegetable oil used for frying was reflected in the elevated content of vitamin E and in the more favourable ratio of saturated and unsaturated fatty acids. The addition of poppy seed to *skubanky* increased the content of calcium.
Conclusions: Traditional Czech dishes made from potatoes were characterised by their nutritional composition. The results were documented following the EuroFIR standards. A photographic documentation of food preparation was made. The results broaden the spectrum of foods and the scope of the data covered by the Czech National Database of Food Composition.

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6_81 Existing flows of food composition data originating from food industry

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Background/aims: Multiple information flows of food composition data originating from the food industry exist, and the industrial players are increasingly taking both, interest and responsibility, in the provision and utilisation of high-quality food information. This development is in line with nutrition research, policy development, food composition data compilation, and business development ever moving closer as yet. Nevertheless, different needs for high-quality food composition data are standing out against increasing numbers of manufactured and processed foods within a fast-evolving and dynamic food market. Thus, providing data can be perceived as a frustrating and time-consuming task as it has been shown in a previous EuroFIR study1, mainly due to a lack of common standards and processes in sharing food composition information. Therefore, this review highlights existing flows and vehicles of food composition data originating from food industry in order to support future approaches making maximum use of those resources.

Methods: A number of pan-European information pools and systems related to food composition data originating from food industry were compared, including manufacturers specifications and other print material, on-pack nutrition labelling and sign-posting, supply chain data-pools and synchronised networks, processed and branded food datasets within national food composition databases, consumer-dedicated web-sites and databases, responses according to regulatory purposes and/or other need-driven inquiries.

They were compared in terms of the data flow and involved communication partners, the embedding of the systems, the periodicity of information up-dates, as well as required data and maximum possible data content with respective formats (values, precision of values, physical data formats).

Results: Data extent and content within all reviewed activities and flows show a very broad range, e.g. from BIG-4 (energy, protein, fat, carbohydrate) values to a combination of logistics, product information and nutritional information including possibly also meta-data or information for food classification. Also, the different motivation and incentives for supporting information flows with own resources have to be considered. Clear prospects and benefits, e.g. in view of marketing and business development, raise commonly higher support for the information system. Also systems are favoured where several information requests can be satisfied from after data has been entered once.

Conclusions: All reviewed information flows may clearly benefit from a European standard on food composition data as relevant definitions, a quality understanding and minimum requirements could be aligned, and thus the usefulness of the data and the appropriate interpretation for the later purpose could be ensured.

XML standards are capable of handling rapid changing and vast amounts of product information. They could be fed by industrial Enterprise-Resource-Planning systems and feed into

authoritative information pools and food composition databases. With defined quality standards for the food composition data, the information pools and databases could be used for a number of information inquiries, assessment purposes or labelling activities, which would act in return resource-saving as data might be entered only once in the future.

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