Identifying New Innovative Uses of Food Composition Data

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Rationale and Objective: Food composition databases (FCDB) represent fundamental information resources for nutrition science. Their use, however, is not limited to the field of nutrition science and the public health domain: food industry, legislation and consumers all need and/or use data on food composition. The present work aimed to identify and characterise new/innovative food composition data (FCD) uses. Results: Advances in information technologies allowing rapid transmission of large data volumes (e.g. third generation cell phone technologies 3G, WLAN) foster the development and dissemination of consistent and coherent food information through multiple channels, in forms appropriate to local culture, age and needs. In the future, food or health information from web portals could be retrieved at the time and location (at home or in shops) as needed, through the use of ultra mobile computers, mobile phones or stationary devices having incorporated access to the Internet. EuroFIR’s eSearch facility, which enables the simultaneous online search in the national FCDBs linked with EuroFIR, will be such a portal and is likely to become a leading food information source. Furthermore, increased travelling requires such information to be available “on the go”, since food information of the visited destination is generally interesting for tourists and other travellers. Food information could also be disseminated as an integral part of educational software and video games related to cooking or health. EuroFIR started cooperating with software developers for a web based health advisor and a video game to assist individuals in losing weight and improving their eating habits. Altogether, several diverse innovative uses of FCD can be identified. However, the speed (and ease) at which these uses can be implemented will likely depend on a standardised accessibility and availability of user-relevant data. EuroFIR deals with both issues by establishing standards to be adopted by the national European FCDBs. This input forms the basis for a technical committee (CEN/TC 387) on a standard for FCD under the European Committee for Standardization. In addition, EuroFIR supports the development of high-quality national European FCDBs. Conclusion: The technology needed for the implementation of FCD into innovative interfaces is already available and allows for sufficiently rapid data transfer. Together with improved data quality and coverage, the standardisation of FCDBs, allowing easier data interchange, will certainly open gates for new FCD uses.

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Keywords: Food data; Innovation; Education; Interfaces; EuroFIR

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Promoting the Use of Food Composition Data through New Media in Singapore

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The Singapore Health Promotion Board (HPB) houses a comprehensive food database system which stores the nutrition information of over 6000 food items. These include mixed dishes, snacks and desserts that are typically consumed by the local population. Information on the nutrient composition of foods has traditionally been communicated to the public through educational materials and the mass media. Since year 2000, HPB began to leverage on the new media platform to further promote the use of food composition data. Several applications were developed for HPB's website, which perform specific functions and cater to the needs of different groups of people:

1) Energy & Nutrient Composition of Foods - the public can utilize this application to find out the energy and nutrient content for commonly eaten foods. Users can also view the photos of selected food items.

2) Recipe Analysis - This application enables the nutritional content of recipes to be analysed based on the ingredients and cooking methods used.

3) Food Intake Assessment - This application estimates an individual's requirement for energy and key nutrients, and assesses his or her food intake to see if nutritional needs are being met. Relevant dietary messages are also shown according to results of the evaluation.

4) Online Indirect Analysis - Targeted at food companies, this application is able to generate nutrition information panels for food products based on the ingredients and preparation methods used.

More recently, HPB launched a mobile phone application known as the Diet Tracker which incorporated the nutrition data of about 300 foods. The public can download Diet Tracker for free into their mobile phones by registering at its website. This application allows users to track their calorie and fat intakes for up to 7 days, and compares the amounts consumed against the user's estimated requirements. Users can then log on to the Diet Tracker's website to view healthy eating tips based on the assessment results. Response from the public to these new media tools has been very positive. Going forward, HPB will work to enhance the features and functions of these applications.

Keywords: Food composition database; New media; Online applications; Mobile phone applications

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Monitoring Sodium Reduction in Australian Processed Foods

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Rationale and Objectives: Mean Australian population salt intakes are estimated at >9 g/day, well above recommendations. More than 75% of dietary salt comes from processed foods. Currently in Australia there is no comprehensive, brand-specific database containing nutrition information on commonly consumed processed foods, making it difficult to monitor changes in product formulations over time. Therefore this project aimed to establish a baseline for sodium levels in processed foods available in Australian supermarkets and to examine whether there had been any changes in sodium levels over a one year period.

Methods: Food categories contributing high levels of salt to the diet were determined. Sodium data for top-selling products in each category were collected from product labels and direct from manufacturers and compiled into a database in both 2007 and 2008.

Results: Sodium data were collected for over 6000 food products. Large variations were observed in sodium content within food categories, with little to no change in overall sodium levels between 2007 and 2008. For example, the range of sodium in white bread products ranged from 225-665 mg/100 g, from 80-840 mg/100 g in canned fish products and from 1-1310 mg/100 g in dry biscuits. There were significant decreases in the sodium content of frozen pizzas (19%, p=0.028), soft cheeses (24%, p=0.036), meat burgers (28%, p=0.019) and canned salmon (12%, p=0.032), and a significant increase in the sodium content of processed cheese products (24%, p=0.016) between 2007 and 2008.

Conclusions: Whilst it appears some Australian food manufacturers have taken steps to reduce sodium in their products, there is still much variation in sodium levels within major food categories. With population salt intakes still far too high, and likely contributing to the burden of cardiovascular disease in the country, there is an urgent need for government action to set Sodium Targets For Processed Food Products.

Keywords: Salt reduction; Australian food industry; Public health; Food supply; Sodium

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The French Observatory of Food Quality (Oqali) was set up in 2008, financed by authorities and implemented by the French Food Safety Agency (Afssa) and the French National Institute for Agronomic Research (INRA).

The primary goal of Oqali is to monitor the global changes in the food supply by measuring the evolution of processed and packaged foodstuffs in the French market, relating to nutritional and socio-economic parameters.

The characteristic of the Oqali database is that information is gathered for each specific foodstuff. The most of it is collected on the products labels or is provided by manufacturers or retailers. The products without nutritional labelling, like some hard discount or economy line ones, are analyzed individually or in composite samples, representative of the market.

Oqali database, using MySql language, is designed to monitor any changes on products. Each product is described, as it is presented on the packaging, with several tables (general description, claims, ingredients, nutrient content, portion, market shares and prices). Ingredients and components as mentioned in labels are linked to standard thesaurus. Each new element on the packaging conduces to a new product creation.

Teams of Oqali, located in different places in France, can update this database simultaneously via one secured Internet access. At the end of 2009, professionals, who provided data, will be able to retrieve them via their own confidential Internet access.

Different categories of food products (breakfast cereals, sweet biscuits and fresh dairy products) have already been integrated and additional products (pre-packed meat products, stewed and canned fruit…) will be studied in 2009.

An annual report, presenting the main results obtained by the data processing, is published and is available on Internet: www.oqali.fr.

Therefore, Oqali database is an essential tool to meet public health challenges and consumer expectations on nutritional information.

Keywords: Nutritional content database; Manufactured products; Socio-economic data.

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Further Developments in EuroFIR BASIS - an On-Line Composition and Biological Effects Bioactive Compound Database

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Rationale and Objectives: The EuroFIR BASIS (BioActive Substances in Foods Information System) is an internet-deployed food composition and biological effects database for plant-based bioactive compounds. The database has been compiled by the European Food Information Resource Network (EuroFIR) under the EU 6th Framework Food Quality and Safety Programme. The composition and biological effects data in EuroFIR BASIS cover multiple bioactive compound classes and plant foods, with data sourced from peer-reviewed literature. Recent improvements in quality assurance, data reporting and usability testing are discussed. Materials and Methods: A standardised approach to quality assurance of literature searching, data evaluation and reporting has been incorporated throughout the design, construction and delivery of the database. The quality assurance systems in EuroFIR BASIS are supported by standard operating procedures (SOPs) and full documentation of decisions and procedures. The implementation of SOPs ensures the quality of each step of the compilation process from reference collection to final data point. Furthermore, comprehensive documents describe the selection process for expert literature evaluators, selection of compounds and food plants for inclusion, and evaluator training methods. Usability testing produced comprehensive evaluations from individuals representing key target user groups, which informed subsequent modifications and improvements to the database.

Results: Data reporting from EuroFIR BASIS uses a sophisticated data retrieval software system, searchable by compound, food or biological effect, allowing users full control over the data selected for output. Outputs can be downloaded as spreadsheets, allowing the user to perform calculations, create graphs and manage the data as required. Conclusions: The implementation of comprehensive quality assurance and data reporting systems has ensured a sustainable, reliable, flexible and fit-for-purpose database. Ultimately, the internet-deployed database will contribute significantly to the field of food composition, providing a unique comprehensive resource on bioactive compounds for researchers, health professionals, health educators, the food industry and policy makers.

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Keywords: Food composition database; Bioactive compounds; Biological effects; Quality assurance; Usability testing

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Poor complementary feeding (CF) is the common cause of most growth faltering occurred during the weaning age. Optimal CF recommendation for Thai infant and young child (IYC) was developed by Thai IYC Feeding Guides working group in 2008. This study aimed to develop CF recipes for Thai IYC, age 6-8, 9-11 and 12-23 months old which meet the Thai Dietary Recommended Intakes (DRI) 2003, optimal caloric distribution and energy density. The Mathematical model was designed to included calculation of macronutrients and concerned micronutrients (Ca, P, Fe, K, Na, Zn, vitamin A, B1, B2, C and Niacin) from Thai food composition database, yield factors at ingredient and recipe levels, consumption size of ingredients, and meal number. The excel solver nonlinear programming was used for solving the optimal solution to meet the energy goal. Other nutrient goals (>70% of CF goals), range of the ingredients consumption size in each recipe, energy density (<1.0 kcal/g) and optimal range of caloric distribution were the constraints. Three different recipes for each age group were solved to find the optimal portions of the ingredients by the program. Mean energy of 9 solved CF recipes was 107±4.1% of the goal. Most of other nutrient goals, except Ca and Zn, were met. Protein, K, Na and most of vitamins were above 100% of CF nutrient goals. Phosphorus, Fe and vitamin B1 were above 70%. When the recipes combined with breast milk, only Zn content was still lower than target (44.3±17.2%DRI). Caloric distribution was in optimal range (carbohydrate:protein:fat = 48.0±3.4 : 16.7±3.0 : 35.0±5.5) and average energy density was 0.8±0.1 kcal/g. Zinc might be a “Problem Nutrient”. The nutrient retention factors had not been included in the model, so some micronutrients might be overestimated. The excel solver able to solve this recipe calculation model within seconds. So the model has possibility to develop to be friendly diet calculation for individual counseling, which health personnel able to evaluate and suggest CF feeding based on favorite foods of each child. The outcome of the study is demonstrated in the “Manual of Complementary Feeding”.

Keywords: Nonlinear programming; Excel solver; Recipe calculation; Yield factor; Complementary food

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