Towards a European Food Composition Data Interchange Platform to support Food and Health Research in Europe

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Outline

- Introducing IFR
- EuroFIR Food Data Platform
- EuroFIR Interchange Platform
- Food & Health Research Infrastructure in Europe
- Future developments & sustainability
Institute of Food Research

• The only publicly-funded UK research institute that addresses the fundamental science of Food and Health

• IFR addresses the global challenges of:
  ▪ Food Security
  ▪ Diet and Health
  ▪ Healthy Ageing

www.ifr.ac.uk
Institute of Food Research

- Annual turnover ~ £15.6m
- 160 scientific staff, 30 PhD students
- 5-Year funding from 1/4/12

Institute of Food Research

- Integrated Biology of the GI Tract
- Plant Natural Products
- Food, Diet and Health
- IFR Innovation
- IFR Extra
- Food Databanks
EuroFIR Data Bank Platform (2005-10)

A virtual platform of inter-connected national and specialised databases:

- Distributed configuration
- Using client – mediator – server applications
- Standardised vocabularies - thesauri
- XML format data interchange
- Draft European standard for food data (CEN/TC 387)
- Quality management system (SOPs; QI)

EuroFIR Data Bank Platform (2005-10)

European Food Composition Information: from 7 in 2005 to….
European Food Composition Platform: >25 in 2011

Foods – 51000 (total)
Generic - 33000
Recipes - 14000
Branded - 4000

Data sets in eSearch
**Foods in European Data Sets**

<table>
<thead>
<tr>
<th>European data sets</th>
<th>Updated</th>
<th>Foods</th>
<th>Language</th>
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<tr>
<td>42980 foods (27348 Language indexed)</td>
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</table>

**International & Specialised Datasets**

- **US, CA, AU & NZ + specialized data sets (eBASIS/ePlantLibra)**
  - 20,000 foods (7,900 with Language indexing)

<table>
<thead>
<tr>
<th>US, CA, AU, NZ and specialised data sets</th>
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<th>Foods</th>
<th>Language</th>
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</tbody>
</table>
Data transformation for eSearch

- Data from four major online English-language FCDBs:
  - USDA SR24 (http://www.ars.usda.gov/Services)
  - CANADIAN NUTRIENT FILE 2010 (http://www.hc-sc.gc.ca/fn-an/nutrition/fiche-nutri-data/)
  - AUSTRALIA NUTTAB 2010 (http://www.foodstandards.gov.au)
  - New Zealand FOODfiles 2010 (www.foodcomposition.co.nz)
- Documented according to EuroFIR/CEN Food Data Standard

Support to LanguaL™ thesaurus

- Dietary supplements – Europe-USA collaboration
  - Denmark (DFI), Finland (Fineli) & Netherlands (NEVO)
  - US Office of Dietary Supplements, USDA Nutrient Data Laboratory
  - New descriptors added to index dietary supplements

- LanguaL 2010: LanguaL Thesaurus
  - 692 new descriptors and growing!

- LanguaL 2010: Multilingual Thesaurus
  (English/Czech/Danish/French/German/Italian/Portuguese/Spanish/….)
Development and implementation of long-term sustainability strategy by ensuring that EuroFIR Food Data Platform is embedded in the European research community, and has connection to all major stakeholders in the food and health area.

- Supporting policy & research in Europe (e.g., EFSA, DG SANCO):
  - **EU (FP7/ESFRI)** – food and health research infrastructure – case studies on food intakes & nutrients
  - **Joint Programming Initiative: A Healthy Diet for a Healthy Life** – the vision for 2030 – standardised food intake and food composition databases

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**FoodCASE Database System**

![Diagram of FoodCASE Database System]

- **Technologies used**
  - JBoss
  - Java
  - Java Servlet
  - PostgreSQL
What can FoodCASE do?

- Comprehensive value documentation & management at all data levels, relying on diverse sets of (expandable) standards
- Automated value aggregation & recipe calculation
- Flagging [=setting of markers] of data allowing infinite filtering possibilities versioning of data, publishing on website
- Web services allowing automated machine-to-machine communications
- Multilingual support & runs on all operating systems
- Comprehensive fully automated quality assistance / semi-automated quality evaluation

➢ Contact paul.finglas@ifr.ac.uk or see www.eurofir.org

Data sets in eSearch
**eSearch Developments**

- Prototype – a proof of concept
- Developed by DFI and Polytec
- Based mainly on datasets collected during EuroFIR NoE
- Key benefit - symbol for harmonized data interchange
- Key for putting Food Composition Data (FCD) together
- Key for linking FCD to other data sources

But.....

- New requirements form users from within EuroFIR & external
- Data updating

Prototypes and key benefits for harmonized data interchange and linking FCD to other data sources. Data updating needs are also highlighted.
Features in progress

- Advanced search: Languals, component value attributes
- Comparison of foods
- Supporting EuroFIR Web Services: SOAP & REST
- Integration with FoodCASE
- Different user profiles
- Single sign-on (not only for eSearch)
- Potential integration with eLearning

- Release schedule in 6 months
EuroFIR Food Composition Building Blocks

Food Composition Database Management
- FoodCASE

Harmonized Food Description
- LanguaL
- FPI

Food Composition Data Interchange Platform
- EuroFIR eSearch Facility

Harmonized thesauri
- EuroFIR Component Thesaurus
- EuroFIR Unit Thesaurus
- EuroFIR Value type Thesaurus

Data Interchange Standards
- EuroFIR Food Data Transport Package
- EuroFIR Metadata Transport Package
- EuroFIR Food Data Query language

Heikki Pakkala, THL, Finland

EuroFIR Food Composition Data Interchange Platform

Several different UI for different type of user groups
- UI module
- UI module (SME)
- UI module (food producer companies)
- UI module (compilers)

New Web Services could be built for linking with the EMP module
- Dedicated Web services (recipe calculation)
- Dedicated Web services (EMP service)

Partner
- EuroFIR Web Service

Partner
- EuroFIR Web Service

Heikki Pakkala, THL, Finland
EuroFIR Systems development

20/04/2012 Soirce: Heikki Pakkala (KTL)

FoodCASE
- From FCDB to FDTP
- EuroFIR Web Services
- eSearch

Towards food consumption
- Cases like IARC and EFSA
- EuroFIR Systems development
- FCDB Management
- Producing data
- Connecting data
- Data retrieval
- Linking FC
- Specs and standards

FoodCASE data management system
- Map foods to FoodEx
- Add composite dish ingredient information
- Add supplement information
- Add additional nutrient information

EFSA datasets
- XML format (Food Data Transport Package)

EFSA Tender (CFT/EFSA/DCM/2011/03)

National Data
- EuroFIR hosted composition data (Access format)
- National hosted composition data (FDTP)

FoodCASE data management system

EFSA datasets
- XML format (Food Data Transport Package)
Future opportunities?

**EMP**
Facilitate the access, dissemination and maintenance of EPIC-Soft and related facilities.

- Multiple interests for collecting the maximum of details on food consumption data:
  - monitoring surveys
  - risk assessment studies

**EuroFIR**
- Effective management, updating and extending food composition data
- Laboratory and data analysis best practices

Need to implement the “missing link”:

- **Food Data Handling** (search, re-order, classify, export...)
- **Food Data Linkage** (link, algorithm compilation)

**EPIC-Soft Data Collection Common Library:** Standardised and detailed consumption data

**EuroFIR Data Collection Common Library:** Standardised and documented composition data

Provide a full integrated dietary methodology in Europe for data collection (food consumption) and data handling (nutrient and other compounds)

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**EURO-DISH**

**DISH: Determinants, Intake, Status, Health**

Study on the need for food and health research infrastructures in Europe

Coordinator: Krijn Poppe MSc
Co-coordinator: Prof. Pieter van 't Veer
Project management: Karin Zimmermann (BSc)
**Overall Objective**

provide advanced and feasible recommendations for Research Infrastructure development …

… to the European Strategy Forum on Research Infrastructures (ESFRI) and future European funding programmes as well as other stakeholders

DISH (Determinants - Intake - Status - Health) model of the key causal chain of food & health research. The four pillars, i.e. Determinants, Intake, Status and Health will be used for organising the research area.

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**EuroFIR Food data building blocks**

- Food Data Transport Package (FDTP)
  - suitable for different purposes needing food composition
- Food description
  - suitable for different purposes needing food description
- Component value documentation
  - suitable for different purposes needing any measurement from food
- CEN standard
  - Based on FDTP
  - Cooperation with food industry, EFSA…
  - Even more abstract and generic
EuroFIR infrastructure tools

- FoodCASE
  - FCDB maintenance
  - Food description maintenance
  - Recipe calculation
- EuroFIR Web Services
  - Automated data interchange for food information
  - Interface now tuned for eSearch
  - Other interfaces like recipe calculation
- EuroFIR eSearch Facility
  - Harmonized Food information available
- EuroFIR eLearning

In the meantime elsewhere…

- Project sizes and scopes increase in the food and dietary related studies
  - Multi-centered studies
  - Ad hoc consortiums
  - More interdisciplinary studies
- Consequence
  → More data interchange
  → More automated tools
  → The need for standards and harmonizing increases
The children of EuroFIR NoE

Almost full coverage of the food compiler organizations in Europe

Links to FAO INFOODS (global)

Framework for solid infrastructure

None of the members work only with food composition

The same infrastructure could be used in the neighbour areas

We have already projects like TDS, EuroDISH
Summary and Outlook

- EuroFIR FCD interchange system is established
- Based on food description & value documentation + standardised vocabularies from EuroFIR NoE
- EuroFIR Web Services facilitates a multitude of different services for a wide range of potential uses
- Sustainability of the system via EuroFIR AISBL and its members is key for future developments
- Integrate into larger Food & Health Platform
Acknowledgements

- EuroFIR collaborating centres especially DFI on LanguaL initiatives

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- www.eurofir.org