ASEANFOODS and Food Composition Data: Current status, gaps and impact on developing quality food consumption data for ASEAN

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Institute of Nutrition, Mahidol University, THAILAND

Science Symposium on The Science & Application of Food Consumption Data - Improving Nutrition & Food Safety in Southeast Asia
April 10, 2014, Hilton Singapore
Aspects to be covered

- Brief introduction to ASEANFOODS
- Activities of ASEANFOODS (1986 to present)
  - development of good quality laboratories
  - development of ASEAN food composition databases
  - FoodComp Course - Asia
  - International food Data conference (8-IFDC)
  - ASEANFOODS Website
- Common problems in using food composition tables
- Tips and precautions in using FCDBs
- Future activities
- Recommendations
ASEAN Network of Food Data System

Association of Southeast Asian Network of food data system

ASEANFOODS: established in 1986

Institute of Nutrition, Mahidol University: Regional Centre, 1986 and INFoods Regional Database Centre 1991.

Assoc. Prof. Dr. Prapasri Puwastien

Member countries: 10 x

Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam, Myanmar, Cambodia

Brunei Darussalam; Laos
*International Network of Food Data System
ASEANFOODS

Association of Southeast Asian Network of food data system*

Objectives

to promote and support the development of national and regional food composition databases (FCDBs) which are of high quality and accessible to users in ASEAN and other regions, and to contribute knowledge and information towards improving food and nutrition security and achieving sustainable diets

*Regional Centre and INFOODS database Centre: Institute of Nutrition, Mahidol University (INMU), Thailand <http://www.inmu.mahidol.ac.th/aseanfoods>
ASEANFOODS: main activities during 1986-2013

1. Organising ASEANFOODS Workshops and trainings
2. Strengthening the analytical performance of food analysis laboratories
3. Developing ASEAN FCDBs
5. Organising the 8th International Food Data Conference (2009).
6. Publishing ASEANFOODS documents: ASEAN Food composition database, Method of Food Analysis, other publications
7. ASEANFOODS Website

ASEANFOODS website http://www.inmu.mahidol.ac.th/aseanfoods/
General process for FCD development

Identify food items and nutrients to be analysed

Sampling plan and sampling

- Fresh
- Cooked/processed foods

Food samples & detailed information and characteristics

Samples preparation

Nutrient analysis in a laboratory

- Select analytical methods
- Check method performance: method verification or validation
- Check analyst's performance - precision and accuracy
- Quantitative measurement of nutrients

Data evaluation and compilation

Good quality food composition data

Internal External QC systems

RMs

ASEANFOODS activities ILSI SEA Symposium 10 April 2014
1. Organising ASEANFOODS Workshops and trainings

- 6 Regional Workshops: supported by AusAIDS, JICA, UNU, INF, FAO/INFOODS, ILSI

- Trainings at national and regional levels: 4 areas
  - ISO 170 25,
  - Internal and external quality control system (production of RMs, proficiency testing (PT) programme and statistical evaluation),
  - Metrology in Food Chemistry and Food Microbiology,
  - Food Analysis and food composition data system
  - FoodComp course
1. Conducting trainings at national and regional levels (cont.)

~ 30 times, > 1500 participants

**At national level:** 1-3 times per year
- Participants from laboratory performance studies
- Accreditation Bodies, government and private institutes and laboratories
- PT providers - applicants for ISO 17043 accreditation

**At regional level:** as organiser or trainer or lecturer
- APFAN training programme: QHSS, Brisbane, Australia (6 trainings)
- AusAID programme: Indonesia, Thailand, Philippines
- FoodComp Courses: the first FoodComp - Asia (ASEANFOODS), FoodComp - Asia 2 (SAARCKFOODS), FoodComp - OCEANIAFOODS (Australia)
Institute of Nutrition
Mahidol University

ASEANFOODS activities                              ILSI SEA Symposium                                            10 April 2014

General process for FCD development

Identify food items and nutrients to be analysed

Sampling plan and sampling

Fresh

Cooked/processed foods

Food samples & detailed information and characteristics

Samples preparation

Nutrient analysis in a laboratory

• Select analytical methods
• Check method performance: method verification or validation
• Check analyst’s performance - precision and accuracy
• Quantitative measurement of nutrients

Data evaluation and compilation

Good quality food composition data

Internal
External QC systems

RMs
2. Strengthening the quality of laboratories

2.1 Develop international linkages and collaborations:

2.2 Organisation of laboratory performance studies

2.3 Development of food reference materials with reference values of components

2.4 Documentation the ASEAN Manual of Food Analysis and other related publications
2. Strengthening the quality of laboratories

How quality control system developed in ASEANFOODS?

2.1 Develop international linkages and collaborations:

- OCEANIAFOODS Regional Meetings and conferences: during 1989 to 1998 and in 2009, presenting ASEANFOODS activities, exchanging experience, and formed collaboration

- Asia Pacific Food Analysis Network (APFAN) Workshop: 1991-2000, as a lecturer on internal and external quality control system, conducting PT and developing RMs

Outcome: - create recognition on good laboratory performance in ASEANFOODS
  - other regional networks
  - create collaborations between regional networks
2.2 Organising Proficiency testing programme

1. Selection and preparation of candidate materials
   Rice flour, soybean flour, weaning food, fish powder, milk powder,….
   Sample preparation → sub-samples, packed in sealed containers

2. Testing for homogeneity and stability of representative nutrients*

3. Establishing assigned values of nutrients**

   1) Expert/outstanding laboratories
      [OCEANIA, Europe, USA, Canada]
   2) PT participants

   Analysis of required nutrients
   Computation and statistical evaluation
   Test material with assigned values of nutrients + documents

4. Proficiency Testing

5. Evaluation of laboratory performance
   Values from good performance laboratories

6. Reference materials with reference values of nutrients
2. Strengthening the performance of laboratories

### 2.2 Proficiency testing performance: 1989-2014

**11 rounds by INMU**

<table>
<thead>
<tr>
<th>Round</th>
<th>Year</th>
<th>Nutrients covered</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1989</td>
<td>Main nutrients, minerals</td>
<td>Regional</td>
</tr>
<tr>
<td>II</td>
<td>1993-4</td>
<td>Main nutrients, minerals</td>
<td>Regional</td>
</tr>
<tr>
<td>III</td>
<td>1998-9</td>
<td>Mandatory nutrients for NL</td>
<td>Regional</td>
</tr>
<tr>
<td>IV</td>
<td>1999-2000</td>
<td>Mandatory nutrients for NL</td>
<td>National</td>
</tr>
<tr>
<td>V</td>
<td>2001</td>
<td>Proximate composition</td>
<td>National</td>
</tr>
<tr>
<td>VI</td>
<td>2001-2</td>
<td>Total folate</td>
<td>International</td>
</tr>
<tr>
<td>VII</td>
<td>2002-3</td>
<td>Mandatory nutrients for NL</td>
<td>Regional</td>
</tr>
<tr>
<td>VIII</td>
<td>2005-6</td>
<td>Main nutrients, Fe, Zn, vit B1</td>
<td>International</td>
</tr>
<tr>
<td>IX</td>
<td>2009-10</td>
<td>Mandatory nutrients for NL</td>
<td>National</td>
</tr>
<tr>
<td>X</td>
<td>2010-11</td>
<td>Mandatory nutrients for NL</td>
<td>National</td>
</tr>
<tr>
<td>XI</td>
<td>2013-14</td>
<td>Mandatory nutrients for NL</td>
<td>National</td>
</tr>
</tbody>
</table>
### Development of food reference materials with consensus values of various nutrients

<table>
<thead>
<tr>
<th>Year</th>
<th>Material</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>AS-FRM 1 Rice flour</td>
<td>Main nutrients and 8 minerals</td>
</tr>
<tr>
<td>1994</td>
<td>AS-FRM 2 Soybean flour</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AS-FRM 3 Cereal-soy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AS-FRM 4 Fish flour-1</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>AS-FRM 5 Weaning food</td>
<td>Mandatory nutrients for NL</td>
</tr>
<tr>
<td></td>
<td>AS-FRM 6 Fish flour-2</td>
<td>(Main nutrients, 3 minerals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cholesterol, Sat. FA, Sugars)</td>
</tr>
<tr>
<td>2003</td>
<td>AS-FRM 7 Milk powder</td>
<td>Mandatory nutrients for NL</td>
</tr>
<tr>
<td>2005-6</td>
<td>AS-FRM 8 Rice powder</td>
<td>Main nutrients and some minerals</td>
</tr>
</tbody>
</table>

**Uses of RMs:**
- Internal quality control system - check accuracy, method validation
- External QC system: test material for PT
Analytical quality control system used among ASEANFOODS laboratories

<table>
<thead>
<tr>
<th>Source of information</th>
<th>N</th>
<th>in-house QC system</th>
<th>PT</th>
<th>RMs</th>
<th>CRMs</th>
<th>Accredited Lab ISO/IEC 17025</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASEANFOODS Workshop (1996)</td>
<td>6</td>
<td>67</td>
<td>50</td>
<td>-</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>1998 (PT-3)</td>
<td>18</td>
<td>28</td>
<td>39</td>
<td>6</td>
<td>22</td>
<td>17 (3 lab)</td>
</tr>
<tr>
<td>2003 (PT-7)</td>
<td>25</td>
<td>56</td>
<td>100</td>
<td>24</td>
<td>36</td>
<td>36 (9 lab)</td>
</tr>
<tr>
<td>2005 (PT-8)</td>
<td>31</td>
<td>77</td>
<td>61</td>
<td>35</td>
<td>45</td>
<td>42 (13 lab)</td>
</tr>
<tr>
<td>2010 (PT-9)</td>
<td>23</td>
<td>87</td>
<td>91</td>
<td>74</td>
<td>74</td>
<td>74 (17 lab)</td>
</tr>
<tr>
<td>ASEANFOODS Workshop (2011)</td>
<td>6</td>
<td>100</td>
<td>83</td>
<td>33</td>
<td>67</td>
<td>83 (5 lab)</td>
</tr>
</tbody>
</table>

*N= number of respondents (laboratories); CRMs: certified RMs; RMs: other types of RMs with assigned value; In-house QC system: using of in-house RMs and monitor with QC chart; PT: proficiency study.
2.4 Documentation of ASEAN Manual of Food Analysis

Activities:

- Pre-workshop
- Workshop (one week, 2002)
- Post-workshop
  - hard copy
  - e-version in ASEANFOODS website*

*http://www.inmu.mahidol.ac.th/aseanfoods/publication.html
2.4 Documentation of ASEAN Manual of Food Analysis

**Opening**

Distribute the work to experts on analysis of each nutrient

**Presentation**

Group working

Discussion and approved

ASEANFOODS activities

ILSI SEA Symposium

10 April 2014
What are our achievements? continued

Other related publications

PT Reports 10 x (8 English, 2 Thai)

Published papers in journals: 5 papers

Conferences Proceedings:
ASEANFOODS, OCEANIAFOODS

Activities of the ASEAN Network of Food Data System (ASEANFOODS)

Original Article
Development of rice reference material and its use for evaluation of analytical performance of food analysis laboratories

Prapasri Puwastien*, Kunchit Judprasong, Naruemol Pinppapai
Institute of Nutrition, Mahidol University at Salaya, Pathumthani 4, Nakhon Pathom 73170, Thailand
3. Developing ASEAN food composition databases: 1996-present

3.1 Current status of FCDBs in ASEAN countries
3.2 Documentation of the first ASEAN FCTs 2000 (JICA)
3.3 Organisation of the First FoodComp-Asia 2002 (FAO, ILSI)
3.4 Organisation of 8th International Food Data Conference (8-IFDC), 2009 (FAO, EuroFIR and foods and chemicals manufacturers in Thailand)
3.1 Current status of FCDBs in ASEAN countries

### Table 1.

Status of the current food composition databases in 6 ASEAN countries: ASEANFOOS Workshop, 2011 (see attached table).

<table>
<thead>
<tr>
<th>Nutrients: proximate</th>
<th>Malaysia</th>
<th>Myanmar</th>
<th>Philippines</th>
<th>Singapore</th>
<th>Thailand</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>English and local food names</td>
<td>?</td>
<td>English and local food names</td>
<td>English</td>
<td>English and local food names</td>
<td>Local language</td>
</tr>
<tr>
<td>Source of data</td>
<td>Analysed/calculated</td>
<td>analysed/borrowed/calculated</td>
<td>analysed/calculated/borrowed (only DF)</td>
<td>analysed/borrowed/calculated</td>
<td>Analysed/calculated</td>
<td>analysed/borrowed/calculated</td>
</tr>
<tr>
<td>Number of food items (total)</td>
<td>783</td>
<td>770</td>
<td>1541</td>
<td>3500</td>
<td>1050</td>
<td>526</td>
</tr>
<tr>
<td>No food gr.</td>
<td>14 (Raw) &amp; 7 (cooked)</td>
<td>13</td>
<td>17</td>
<td>15</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>No. nutrients</td>
<td>19</td>
<td>13</td>
<td>17</td>
<td>24 (core)</td>
<td>24</td>
<td>85</td>
</tr>
<tr>
<td>Minerals</td>
<td>Ca, P, Fe, Na, K, Cu, Zn, Mg</td>
<td>Ca, P, Fe</td>
<td>Ca, P, Fe, Na, K, Cu, Zn, Mg, Mn.</td>
<td>Ca, P, Fe, Na, K, Zn, Se</td>
<td>Ca, P, Fe, Na, K, Cu, Zn</td>
<td>Ca, Fe, Mg, Mn, P, K, Na, Zn, Cu, Se,</td>
</tr>
<tr>
<td>Water-soluble vitamins</td>
<td>B1, B2, B3, C</td>
<td>B1, B2, B3, C</td>
<td>B1, B2, B3, C</td>
<td>B1, B2, B3, C</td>
<td>B1, B2, B3, C</td>
<td>B1, B2, B3, B5, C, B6, folic, biotin, B12,</td>
</tr>
<tr>
<td>Fat-soluble vitamins</td>
<td>all, except vit K</td>
<td>Retinol, β-carotene,</td>
<td>Retinol, β-carotene,</td>
<td>Retinol, β-carotene,</td>
<td>Retinol, β-carotene,</td>
<td>vit. A, D, E, K</td>
</tr>
</tbody>
</table>
## 3.1 Current status of FCDBs in ASEAN countries

### Table 1. (continued)

Status of current food composition databases in 6 ASEAN countries

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Malaysia</th>
<th>Myanmar</th>
<th>Philippines</th>
<th>Singapore</th>
<th>Thailand</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatty acids</td>
<td>√ (some)</td>
<td></td>
<td></td>
<td></td>
<td>√ (INMU and MOPH (all))</td>
<td>√</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>√ (some)</td>
<td></td>
<td></td>
<td></td>
<td>√ (INMU and MOPH)</td>
<td>√</td>
</tr>
<tr>
<td>Sugars</td>
<td>√ (some)</td>
<td></td>
<td></td>
<td></td>
<td>√ (some)</td>
<td>√</td>
</tr>
<tr>
<td>Amino acids</td>
<td>√ (some)</td>
<td></td>
<td></td>
<td></td>
<td>√ (MOPH)</td>
<td>√ (18 amino acids)</td>
</tr>
<tr>
<td>Others (specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>starch</td>
<td>Iodine (MOPH) Phytosterols, Carotenoids</td>
</tr>
<tr>
<td>Method of analyses (Std/in-house/published method)</td>
<td>Std/published with modification</td>
<td>Std</td>
<td>Std/published with modifications</td>
<td>Std/in-house (analysis by external lab)</td>
<td>Std/in-house</td>
<td>Std/in-house</td>
</tr>
<tr>
<td>Database compilation tool</td>
<td>?</td>
<td>Excel</td>
<td>Excel</td>
<td>Excel</td>
<td>Excel</td>
<td>Access, Excel</td>
</tr>
<tr>
<td>Nutrient intake assessment software</td>
<td>NutriCal</td>
<td></td>
<td></td>
<td>FOCOS (System: Oracle DB and Net)</td>
<td>INMUCAL</td>
<td>up coming</td>
</tr>
<tr>
<td>Database in Website</td>
<td>Nutriweb</td>
<td></td>
<td></td>
<td>Food Info Search</td>
<td>pdf (MOPH)</td>
<td>up coming</td>
</tr>
</tbody>
</table>
### 3.1 Current status of FCDBs in ASEAN countries

<table>
<thead>
<tr>
<th>Country</th>
<th>On-line electronic database: website address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia (Nutriweb)</td>
<td><a href="http://www.nutriweb.org.my">http://www.nutriweb.org.my</a></td>
</tr>
</tbody>
</table>
| Thailand: (Ministry of Public Health) | Language: Thai and English  
1. Nutritive values of Thai foods  
[http://nutrition.anamai.moph.go.th/FoodTable/Html/frame.html](http://nutrition.anamai.moph.go.th/FoodTable/Html/frame.html)  
2. Amino acids content of Thai foods  
3. Fatty acids Composition and Cholesterol in Thai foods  
3.2 Documentation of the first regional food composition database: ASEAN FCTs (1996-2000) (supported by JICA)

1996, supported by JICA
National FCTs 4500 ITEMS compilation and modification

harmonisation & standardisation:
check identity, food code, food description of selected food items, identify items to be merged

reviewed, re-evaluated, scrutinised, merged, edited, completed and finalised

ASEAN FCTs ’2000:
~1750 selected food items

Formed a technical committee
5 years

1. Pre-workshop activities
3 mo.

2. Workshop activities
6 days

4 years

3. Post-workshop activities

ASEAN FCTs 2000

ASEANFOODS activities ILSI SEA Symposium 10 April 2014
National FCTs

ASEAN FCTs-2000

- 17 food groups
- 1750 food items
- 21 nutrients

ASEANFOODS activities

ILSI SEA Symposium

1996-2000

1997

1998

1999

2000

2001
ASEANFOODS website

http://www.inmu.mahidol.ac.th/aseanfoods/

ASEAN Food Composition Database
Electronic version 1, February, 2014

http://www.inmu.mahidol.ac.th/aseanfoods/composition_data.html

It contains FCDBs of 616 food items with 21 components, as aggregated ASEAN and individual unique data of Thai foods.
<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Malaysia</th>
<th>Myanmar</th>
<th>Philippines</th>
<th>Singapore</th>
<th>Thailand</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expected year for the new version</strong></td>
<td>2015</td>
<td>2014</td>
<td>2016</td>
<td>2012/13</td>
<td>2014</td>
<td>-</td>
</tr>
<tr>
<td><strong>Sources of FCD</strong></td>
<td>Analysed/calculated</td>
<td>analysed/calculated</td>
<td>analysed/calculated/borrowed (DF and other missing nutrients)</td>
<td>analysed/borrowed/calculated</td>
<td>Analysed/calculated</td>
<td>analysed/borrowed/calculated</td>
</tr>
<tr>
<td><strong>No food gr.</strong></td>
<td>28 (14 Raw, 14 cooked)</td>
<td>13</td>
<td>17</td>
<td>15</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td><strong>No. nutrients</strong></td>
<td>29 mandatory, 11 optional</td>
<td>13</td>
<td>&gt;17</td>
<td>24 (core)</td>
<td>24 (core)</td>
<td>85</td>
</tr>
<tr>
<td><strong>Nutrients: proximate</strong></td>
<td>water, protein, fat, ash, dietary fibre</td>
<td>water, protein, fat ash (analysed but no record)</td>
<td>water, protein, fat ash, dietary fibre (borrowed)</td>
<td>water, protein, fat, ash, dietary fibre</td>
<td>water, protein, fat, ash, dietary fibre</td>
<td></td>
</tr>
<tr>
<td><strong>Total CHO (1) avail. CHO (2)</strong></td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>Sum of starch + sugars</td>
<td>2 but 1 (when no data on DF)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Minerals</strong></td>
<td>Ca, Mg, Na, Fe, Cu, Zn</td>
<td>Ca, P, Fe</td>
<td>Ca, P, Fe, Na, K, Cu, Zn, I</td>
<td>Ca, P, Fe, Na, K, Cu, Zn</td>
<td>Ca, P, Fe, Na, K, Cu, Zn, Se, I</td>
<td></td>
</tr>
<tr>
<td><strong>Water-soluble vitamins</strong></td>
<td>B1, B2, B3, C folate</td>
<td>B1, B2, B3, C</td>
<td>B1, B2, B3, C</td>
<td>B1, B2, B3, C</td>
<td>B1, B2, B3, C</td>
<td>B1, B2, B3, B5, C, B6, folic, biotin, B12</td>
</tr>
<tr>
<td><strong>Fat-soluble vitamins</strong></td>
<td>A and E</td>
<td>Retinol, β-carotene, VitA RE</td>
<td>Retinol, β-carotene, VitA RE (not certain)</td>
<td>Retinol, β-carotene, VitA RE</td>
<td>Retinol, β-carotene, RAE</td>
<td>Same plus a and b carotenes, b-cryptoxanthin, lycopene, lutein, zeaxanthin</td>
</tr>
</tbody>
</table>
### Table 2. Plan for new version of national FCDBs in 6 ASEAN countries (see attached table) (continued)

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Malaysia</th>
<th>Myanmar</th>
<th>Philippines</th>
<th>Singapore</th>
<th>Thailand</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatty acids</td>
<td>Total, individuals, trans fat</td>
<td>Total, individuals</td>
<td></td>
<td>Total, individuals, trans fat (some)</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>√</td>
<td>√</td>
<td></td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Sugars</td>
<td>Total, individuals (sucrose, glucose, fructose, lactose, maltose.)</td>
<td>Total sugars (analysed, borrowed/calculated)</td>
<td></td>
<td>√</td>
<td>√ (some)</td>
<td>√</td>
</tr>
<tr>
<td>Amino acids</td>
<td></td>
<td></td>
<td></td>
<td>√</td>
<td>(18 amino acids)</td>
<td></td>
</tr>
<tr>
<td>Others (specify)</td>
<td></td>
<td></td>
<td></td>
<td>starch</td>
<td>Iodine (MOPH)</td>
<td>Phytosterols, Carotenoids, isoflavone, purine</td>
</tr>
<tr>
<td>Method of analyses (Std/in-house/published method)</td>
<td>Std/published with modification</td>
<td>Std</td>
<td>Std/published with modifications</td>
<td>Std/in-house (analysis by external lab)</td>
<td>Std/in-house</td>
<td>Std/in-house</td>
</tr>
<tr>
<td>Database compilation tool</td>
<td>Excel?</td>
<td>Excel</td>
<td>Excel</td>
<td>Excel</td>
<td>Access, Excel</td>
<td></td>
</tr>
<tr>
<td>Nutrient intake assessment system</td>
<td>NutriCal</td>
<td>FOCOS (System: Oracle DB and Net)</td>
<td>INMUCAL</td>
<td>INMUCAL</td>
<td>up coming</td>
<td></td>
</tr>
<tr>
<td>Database in Website</td>
<td>will be available in September 13</td>
<td></td>
<td>Food Info Search</td>
<td>E-version in INMU web</td>
<td>up coming</td>
<td></td>
</tr>
</tbody>
</table>
Objective of FoodComp Asia 2002

To show how FCD generators, compilers and users can collaborate and contribute to the development of quality food composition data which is, in result, valuable for effective use in nutrition and other related areas.

Participants: 11 countries

- 4 from SAARCFOODS
- 2 from NEASIAFOODS
- 10 from ASEANFOODS

Supported by: FAO and ILSI
FoodComp Asia 2002: Three main areas - FCD generation, Compilation and Uses

Course elements

- Lecture
- Group working
- Computer exercise
- Food lab practices
- Presentation

ASEANFOODS activities

http://www.inmu.mahidol.ac.th/aseanfoods

10 April 2014
3.4 The 8th IFDC: organised by INMU 
Oct 2009, BKK, Thailand,

Theme: “Quality Food Composition Data: key for health and Trade”

- Sources of funding: FAO and EuroFIR
  Private foods and chemical companies, participants

- Participants: 139 from 44 countries
- Presentation: 40 Oral; 110 Posters

Website: http://www.inmu.mahidolac.th/8ifdc
- conference programme
- Abstracts: oral and posters
- ppt of oral presentations
- Bangkok Declaration
- All photos throughout the conference
Common problems in using food composition tables: information from data users (2000)

1. Incompleteness of FCD

a. **Missing nutrients**: DF, sugars, some minerals and trace elements (Cu, Zn, iodine), fatty acids, cholesterol, some vitamins, amino acids, anti-nutritional factors, phytochemicals

b. **Missing food items**
   - raw vs. cooked
   - processed foods - nutrition labelling
   - specific local foods (indigenous foods): unconventional but seasonally or locally common
   - food infrequently consumed
Common problems in using food composition tables: information from data users (continued)

2. Data presentation: most data expressed per 100 g or 100 mL, nutrients per household unit is required by the users*

3. Language used, food identification (English and scientific names)

4. Unavailable of Information to the users:
   - detailed information on foods and nutrients
     e.g., converting factors used for calculating some nutrients

5. No information on bioavailability of nutrients, yield factor, nutrient retention, glycemic index

6. Computer software to facilitate the use of FCDBs - a user-friendly with wide applications
TIPS AND PRECAUTIONS IN USING FCDBs

1. **Year of publication**: use updated version → Up-to-date information
   Updated analytical methods provide more accurate FCD.

2. **Sources of FCD**:
   - **Analysed data**: best choice
   - **Calculated data**: converting factors (i.e., protein, carbohydrate, energy, vitamins, etc); cooked foods: yield factor and retention factor of nutrients
   - **Borrowed data**:
     - Choose database from neighboring countries
       (Malaysia, Philippines, Singapore, Thailand, Vietnam or ASEAN FCDB)
     - Choose database from neighboring region
       Food Composition Table for Use in East Asia

   If not available, then use database of other regions
   e.g., USDA (U.S. Department of Agriculture) database
3. **Check detailed information of selected nutrients:**
   for example,

   "**Fibre**": crude fibre (FIBC) or dietary fibre (FIBTG)
   - Crude fibre: mainly cellulose and lignin;
     hemicellulose and pectic substance get lost during analysis (acid and alkaline treatment)
   - Dietary fibre: cellulose, hemicellulose, pectic substance, and lignin; related directly to human health

   **Carbohydrate**: total or available carbohydrate
   - total carbohydrate (CHOCDF) by difference (include DF)
   - available carbohydrate (CHOAVLDF) by difference (exclude DF)
   - available carbohydrate (CHOAVL) by summation of analysed values
     (most recommended by INFOODS)
     \[ CHOAVL = \text{free sugars plus dextrin} + \text{starch} + \text{glycogen} \]
4. Calculated data: **factors used for calculation**

A. **Crude protein**: total N × converting factor

B. **Carbohydrate**: total CHO vs available CHO

C. **Energy (ENERC)**: calculated using
   - total carbohydrate
   - available carbohydrate + energy from FIBTG

D. **Vitamins**:
   - e.g., β-carotene to vitamin A,
   - Vit A to Vitamin A RE, or RAE
Calculated data: “conversion factors” and specific factors used for calculation

4A. Crude protein = total N x conversion factor (Kjeldahl’s method)

Table 7. Factors for converting nitrogen to protein

<table>
<thead>
<tr>
<th>Foods</th>
<th>Converting factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>6.38</td>
</tr>
<tr>
<td>Barley, oats and rye</td>
<td>5.83</td>
</tr>
<tr>
<td>Rice</td>
<td>5.95</td>
</tr>
<tr>
<td>Wheat flour, refined</td>
<td>5.70</td>
</tr>
<tr>
<td>Wheat, whole-kernel</td>
<td>5.83</td>
</tr>
<tr>
<td>Almonds</td>
<td>5.18</td>
</tr>
<tr>
<td>Peanuts, Brazilnuts</td>
<td>5.46</td>
</tr>
<tr>
<td>Soybean</td>
<td>5.71</td>
</tr>
<tr>
<td>Nut and seeds, others</td>
<td>5.30</td>
</tr>
<tr>
<td>Mixed diet and others</td>
<td>6.25</td>
</tr>
</tbody>
</table>

4B. Carbohydrate (CHO):

1) Carbohydrate by difference

Total carbohydrate  \(<\text{CHOCDF}\> \text{ (include DF)}\)
= \(100 - (\text{weight in grams [moist. + protein + fat + ash]} \text{ in 100 g food})\)

Available carbohydrate  \(<\text{CHOAVLDF}\> \text{ (exclude DF)}\)
= \(100 - (\text{weight in grams [moist + protein + fat + ash + dietary fibre]} \text{ in 100 g food})\)
(E- version ASEAN FCDB, version 1, 2014, present both)

2) Available carbohydrate by analysis*

Available CHO by summation \((\text{CHOAVL})\) of analysed values:
\(\text{CHOAVL} = \text{free sugars plus dextrin + starch + glycogen}\)

*Most recommended by INFOODS - International Network of Food Data System
4C. Energy by calculation: factors used for calculation energy

1) Energy calculated from protein, lipid, total CHO (CHOCDF) = 4, 9, 4 kcal/g, respectively. (Thai FCTs, 1999)

2) Energy calculated from protein, lipid, available CHO (CHOAVLDF) and dietary fibre = 4, 9, 4 and 2 kcal/g, respectively. (e-version, ASEAN FCTs, 2014)

Unit of expression: kcal or kJoule*

1 kcal = 4.184 kJ

*FAO/INFOODS (2012). FAO/INFOODS Guidelines for Checking Food Composition Data prior to the Publication of a User Table/Database-Version 1.0. FAO, Rome
4D. Converting factor for estimating β-carotene to vitamin A

- 6 µg of β-carotene = 1 µg of Retinol Equivalent (VITA_RE)
- 12 µg of β-carotene = 1 µg of Retinol Activity Equivalent (RAE)
5. Presentation of analytical data: unit of expression

- Energy: kilojoule or kilocalories
- Vitamins: e.g.,
  - Vitamin A: IU or $\mu$g
    (as retinol or retinol equivalent (RE) or retinol activity equivalent, (RAE))
    
    Vitamin A $3.33$ IU = $1 \mu$g Retinol

- Niacin: mg niacin or mg niacin equivalent

  Niacin equivalent = amount of niacin + amount of tryptophane/60

  $60$ mg tryptophane = $1$ mg niacin
6. Validity of data: must be checked prior to documentation

- The sum of main nutrients: $100 \pm 3 \text{ g per 100 g}$
- Carbohydrate: close to starch + sugars + dietary fibre
- The sum of minerals must not $>\text{ ash value}$
- Total fatty acids must not $>\text{ total lipid}$

7. Variation of food composition: season, geography, maturity, cooking methods, etc

e.g., moisture, lipid, minerals (iodine, Se), vitamins, etc.
8. Read explanatory notes and information to the users carefully.

9. Overview food items in each food groups could ease in searching the data

• Coconut: juice (Beverage), young tip (Vegetables), young coconut (Fruits),
  coconut milk (Fat and Oil), sugar coated dried coconut (Sugars, syrup
  and confectionary)

• Water melon: young melon, seeds, mature fruit
• Tamarine: young pod, mature pod, seeds
• Pumpkin: seeds, fruit (Vegetables - fruit vegetable)
• Spices and condiments: separate from vegetables
FAO / INFOODS Guidelines for Checking Food Composition Data prior to the publication of a Table/Database - Version 1.0, 2012


- The Guidelines help in checking and standardising the detailed information in FCDBs → increase quality of FCDBs.

- It is recommended to be used by the data generators, compilers and users
Future activities of ASEANFOODS

1. Activities to develop good quality Food analysis laboratories
   - Continue providing training and workshop on internal and external quality control systems at national and regional levels
   - Encourage organising PT programme at national level following ISO standard protocols

2. Activities on food composition data:
   2.1 Revise, update and document national FCDBs
   2.2 Organise the 7th ASEANFOODS Workshop in 2014 - to prepare and document the second version of the ASEAN FCDBs, following the INFOODS/FAO Guidelines
   2.3 Organise training courses on food composition data generation and compilation at national and regional levels

3. Revise and update ASEANFOODS Website regularly

4. Support ASEANFOODS and INFOODS activities
Recommendation

• To obtain good quality FCDBs and for effectively uses, FCD generators, compilers and users should follow and apply the FAO/INFOODS standards and guidelines at all steps
  In addition, protocol and criteria for evaluation of data quality, developed by USDA, EuroFIR, should be used by FCD generators as a guideline to generate good quality FCDB

• To update information and experience, closed communication and collaboration among data generators, compilers and users should be encouraged

• Join INFOODS discussion List: InFoods-Food-Comp-L@LISTSERV.FAO.ORG
  Problems/Questions/Solutions
Acknowledgements

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  • National Science and Technology Development (1993, 2005)
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Collaborators and contributors: expert laboratories, ASEANFOODS members

Technical advisors: Dr. Barbara Burlingame, Dr. Ruth Charondiere
Dr. William Horwitz, Dr. Pieter Scheelings, David Mugford, Dan Tholen, Paul Armishaw, staff from IAEA and IRMM

Thank you for your attention