

## Food Composition Activities in ASEANFOODS: 2000-2003

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### ABSTRACT

ASEANFOODS is the Association of Southeast Asian Networks of Food Data systems. Its main objective is to organise activities to strengthen the development of national and regional food composition data with high quality, adequate quantity and accessibility to the users. With the support and collaboration from FAO, UNU, INFOODS, OCEANIAFOODS and other international and national organisation i.e., AUSAIDS, JICA, APFAN, ILSI, INMU and NSTDA-Thailand, various activities have been carried out since 1986. In this presentation, activities mainly conducted during 2000-2003 is presented.

*Regarding the food composition data:* the first ASEAN FCTs was developed in 2000; FoodComp-Asia course which was the first international course in Asia, supported by FAO and ILSI was organised in 2002. Participants came from 11 countries, they were 4 from SAARCFOODS, 2 from NEASIAFOODS and 10 from ASEANFOODS.

*The activities to strengthen laboratory performance:* four activities were conducted; 1) food reference materials (RMs) were developed with consensus values of components. Two approaches were conducted; the values developed by interlaboratory studies, and obtained from laboratories with good performance, identified by proficiency studies. 2) Three rounds of laboratory performance studies were organised during 1989 to 1999 and two rounds during 2000 to 2003. The last study round, which included the analytical performance on the analysis of mandatory nutrients for nutrition labelling, showed that saturated fat, cholesterol, dietary fibre, sugars and vitamin A were problematic components. A technical meeting among food analysts will be organised to improve the performance on the analysis of those components. 3) A questionnaire survey was conducted among laboratories in ASEAN on existing analytical quality control system, the use of reference materials, the participation in the proficiency study, problems involved and requirement. The outcome of the survey are used for planning activities to strengthening the members countries in these areas. 4) Documentation of ASEAN Manual for food analysis: the activities were divided into three phrases - a. pre-workshop - the experts in each country were identified and analytical methods used were collected; b. Workshop - the methods of nutrient analyses were harmonised by groups of experts from each ASEAN country; and c. Post-workshop - the selected method(s) are reviewed, edited and final approved by technical team. It is expected that the manual will be available by the year 2004. Future activities of ASEANFOODS included preparing the ASEAN FCTs as an electronic database with food illustration, updating the FCTs in 2010, organisation of the second FoodComp-Asia in 2006, and continued activities on development of RMs and laboratory performance studies.

## INTRODUCTION

The International Network of Food Data System (INFOODS) was established in 1983 by the United Nations University to improve the quantity, quality and accessibility of food composition data. Subsequently, various regional networks have been formed to encourage these activities, and to facilitate collaboration and the interchange of information and knowledge between countries and regions.

The Association of Southeast Asian Networks of Food Data systems (ASEANFOODS) was established in 1986 with member countries comprising of Indonesia, Malaysia, the Philippines, Singapore, Thailand and Brunei Darussalam. Vietnam joined the network in 1996 and in 2001, ASEANFOODS has welcomed three new member countries: Cambodia, Laos, and Myanmar. In order to coordinate the activities of the member countries, the Institute of Nutrition, Mahidol University (INMU) was appointed as the Network's Regional Centre in 1986, and as the INFOODS Regional Database Centre in 1991.

With the financial and technical support, collaboration and encouragement from FAO, UNU, INFOODS, OCEANIAFOODS, APFAN and other international and national organisation i.e., AUSAIDS, JICA, ILSI, INMU and NSTDA–Thailand, various activities have been carried out since 1986. ASEANFOODS activities carried out during the first 9 years was reported at the second International Food Data Conference (IFDC) and it was published in *Food Chemistry*<sup>(1)</sup>. The activities during 1995 to 1999 was presented at the third IFDC, and the paper was published in the *Journal of Food Composition and Analysis (JFCA)*<sup>(2)</sup>. This paper addressed the activities at the regional centre during the year 2000 to 2003.

## FOOD COMPOSITION ACTIVITIES IN ASEANFOODS DURING 2000-2003

The activities on food composition are divided into two categories, one is the activities related to food composition data and the other are the activities to strengthen the performance of laboratories in member countries.

### 1. Activities related to food composition database

#### ***1.1 Development of the first ASEANFOODS food composition tables.***

Among ASEAN countries, there are national food composition tables (FCTs) available in Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam. However, incomplete information surrounding nutrient data and certain common food items is a persisting problem facing users in each country. The availability of an ASEANFOODS food composition database to obtain, retrieve, compare and exchange food composition data among ASEAN countries will help fulfil the data needs of ASEANFOODS member countries and others in the nearby regions where food composition data are lacking or not completely available. In order to establish the ASEAN food composition database, a special technical committee comprised of technical coordinators from Malaysia (Dr Tee E Siong), the Philippines (Dr Aida Aguinaldo) and Thailand (Dr Prapasri Puwastien), and one expert from INFOODS (Dr Barbara Burlingame) was formed. Some guidelines for the ASEAN database development were prepared. The activities for the "*Creation of the first ASEAN Food Composition Database*" was divided into three phrases, the pre-workshop, the workshop and the post workshop.

For the pre-workshop activities, the archival files of the ASEAN food composition database were compiled, and all the format were modified according to the developed guidelines. At the workshop, the database from six countries was harmonised and standardised by reviewing the data, checking the identity, categorising to the right place, identifying the data to be merged, the food code were given. After the workshop, the data were reviewed, making correction, merged,

and the camera-ready FCTs were prepared and published in 2000. The detailed information of the systematic development of the ASEAN FCTs was published in 2002 in Public Health Nutrition<sup>(3)</sup>. This activity was supported by INFOODS, the Japan International Cooperation Agency (JICA) and FAO.

### ***1.2 The First International FoodComp-Asia 2002 course***

Following the recommendation derived from the Third International Food Data Conference (3IFDC), a Regional FoodComp-Asia 2002 course was organised by the Institute of Nutrition, Mahidol University, Thailand for three weeks during 6 to 24 May 2002. This course was organised in collaboration with FAO, ILSI, UNU/INFOODS and VLAG, University of Wageningen, the Netherlands.

#### ***Objectives of the course***

The aim of FoodComp Asia 2002 was to show how those involved in the production of analytical data for nutrients in foods and the compilation of the data contribute to the quality and usefulness of FCD in nutrition. The course was based on the philosophy that the preparation of nutritional databases requires close understanding of the needs of the users by both compilers and producers of analytical data. The course showed how this understanding can be achieved and the benefits that flow from collaboration of users, analysts and compilers.

#### ***Participants***

Fifteen participants from 11 countries: three from SAARCFOODS, two from MASIAFOODS, and 10 from ASEANFOODS attended the course. Majorities of the participants, twelve of them, are food composition data generators. Among all, only one is data user, one is data generator and compiler and one is data generator and user.

#### ***Course structure***

FoodComp 2002 was structured around the Guidelines for the Production and Use of Food Composition Data', compiled by Dr. H. Greenfield and Professor DAT Southgate under the initial auspices of INFOODS and later the FLAIR Eurofoods-Enfant Project. The course was divided into 3 main areas: food composition data generation, compilation and use. Ways in which nutritional databases are used and how these determine the range of nutrients for which values are required and the foods for which values are needed, were covered. The choice and validation of analytical methods to give nutritionally relevant values were discussed. The stages in the production of a nutrient database were presented. The major elements of the course comprised lectures, laboratory practices, group working and presentation. Participants become familiar with computer software for constructing a computerised database and using nutritional data. Participants had a real experience of peer reviewing scientific papers and writing a proposal to be submitted to an international agency.

#### ***Financial Support***

Financial support for the FoodComp Asia 2002 was provided by FAO and International Life Science Institute (ILSI). With this financial support we were able to waive the course fee which included registration, tuition fee, course materials and documents, hotel, lunch and break for all participants. Donor agencies in each country provided support for the airfare and minimal daily expenses for their participants.

The detailed information of the FoodComp Course can be followed in the ASEANFOODS web site at <http://www.inmu.mahidol.ac.th/aseanfoods><sup>(4)</sup>.

### *Recommendation from the FoodComp-Asia 2002*

#### 1) FoodComp course syllabus

Since 1992, the FoodComp course was organised several times in the Netherlands and at different regions in the world. For the most benefit of the participants and the standard quality of the FoodComp course, a meeting of the Course Directors and the main lecturers is strongly recommended. The objectives of the meeting are to exchange and share experience and information gained from each course; to harmonise, standardise and develop a standard FoodComp course syllabus in details. The evaluation of the course by participants should be taken into consideration in modification and improvement of the course.

#### 2) Plan for International FoodComp course

A specific plan for organising the course in different regions should be set up by the International Advisory Board and technical committee of the FoodComp course and the plan should be circulated to the funding agencies for their budgetary planning for the support.

#### 3) Course materials

The main references and materials used in the course should be listed and have them available at the key organisation, i.e., FAO, Rome. H Greenfield and DAT Southgate. Food Composition Data: production, management and use, the new edition, should be provided by FAO to the participants of the FoodComp course.

## **2. Activities to strengthen the analytical performance of laboratories**

Several activities were performed, they are the development of food reference materials with consensus values, the organisation of the laboratory performance studies, the questionnaire survey of quality control system among laboratories and the documentation of ASEAN Manual for food analysis. The summary of each activity are presented as follows.

### **2.1 Development of reference materials (RMs) with consensus values of components**

Two approaches to get the consensus values of components in the candidate reference materials were conducted - by interlaboratory study and by laboratory performance study. Since 1989 to 1998, six food RMs – rice flour, soybean flour, two sets of weaning foods and two sets of fish powder with consensus values of nutrients (main nutrient and minerals) were developed by interlaboratory studies which include expert/outstanding laboratories from different regions. An example of the study in 1993-1994 was presented at the fourth OCEANIAFOODS Conference in 1995 and published in the Proceedings<sup>(5)</sup>. Some issues and problems encountered were also presented and published in the Proceedings of the fifth OCEANIAFOODS Conference, Noumea, New Caledonia, in 1998<sup>(6)</sup>. During 2000 to 2003, milk powder with consensus values of total lipid, protein, some minerals – sodium, calcium, iron - , and some vitamins – vitamin C, B1 and B2 - , ash and moisture were developed from the laboratory performance study, Round 7. The values were obtained from the accepted values reported by participants after statistic evaluation<sup>(7)</sup>.

### **2.2 Laboratory performance study**

The overall objective is to study the status of laboratory performance (or proficiency study) on nutrient analysis.

During 1986 to 1999, three studies were organised using the developed RMs with consensus values of components as the test materials. During 2000 to 2003, two studies were performed. One study was on the analysis of folate. The study included laboratories around the world who have been analysing total folate in foods by different methods. The report of the study will be published in the Journal of Food Composition and Analysis<sup>(8)</sup>. The other study which just finished was on the analysis of mandatory nutrients (17 components) for nutrition labelling. Summary of the study is presented as an example as follows.

### *Laboratory performance study-Round 7*

Twenty-eight laboratories, governmental and non-governmental, in Thailand and ASEAN participated in this study. Three test materials, AS-FRM 5 (weaning food) with consensus values of nutrients and two commercial food products – milk powder and full-fat soybean flour - with unknown concentration of components were used in this study.

Moisture, total protein and vitamin B<sub>2</sub> in milk powder were selected as representative nutrients for checking sample homogeneity and vitamin B<sub>2</sub> as a labile component for checking sample stability. Milk powder was found to be sufficiently homogenised and stable, suitable to be used as a test material in the study. Soybean flour was a commercial product with very fine powder. It was used as test material only for dietary fibre determination, thus its homogeneity was not checked. Samples were then sent to participating laboratories for duplicate analysis of the mandatory nutrients for nutrition labelling using their routine methods. The results with laboratory code number were collected and compiled into Excel spread sheet with information on methods of analysis and quality control system at each laboratory. The statistical evaluation was carried out for within and between laboratory variation using robust z-score. Laboratories with an absolute z-score value, within or between,  $\leq 2$  were satisfactory. Laboratories with absolute z-score of  $2 < [z\text{-score}] < 3$  were considered as questionable results and equal to and greater than 3 were identified as outliers. In this study, some possible causes of the discrepancies results for some nutrients were identified and discussed in the final report<sup>(7)</sup>. Corrective actions and collaborative activities among participating laboratories to improve and strengthen the performance of laboratories with unsatisfied and questionable results were encouraged. It was found that the main discrepancies of submitted results are saturated fat, cholesterol, dietary fibre, sugars, and vitamin A. A technical meeting on the analysis of these problematic components will be organised in December 2003. One of the main outcome of this study was the consensus values of lipid, protein, Na, Ca, Fe, vit C, B1, B2, ash and moisture in milk powder. They were obtained from the participants with accepted results identified after statistic evaluation. Milk powder can be used as a QC sample or as a RM for laboratory performance study in the future.

### **2.3 Questionnaire survey on analytical quality system**

The objective of the survey was to study the existing analytical quality control system among laboratories in ASEAN, the status on the use of reference materials, the participation in the proficiency study, problems involved and requirement. The outcome of the survey will be used by the organiser for planning activities to strengthening the member laboratories in the surveyed areas. The information on users' requirement are very important to the CRMs and RMs producers and the PT providers.

Seventeen laboratories from 6 countries responded to the questionnaire. The purpose for food analysis among these laboratories were services (59%), FCTs development (19%), research (15%), product quality control (3%) and others (6%). As expected, there is a limited use of CRM and RM in all analyses, especially for vitamins which is likely due to the unavailability of the stable RMs. Replicate analysis is the most common QC system (31%), followed by % recovery (20%), participating in PT study (19%) and having in-house QC sample and monitored precision by QC chart (15%).

The three main reasons that limited the use of commercial CRMs are their prohibitive cost, limited range of food matrix and coverage of nutrients. The types of food materials, the nutrients covered, type and size of packaging materials including the needed information were specified by the respondents. The cost of 10 to 100 US\$ for a package of 10 to 50 g RMs, depending on the nutrient covered, is affordable by laboratories.

The most common problems encountered in the participation of the proficiency study are the high registration fee, the limited of covered nutrients and the coverage range of matrix of test materials. The affordable cost per round of 40 to 100 US\$, depending on the covered nutrients,

was proposed by laboratories. At present, many laboratories participated in the PT study which were organised worldwide. The PT providers are distributed in Europe, Australia, America and Asia. However, the fee for one round varied widely, from affordable cost - free to less than 100 US\$ - to 200 to 1100 US\$ which is too costly for laboratories in developing countries. The required test materials, nutrients to be included, and frequency of the proficiency study (PT) per year were given by the respondents. At present, there are one or two organisers (which are normally called PT providers) in each country in ASEAN. Detailed information obtained from the survey can be followed from the ASEANFOODS web site<sup>(4)</sup>.

*Recommendation from the survey study are as follows:*

- Stepwise quality control system should be encouraged among laboratories in each country.
- RMs with consensus values of nutrients should be prepared at national or regional level, following a well-designed harmonised protocol. The difficulties encountered and the requirement of the users must be taken into consideration.
- Laboratory performance study (PT study) should be organised at national level, in order to minimise the difficulties. Special arrangement among member countries can be made (e.g. use the same test materials, following the same protocol, etc.). The outcome can then be compared. The information on the existing status and needs of the participants obtained from this questionnaire survey would be useful for effective planning of the activities.
- Harmonised protocols for developing the RMs and organising the PT study and short training on the protocols are strongly recommended.
- To exchange experience, regular communication among the project coordinators through e-mail, meeting, and related conference are encouraged.

#### **2.4 Documentation of ASEAN methods for food analysis.**

One of the recommendation from the ASEANFOODS members at the second ASEANFOODS workshop in 1989 and from the participants of FoodComp course (which involved participants from three regions: ASEANFOODS, MASIAFOODS, and SAARCFOODS) was the documentation of analytical methods used in ASEAN.

With the limited support provided by UNU, two experts from each country were invited to participate in this activity. The activities were divided into three phrases - the pre-workshop, the workshop and the post-workshop -, as follows.

##### 1) Pre-workshop activities

Analytical methods for nutrient analysis used among member countries were compiled by the invited experts. Before the workshop, each expert was assigned to review the analytical methods (submitted from different countries) of one or 2 nutrients according their first and second area(s) of expertise. They were requested to prepare recommended method(s) for each nutrient to be discussed at the workshop.

##### 2) Workshop activities

At the workshop, small working groups for each nutrient were formed. Each group composed participants from different countries. The submitted analytical methods were reviewed, discussed, harmonised, edited and the selected method(s) were submitted to the organiser for final approval.

##### 3) Post-workshop activity

The documents prepared during the workshop have been reviewed, edited and final approval for the format and content by the technical coordinators from Malaysia (Dr Tee E Siong), Indonesia (Dr Julia Kantasubrata) and Thailand (Dr Prapasri Puwastien). An ASEANFOODS manual for

nutrient analysis will be prepared on a CD, as an electronic version and published as a hard copy. They will then be distributed among the country members and submitted to UNU and FAO for distribution to the needed countries. The manual should be available in 2004.

*Recommendation from the activities on “Documentation of the ASEAN manual for nutrient analysis” are as follows:*

- From each country, 5 experts with different areas of expertise should be invited.
- Activities should be divided into pre-workshop, workshop and post-workshop.
- Provide 3 months for pre-workshop, 7 days for workshop, and at least 6 months for post-workshop, and one month for publishing the manual.
- At the workshop, details of each harmonised methods must be presented for comments and final approval.
- Sufficient support must be available for conducting the above activities

## **FUTURE ACTIVITIES OF ASEANFOODS**

1. Food composition database
  - Electronic food composition database with food illustration will be prepared and have it available as a CD and in the ASEANFOODS web. The ASEANFOODS members agreed to update the ASEANFOODS FCD in 2010. At present, the national FCTs of the member countries are being updated.
  - The second FoodComp-Asia is planned to organised in 2006.
2. Activities to strengthen laboratory quality performance
  - Activities on development of RMs and laboratory performance study will be continued.
  - The ASEAN Methods for nutrient analysis should be available in 2004
3. ASEANFOODS Homepage: <http://www.inmu.mahidol.ac.th/aseanfoods>  
The ASEANFOODS homepage will be updated. More information derived from each activity will be posted in the web.

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