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Food composition programme in Malaysia and its coordination with regional networks

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Introduction

Ten years have lapsed since a systematic food composition programme was initiated in 1980. From its humble beginning of a literature survey of available data on food composition, a systematic analytical programme was soon initiated. Data from the analytical programme enabled the publication of the first update to the Food Table in 1985, which was a considerable improvement over the preliminary table of 1982. The programme continued smoothly, albeit slowly, and covered a wide variety of raw, processed and cooked foods, enabling the publication of yet another update in 1988. At the same time, numerous other countries were also improving and intensifying their national food composition programmes. In order to collaborate these efforts and improve the amount, quality and availability of food composition data, various international and regional networks were initiated. This report describes the development of the food composition programme in Malaysia, and its linkages with various regional networks.

The Malaysian food composition programme

A systematic programme to compile a comprehensive food composition table for use in Malaysia was initiated in 1980. The first phase consisted of a definition of the state-of-the-art of food composition studies in the country, and compilation of a preliminary table for immediate use in 1982 (1). In the second phase, systematic chemical analysis of local foods commenced, and was carried out as a collaborative programme among the Institute for Medical Research (IMR), the Malaysian Agricultural Research and Development Insitute (MARDI), Universiti Pertanian Malaysia (UPM) and Universiti Kebangsaan Malaysia (UKM). To execute the Programme, a Working Group was formed, comprising of scientists from the participating institutions. Financial assistance for the analyses was obtained under the ASEAN Protein Project, which was funded by the ASEAN-Australian Economic Cooperation Programme (AAECP). At the end of the second phase, an update to the preliminary table was published in 1985 (2).

The analysis and compilation programme continued for another four years into its third phase. Continued financial assistance was obtained from the AAECP, under the ASEAN Food Habits Project. The climax of the programme was the publication of Nutrient Composition of Malaysian

Foods 1988 (3). Besides the printed copies, the database was also available in dBase format. In cognizance of the need for continuous interaction between food composition data generators and users, a Workshop for Users of Food Composition Data was organised in late 1988. The primary objective of the Workshop was to understand the needs of data users, and to maximise the distribution and effective use of data. Nutritionists, dietitians, food scientists and educationists provided inputs for improvements to the 1988 Table, as well as recommendations for future work in food composition data generation and compilation (4).

With the publication of the comprehensive edition of the Food Table in 1988, the systematic food composition programme in Malaysia has achieved an important stage of development. Work on the programme continued, and current activities emphasise on providing further input and refinement to the database established. These included analyses of selected nutrients which have not been given sufficient attention, selected groups of foods for which information is lacking, as well as studies on analytical methodologies. Effort was also made to improve the management, storage and retrieval of the large amount of data that has become available.

Two groups of foods which the government was encouraging their consumption, but for which compositioned data were lacking were studied. In the first group, 19 types of local vegetables, used mainly as *ulam-ulam*, were studied. The nutritional value of 20 species of fresh-water fishes (5) were compared with that of 50 species of marine fishes from 31 families (6). In response to the great interest generated on the consumption of snack foods, the nutritional value of these foods was also examined (7). Studies into analytical methodologies placed emphasis on several nutrients, including vitamin C, calcium and iron (8, 9, 10).

Studies on several specific nutrients were carried out. In response to increasing interest in the dietary fibre content of foods, a study of this "neglected nutrient" was initiated. In conjunction with this unavailable carbohydrate, the "available carbohydrate" content of foods was examined, to obtain more accurate data on carbohydrate content, as opposed to results obtained "by difference" (11). The study of cholesterol content of foods was initiated, to meet increasing demand for these data in the control and prevention of cardiovascular disease.

There has been a great deal of interest in the vitamin A and carotenoid contents of foods in recent years, in relation to their importance to vitamin A deficiency as well as to their possible roles in the prevention of cancer (12). Much progress has been made in the development of analytical methods for more accurate determination of these two groups of closely related nutrients (13). A systematic project to develop an improved method for the analysis of retinol and carotenoids was thus initiated (14). The HPLC method developed was found to be suitable for the simultaneous analysis of retinol and carotenoids in a variety of fruits and vegetables (15), as well as foods of animal origin (16). Besides making available an improved methodology, the project has also resulted in making available the carotenoid composition of these foods, to provide more accurate estimations of the vitamin A values of foods.

Further to the above-mentioned completed project on the development of a HPLC method for more accurate analysis of retinol and carotenoids in foods, two other studies were carried out. In the first study, the HPLC method developed was successfully adapted for the simultaneous determination of retinol and carotenoids in

blood sera. For the first time, the carotenoid composition of a sample of "normal" sera of Malaysians has become available. The method would be useful for more accurate determination of these nutrients in human subjects, e.g. in the assessment of vitamin A status. In order to provide more accurate data on the vitamin A value of foods, the biological utilisation of carotenoids in selected plant sources was investigated using experimental rats in the second study.

Coordination with regional networks

The Malaysian food composition programme in Malaysia has been developed in coordination with various international and regional networks. At the commencement of the programme in the early 1980's, the establishment of the International Network of Food Data Systems (INFOODS) in 1983, aimed as an international effort to improve the amount, quantity and availability of food composition data, had provided additional impetus for the programme. It was comforting to know that Malaysia was not alone in its effort. Details of INFOODS will be presented elsewhere in this Symposium. The following year, Malaysia participated in the inauguration of ASIAFOODS (17), one of the several regional networks subsequently established.

In the ASEAN region, Malaysia has collaborated fully with other member countries in a number of activities in food analysis. Two workshops on food analytical techniques were organised, the first was held in Singapore in 1981 (18), followed by another workshop in Indonesia in 1984 (19). Arising from discussions during these two workshops, the ASEAN Food Data Network was established in 1986. Coordinated from Bangkok, various activities have since been organised, including two workshops in 1986 and 1989 (20, 21). Besides discussions on a variety of analytical methods, emphasis was also given to the generation of national food composition databases, quality control and interlaboratory testing, and computerised databases. An interlaboratory trial on nutrient analysis among the various laboratories in ASEAN was carried out in 1988. Activities being planned for the immediate future include the publication of an ASEANFOODS newsletter in late 1991. Plans are also being made for the convening of a consultative meeting in early 1992 for the development of a ASEANFOODS Database.

More recently, the Asia-Pacific Food Analysis Network (APFAN) was established, with the nucleus in Australia. The author has participated in two recent activities of the Network, namely a regional seminar in Penang in October 1990 (22) and a workshop in Brisbane, in July 1991 (23). The seminar focused on the analysis of trace constituents in foods, and covered developments in the analyses of vitamins, minerals, additives, adulterants and mycotoxins in the region. The workshop was held in the Queensland Government Chemical Laboratory, and was aimed at upgrading the analytical capabilities of workers from developing countries. Participants had the opportunity to have `hands-on' practical sessions in the analysis of dietary fibre, carotenoids (and vitamin A), trace minerals, and aflatoxin, as well as some tips in trouble shooting in liquid chromatography and atomic absorption spectrometry. A second regional seminar is being planned for November 1992 in Kuala Lumpur, with some thrust on quality assurance and validation of analytical methods.

These associations with various regional networks have proved useful as they enable sharing and exchange of experiences, and the development of harmonised food composition databases. Malaysia will continue to work towards strengthening these

collaborations, in order to further update and improve its food composition programme, as well as other programmes in the region.

References

1. Tee ES. Nutrient composition of Malaysian foods: a preliminary table. Kuala Lumpur: Institute for Medical Research; 1982.
2. Tee ES. Nutrient Composition of Malaysian Foods - A Preliminary Table (First Update). Kuala Lumpur: ASEAN Protein Project, National Sub-Committee Malaysia; 1985.
3. Tee ES, Mohd Ismail N, Mohd Nasir A and Khatijah I. Nutrient Composition of Malaysian Foods. Kuala Lumpur: ASEAN Sub-Committee on Protein - Food Habits Research and Development; 1988.
4. Khatijah I and Mohamad Nordin AK (editors). Proceedings of the Workshop for Food Composition Data Users. Kuala Lumpur: ASEAN Sub-Committee on Protein - Food Habits Research and Development; 1988.
5. Tee ES, Siti Mizura S, Kuladevan R, Young SI, Khor SC and Chin SK. Nutrient composition of Malaysian freshwater fishes. Proc Nutr Soc Mal 1989; 4: 63-73.
6. Tee ES, Siti Mizura S, Kuladevan R, Young SI and Khor SC. Nutrient composition of Malaysian marine fishes. ASEAN Food Journal 1987; 3: 67-71
7. Tee ES, Siti Mizura S, Anuar A, Kuladevan R, Young SI, Khor SC and Chin SK. Nutrient composition of selected cooked and processed snack foods. Pertanika 1989; 12(1): 15-25.
8. Tee ES, Young SI, Ho SK and Siti Mizura S. Determination of vitamin C in fresh fruits and vegetables using the dye-titration and microfluorometric methods. Pertanika 1988; 11: 39-44.
9. Tee ES, Siti Mizura S and Khor SC. Determination of calcium in foods by the atomic absorption spectrophotometric and titrimetric methods. Pertanika 1989; 12(3): 303-311.
10. Tee ES, Siti Mizura S and Khor SC. Determination of iron in foods by the atomic absorption spectrophotometric and colorimetric methods. Pertanika 1989; 12(3): 313-322.
11. Siti Mizura S. Annual Report 1989. Kuala Lumpur: Institute for Medical Research; 1989.
12. Tee ES. Carotenoids and Retinoids in Human Nutrition. Crit Rev Food Sci Nutr 1992; 31:103-163.
13. Tee ES and Lim CL. The analysis of carotenoids and retinoids: a review. Food Chem 1991; 41: 147-193.
14. Tee ES and Lim CL. Development of a HPLC Method for the Analysis of Carotenoids in Vegetables and Fruits. Proceedings of the Universiti Pertanian Malaysia Seminar on Advances in Food Research III, 19-20 November 1990, Serdang, Selangor Darul Ehsan, Malaysia; 188-216.
15. Tee ES and Lim CL. Carotenoid Composition and Content of Malaysian Vegetables and Fruits by the AOAC and HPLC Methods. Food Chem 1991; 41: 309-339.
16. Tee ES and Lim CL. Re-analysis of Vitamin A Values of Selected Malaysian Foods of Animal Origin by the AOAC and HPLC Methods (in press in Food Chemistry).
17. Tee ES. Status, resources and needs for food composition data: a Malaysian report. Proceedings of the 1st ASIAFOODS Conference, 17-21 September 1984, Bangkok; 65-67.

18. ASEAN Sub-Committee on Protein, Singapore. Proceedings of the ASEAN Workshop on Analytical Techniques. 12-14 February 1981, Singapore.

19. Imamkhasani S (editor). Proceedings of the Second ASEAN Workshop of Food Analytical Techniques. 18-24 March 1984, Surabaya, Indonesia. National Institute for Chemistry, Indonesian Institute of Sciences, Bandung, Indonesia.

20. Roestamsjah, Karossi TA and Tsauri S (editors). Proceedings of the 1st ASEAN Workshop on Food Composition. 22-25 October 1986, Jakarta, Indonesia. National Institute for Chemistry, Indonesian Institute of Sciences, Bandung, Indonesia.

21. ASEAN Interim Project Management Committee on Protein. Proceedings of the ASEAN Workshop on Food Data System. 25-27 October 1989, Bangkok, Thailand.

22. Tee ES. Developments in analysis of vitamins in foods in Malaysia. Paper presented at the Asia-Pacific Regional Seminar on Analysis of Trace Constituents in Foods. 15-17 November 1990, Pulau Pinang, Malaysia.

23. Tee ES. Developing capabilities in food analysis: regional needs and benefits. Paper presented at the Asia-Pacific Food Analysis Network (APFAN) Food Analysis Workshop, 15-19 July 1991, Brisbane, Australia.

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