

Evaluation of the Korean National Food Composition Tables

- Review -

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Abstract

This review was conducted to evaluate the 'Korean Food Composition Table' and establish it as an internationally accepted database by examining its contents and evolution over time. The food composition table has been published by National Rural Living Science Institute, every 5 years, listing the nutrient content for each food, as both the raw agricultural product and processed foods, since the 1st edition in 1979 by RDA (Rural Development Administration). This is the basic data applied to the evaluation of the nutritional value of foods in Korea. The data is used as a useful tool in many fields, not only for the establishment of the National Food Supply Plan but also for nutritional research, the draft of National Food Policy, and in clinical and epidemiological research. The database is also utilized by food service providers and food processors, etc. Consumers and the international society have been interested in the quality and safety of foods and raw agricultural products. As these data expand in volume, the type of foods included in the composition table is expanded to cover new additions for the convenience of users of the 'Nutrient Data Base' as judged by the publishers. The form of these reports varies, according to the current information, from a simple booklet to CD-ROM and to the Web service. We expect to continue to make improvements in the National Standard Table for food composition through expanding both the quantity and quality of data in an orderly manner. This effort can help food composition data to be comprehensively developed systematically and gradually at the national level.

Key words: food composition table, nutrient, evaluation

INTRODUCTION

All the nations in the world establishes recommended dietary allowances in order to promote good health and improve the physical condition of the people in their country. The establishment of the recommended dietary allowance is a necessity for making plans for food production and supply to meet the daily needs of the population (1). Each country publishes food composition data to provide information about the nutrient contents in food and processed foodstuffs (2-5). Konig made the first food composition table in 1878 and two Americans, Atwater and Woods later established a table in 1896. The food composition tables have been making progress in quantity and quality with progress in the development of analytical technology. Every nation in the world uses its own food composition table, which analyzes the commonly used foods in their country (6). As these data expand in volume and new information technologies become available, the form of food composition tables are modified to improve access and convenience for the users; over time tables such as 'Nutrient Data Base' are

published in forms that also reflect the preferences of new publishers. The form of these reports varies, according to the current information, from the simple booklet to CD-ROM and to Web-based data access service.

In Korea, the National Rural Living Science Institute (NRLSI, forerunner of National Rural Resources Development Institute), Rural Development Administration (RDA), was appointed as a contact point for NEASIA-FOODS of INFOODS (The International Network of Food Data System). The institute is expected to support the enhancement of food composition data through its publications. This institute publishes the food composition table, which is a database system updated and published every 5 years. It contains lists of the nutrient contents in each food group, encompassing both raw agricultural products and processed foods. This is the basic data applied to the evaluation of the nutritional value of foods in Korea (6). This food composition table is well-known and its use is widespread, since data in the table are used as the basic data in many fields; not only in the establishment of the National Food Supply Plan but also for nutritional research for developing the National Food

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Policy, as well as in clinical and epidemiological research. The database is also utilized by institutional food providers, for establishing food processing requirements, and other purposes. Since consumers and the international society have an interest in the quality and safety of foods and raw agricultural products, we evaluated the food composition table published by the National Rural Resource Development Institute as a representative and comprehensive source of nutrient information in Korea. It is expected that the development of a National Standard Table for food composition will be pursued in an orderly and comprehensive manner.

CHANGE AND DEVELOPMENT OF THE "NATIONAL FOOD COMPOSITION TABLE"

Statement of publication

RDA published "The Food Composition Table" for the first time in 1970, and over time it has become recognized as the authoritative source of food composition data in Korea (7). Thereafter, a revised edition has been published every 5 years since the 3rd revision in 1981 by the National Rural Nutrition Institute (forerunner of NRLSI) of RDA (8-12). NRLSI published the 6th edition of the food composition table in 2001 (2). The latest published food composition table (6th edition) was composed of volumes I and II. Covering most commonly used food products, volume 1 recorded many kinds of foods that were cultivated in large quantities in many areas of Korea. A comparison was made between the vegetables grown in greenhouses with those grown outdoors, compared wild fish and shellfish to cultivated fish, and the meats by part, by-products and processed products. Food products were also classified by preparation methods into raw, dried, boiled, steamed, and fried foods. The number of reported foods has increased due to various reasons: 1) cultivation of new plants; 2) discovery of other wild plants for eating; 3) development of processed foods and health-promoting products; 4) development of new methods for growing plants; and, 5) changes in the domestic supply due to importation of agricultural products.

The latest Nutrient Data Base is readily available via the Internet and it can be used and applied to dietary intake measurements, evaluation of the food supply and consumer demand, as well as in other various endeavors (13).

Changes in the number of foods and nutrients in the food composition table

The most recent food composition table was compiled after analyzing new food products and including additional nutritional components to reflect the changing food

habits and needs of the public. The quality of the food composition table has been enhanced by including the analysis of amino acids to the 1st revision (8), fatty-acids, cholesterol, vitamin B₆ and B₁₂ to the 2nd revision (9), vitamin E to the 4th revision, vitamin D, dietary fiber, and micro nutrients to the 5th revision (12). The latest published food composition table (6th edition) was composed of volumes I and II. The proximate composition, minerals, and vitamins of 2,337 kinds of food were recorded in volume I while volume II records the special vitamins, amino acids, cholesterol, fatty acids, dietary fiber and micro minerals.

The 1st edition published 1970 recorded the nutrient analysis of 476 kinds of food products and was supported by FAO Korea and the Korean nutrition society as well as the Korean applied nutrition program under the supervision of RDA. Additional support was provided by UNICEF, FAO, and WHO (Fig. 1). This data was quoted in the annals of America and the FAO. There were 14 food group classifications and the recorded food composition data included calories, proximate composition, three minerals (calcium, phosphorus, and iron) and five vitamins (vitamin A, B₁, B₂, C, and niacin), and there also was an indication of a unit of vitamin A as IU.

Five hundred and forty one kinds of foods were recorded in the 1st revision (1977) on the basis of the 1st edition published in 1970, and 65 new kinds of rice, imported konjak, butter, and instant curry were added. Furthermore, amino acid content was added to the composition table, which was not included in the 1st edition (8).

There were 815 food products included in the 2nd revision of the food composition table, 203 of which were fishes and shellfishes (9). The number of recorded foods in the 3rd revision (1986) increased to 1,080 kinds. This revision arranged the groups of food products in alphabetical order. The potassium composition was added and was recorded in the second volume. There were

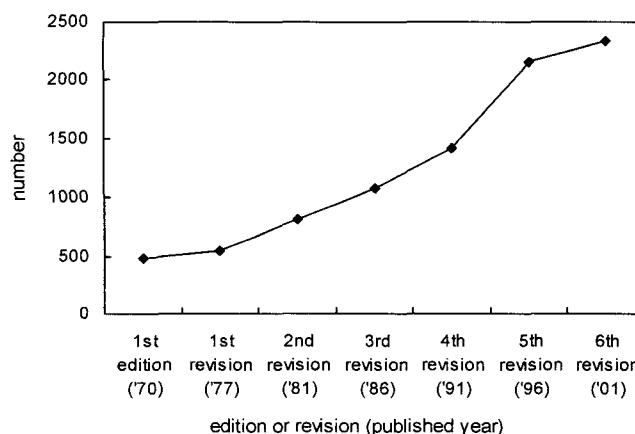


Fig. 1. Changes in the numbers of recorded foods in the National Food Composition Table.

1,426 foods were recorded in the 4th revision (1991). Sodium and potassium were moved to the second volume from the first volume, with calories indicated as energy and placed into the first column, replacing water as the first nutrient. In the fifth revision, published in 1996, there were 2,163 kinds of food recorded with 18 food groups. Processed and cooked foods were added to the 6th revision (12).

Thus, over time both the numbers of foods and nutrients increased in the Food Composition Table, which was reflective of the expanding food choices, the growing number of nutrients included in the dietary allowances, and increased public interest in micronutrients. The improvements assist the Korean population with maintaining healthy lifestyles, including increases in physical activity and healthy diets. The sixth revision of food composition table is especially convenient for people to use, and is the latest edition of the food composition Table.

Change in recorded food numbers by composition data

The number of food products with their proximate analysis and major mineral and vitamin compositions increased from 476 for the 1st edition (1970) to 2,337 for the 6th revision of the National Food Composition Table (2001). In the sixth revision, the data were compiled from the Recommended Dietary Allowances for Koreans (1), the Standard Tables of Food Composition in Japan (3), Composition of Foods (4), and the Foods Composition Table for Use in East Asia (14). The data quoted was described in the form of "Cited Documents (Published Year)" in the data resources. The data in the 6th revision was mostly cited from the fifth revision of the Standard Tables of Food composition in Japan (3) with the newly added foods, and included vitamin K as cited from the fifth revision of Standard Tables of Food composition in Japan (3), and Composition of Foods (4). There was a subdivision of 17 categories and the content of vitamin A was reported as retinol equivalent (RE) parallel with IU where major data in this revision was quoted from the composition tables from the Korea Marine Products (13), the Korea Foods Composition Table (15), Journal of National Institute of Health (16), Report on Nutrition Improvement in Korean Rural Area (17), and the Research Report on the Rural Living Science (18-22).

The sixth revision (2001) has two volumes: volume I and II. In the first volume, 2,337 kinds were recorded under the categories of proximate composition, minerals, vitamins, etc; while volume II included the special vitamins, amino acids, cholesterol, fatty acids, dietary fiber and micro-minerals present in an infinitesimal quantity (2). In the second volume of the 6th revision, 9 kinds of special micronutrients in foods such as dietary fiber,

magnesium, manganese, and copper were newly recorded. The contents of vitamin B₆, B₁₂, folic acid, pantothenic acid, amino acids, fatty acids, cholesterol and dietary fiber were recorded in the second volume. In some foods, vitamin B₆, B₁₂, pantothenic acid, and folic acid were cited from the Composition of Foods (4) and the food composition table for use in east Asia (14). In the same manner, vitamin D was cited from a follow up research report V on vitamin D of the Japanese foods (23) and the vitamin E from the fat soluble nutrients table of Japanese food (24). The number of foods for which vitamin E was reported changed from 165 in the 4th revision (1991) to 721 in the 6th revision of the National Food Composition Table (2001).

The number of foods for which fatty acids and cholesterol were reported increased from 40 and 17 in the 2nd revision to 48 and 296 in the 6th revision, respectively (Fig. 2). These data were replaced and recorded through the "Research on Analysis of Special Foods Composition of Domestic Natural Foods Resources (25)" and the "DB Constructing Business of Foods Composition - analysis of fatty acids (26). The 163 kinds of foods for which amino acids data was reported increased to 577 kinds from the 1st revision (1977) to the 6th revision of the National Food Composition Table (Fig. 3). The amino acid contents of general foods were cited from the "Report on the Analysis Research of Special Food Composition in Domestic Natural Foods Resources" (25) amino acid contents (mg amino-acids/per 100 g edible portion) of fishes and shellfishes were mostly cited from the data of the Composition Table of Korea under the marine products (13), while the other foods were cited from the fourth revision of the Standard Tables of Food Composition in Japan - the revision of amino acids table in Japanese foods (27).

The analyzed dietary fiber data were cited from domestic reports and "the fourth revision of the Standard

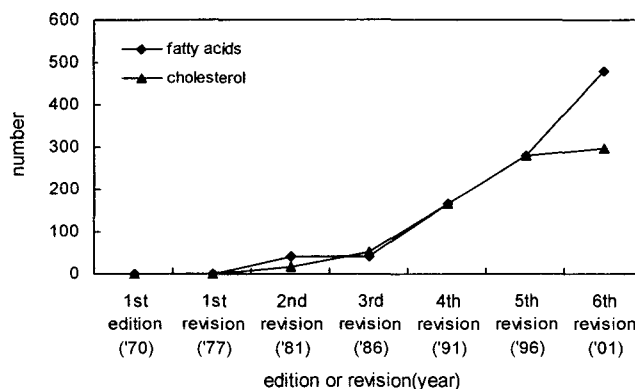


Fig. 2. Changes in the number of foods for which fatty acids and cholesterol data were reported in the National Food Composition Table.

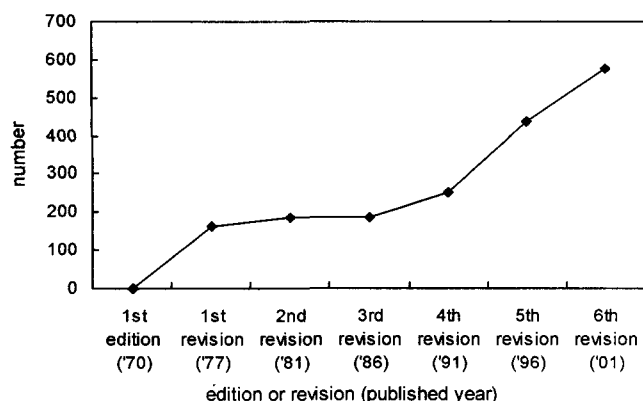


Fig. 3. Changes in the number of foods for which amino acid data were reported in the National Food Composition Table.

Tables of Food Composition in Japan - the vegetable fiber in Japanese foods (28). The micro-nutrient composition of foods was cited from the "Fifth Revision of the Standard Tables of Food Composition in Japan (3)", "Foods Composition Table for Use in East Asia (14)", "The Table of Mineral Contents in Japanese Foods (29), and the "Composition of Foods (4)".

CONCLUSION

We evaluated the national food composition table published by National Rural Resource Development Institute, RDA by reviewing the change and development of this book. In essence, the food composition table is used to evaluate the quality of all foods consumed by Koreans. It is a useful tool for food policy research, it has produced information that is applicable to the food industry development, and it has become the basis for evaluating the quality of foods and agricultural products.

The NRRDI, RDA and the Korea Food and Drug Administration, Institute of National Fisheries and Science have continuously improved the generation of data on food composition in Korea. However, there were concerns that needed to be addressed, due to diversity of foods and distrust in the previously generated data. While the "Foods Composition Table" has improved in quantity and quality, the number of foods included is still restrictive as compared to food composition tables in Japan and America. In addition, the numbers of nutrients reported remain too limited.

Thus, the food composition data still needs to be systematically, but gradually, expanded and at the national level. It is possible for each institute and organization to acquire new technology through collaborative exchange of human and technical resources to further improve the quality of food composition data and the food composition table.

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