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Advances in food composition tables in Japan-Standard Tables Of Food Composition in Japan – 2015 – (Seventh Revised Edition)–

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ABSTRACT

The latest version of the Standard Tables of Food Composition in Japan-2015- comprises the main food composition table (Standard Tables of Food Composition in Japan–2015-[Seventh revised Edition)) and three supplementary books. The supplementary books are Standard Tables of Food Composition in Japan – 2015 – (Seventh Revised Edition) – Amino Acids –, Standard Tables of Food Composition in Japan – 2015 – (Seventh Revised Edition) – Fatty Acids – and Standard Tables of Food Composition in Japan – 2015 – (Seventh Revised Edition) – Available Carbohydrates, Polyols and Organic Acids–.

We believe understanding these food composition tables can give greater insight into Japan's gastronomic culture and changes in eating habits. We expect them to play important roles as part of the East Asia food composition tables.

1. Introduction

Food composition tables and nutrient tables/databases are an important source of information for health studies, food labeling, nutrition education, dietary assessment and agriculture, government policy for health and nutrition (FAO, 2016; Food & the United Nations Rome, 2003; Garrow, James, & Ralph, 2000).

These tables are generally constructed on a country-by-country basis, describing nutritional information relevant to the primary foods in each country.

In recent years, these food composition tables have been released as both a printed publication and an electronic database, thus facilitating access and improving data availability.

The first edition of the food composition tables of Japan (number of components listed: 14, number of foods listed: 538) was released in 1950 (National food and nutrition measures Council (Economic Stabilization Board), 1951). Food composition tables in Japan have been developed according to Japanese style diet. In Japan, a typical meal is made up of staple food, a main dish and side dishes. Staple food is cereals. Main dish contains meat, fish, eggs or soy products. Side dishes contain vegetables, seaweed or mushrooms. The tables are revised regularly to account for technological advancements, such as improvements in measurement methods and changes in circumstances involving food stuffs, such as breeding or changes in cultivation methods (Table 1). "Main Composition Tables 2015" to the food composition table (number of components listed: 52, number of foods listed: 2191) represents the seventh version overall, with the total number of components increased 3.7-fold and foods 4.1-fold compared with the first edition.

The Standard Tables of Food Composition in Japan -2015- released in 2015, includes the main food composition table (Standard Tables of Food Composition in Japan–2015-(Seventh revised Edition) (hereinafter referred to as "Main Composition Tables 2015") (MEXT, 2015b), and three supplementary books. Supplementary books are Standard Tables of Food Composition in Japan – 2015 – (Seventh Revised Edition) – Amino Acids – (hereinafter referred to as "Amino Acids Composition Tables 2015") (MEXT, 2015c), Standard Tables of Food Composition in Japan – 2015 – (Seventh Revised Edition) – Fatty Acids – (hereinafter referred to as "Fatty Acids Composition Tables 2015") (MEXT, 2015d) and Standard Tables of Food Composition in Japan – 2015 – (Seventh Revised Edition) – Available Carbohydrates, Polyols and Organic Acids – (hereinafter referred to as "Carbohydrates Composition Tables 2015") (MEXT, 2015e). These four books are the latest of Japan's food composition tables (hereinafter referred to as "All Composition Tables 2015").

While these tables largely comprise digital data for nutrition calculations, understanding these food composition tables can give greater insight into Japan's gastronomic culture and changes in eating habits. In addition, they are expected to play an important

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Table 1
History of main composition tables.

Name	Year	No of foods	No. of nutrients
Standard Tables of Food Composition in Japan	1950	538	14
Standard Tables of Food Composition in Japan Revised Edition	1954	695	15
Standard Tables of Food Composition in Japan Thied Revised Edition	1963	878	19
Standard Tables of Food Composition in Japan Fourth Revised Edition	1982	1621	19
Standard Tables of Food Composition in Japan Fifth Edition	2000	1882	36
Standard Tables of Food Composition in Japan Fifth Revised and Enlarged Edition	2005	1878	43
Standard Tables of Food Composition in Japan - 2010 -	2010	1878	50
Standard Tables of Food Composition in Japan - 2015 - (Seventh Revised edition)	2015	2191	52

role as one of the main tables of the East Asia food composition tables.

The purpose of this paper is to discuss the development methods, features and challenges of "All Composition Tables 2015".

2. Methods of "All Composition Tables 2015

2.1. Development period

Development period of "All Composition Tables 2015" is the December 2010 – December 2015.

2.2. Organization

The food composition table in Japan is developed by the Expert Committee on Food Components, which belongs to a Japanese government organization (The Council for Science and Technology, MEXT: Ministry of Education, Culture, Sports, Science and Technology). The committee consists of 19 experts in epidemiology, nutritional science, food science, food analysis. The Office for Resources is the secretariat. The secretariat outsources the food component analysis to private laboratories. Over the past 10 years, the analyses have virtually been carried out by the largest third-party analytical body (Japan Food Research Laboratories, JFRL). In JFRL most of the analytical items for the food composition table such as protein, fat, carbohydrates, vitamins, mineral nutrients, fatty acids, amino acids are accredited as ISO/IEC17025.

2.3. Established procedure

The above committee examined the selection and the analysis methods of the food list. Listed foods from The Standard Tables of Food Composition in Japan -2010- (hereinafter referred to as "Composition Tables 2010") (MEXT (The Council for Science & Technology, Ministry 7) of Education, Culture, Sports, & Science & Technology), 2010) was used as the foundation for the latest food list, The committee examined foods that became common recently as well as questionable ingredients listed in "Composition Tables 2010".

Committee members are responsible for one or two food groups and cooking methods. Once the food list is determined, each committee member according to their area of responsibility creates a purchase order with specifications for samples based on the food list. In addition there are specific cooking instructions for each food on the list. ISO/IEC17025 accredited private laboratories analyze the samples according to the committee's specifications and report the results. The laboratories record sample history details such as preparation history as well as discard rates and cooking details if necessary.

The committee studies the latest reports from the laboratories with all the previous data from The Standard Tables of Food Composition in Japan Fourth revised edition -1982- (Science & Japan, 1982) and determines the listed value per 100 g edible portion of all food and all components in "All Composition Tables 2015".

Component values and energy of confectioneries are calculated from the recipe. In "Amino Acids Composition Tables 2015" and "Fatty Acids Composition Tables 2015", component values of some of the cooked foods listed are estimated from their raw ingredients. We estimated values of 171 foods in "Amino Acids Composition Tables 2015" (FSANZ: NUTTAB, 2010; USDA: Composition of Foods, Processed, & National Nutrient Database for Standard Reference, 2014) and 168 foods in "Carbohydrates Composition Tables 2015" (FSANZ, 2010; Public Health England, 2015; USDA, 2014) from values borrowed from overseas composition tables. The sources are indicated in brackets.

In addition, the committee calculated the residual ratio of the components after foods were cooked and created residual ratio table by food groups and by cooking methods.

The committee utilized the data provided from Japan Water Works Association. The data included Japan's tap water's mineral content by region and water source (the average value of the year).

Moreover, the committee collected recipes and samples of common Japanese side dishes from food service providers nationwide to examine component value and nutrition as well as water content. Additionally the committee member responsible wrote explanations of component values of the food groups and each food for easier understanding.

2.4. Analysis

Analytical methods for these components including their validation process are discussed and determined by the committee.

Most analytical items in the foods have been analyzed basically according to the latest version of "the Analysis Manual for the All Composition Tables 2015" which were revised and then published as a book and on MEXT's website (http://www.mext.go.jp/a_menu/syokuhinseibun/1368931.htm) (MEXT, 2015a). To conserve the budget and analytical time, several foods collected from different production areas were combined to make a composite sample prior to analysis. For the method validation, the precision and trueness were evaluated by repetition tests and recovery tests using an appropriate standard or certified reference material, respectively. Satisfactory Z-scores in proficiency tests were to be confirmed for most of the analytical items.

2.5. Energy and the energy conversion factor

Energy of food is calculated by multiplying the amount (g) of proteins, lipids, and carbohydrates per 100 g of edible portion by the energy conversion factor of each energy-yielding component. Energy is calculated in 7 ways. i) The main foods for Japanese are based on the study of the Japanese diets (Resources Council & Technology Agency., 1979; Resources Council, 1980a; Resources Council & Technology Agency, 1981, 1982). The following are the main foods for Japanese people: cereals, animal products, fats and oils, soybeans and soybean products. The results of the study on the energy usage of the Japanese are based on past research. ii) In regard to the foods other than the aforementioned, in principle, the energy conversion factors are based on those used in the report by FAO-WHO Joint Ad Hoc Expert Committee (FAO/WHO, 1973). iii) If energy conversion factors are unclear, the Atwater factor has been applied (Atwater, 1910). iv) When the prepared foods are made from more than one raw material, the Atwater factor is