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Current Composition Table of Foods in Japan and Future Trends

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ABSTRACT

In Current Standard Tables of Food Composition in Japan (Fifth Revised Edition), standard composition values of food used regularly in Japan are shown by values per 100g of their edible portion, with one value of standard composition per one foodstuff as a rule. In the Explanation (Chapter 1) and Reference Data (Chapter 4) of the original table, the most important matters are mentioned, including the table of the weight change rate by cooking, the table of the outline of the cookery, and the formula of the actual amount of intake nutrition. These are helpful for an understanding of the actual amount of intake nutrition. The formula for the amount of purchase in consideration of the amount of refuse is also shown. Information concerning foodstuffs and composition items in the table as well as important points in the reference column are concurrently written in English. As related studies, the composition tables by values per 100ml or considered loss, the table or the formula for estimation of the amount of sucrose, and the list of the composition extant rate after cooking, among others, are also provided. Users should understand the original composition table, and then suggest how to utilize it. (*J Community Nutrition* 5(2) : 65~71, 2003)

KEY WORDS : current composition table of Japan · actual amount of intake nutrition · related research of composition table · outline of cookery · consideration of cooking loss.

Introduction

The Japanese Table of Food Composition offers the values of food used regularly in Japan. It is suitable for application to the diet of the country in which the user lives and whose typical diet he/she follows. If considered on a global scale, the table lists many similarities between those foods used regularly in South Korea, or China, which are adjacent to Japan, or even in Asia as a whole.

The current composition table-now utilized widely-was Issued as a standard table of food composition in Japan, fifth revised edition (The 5th Table) (Resources Council, Science and Technology Agency, Japan 2000) by Science and Technology Agency (restructured as the Ministry of Education, Culture, Sports, Science and Technology), Japan, in November 2000. The first edition was published in 1950, and the fifth revision has now been published. The number of foodstuffs and composition items of all the editions until The 5th Table are shown in Table 1. The outline and points of attention for the use of The 5th Table are indicated. Furthermore, related studies are introduced to utilize the table effectively.

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Standard Tables of Food Composition in Japan, Fifth Revised Edition

1. Standard composition values

In general, values of foodstuff composition have a wide range of variety in general due to their species, production environments, and processing methods. For example, there are differences between the lean and fat of cattle or swine, or between the blanched part and green of Welsh onions or Chinese cabbage (Resources Council, Science and Technology Agency, Japan 1995, 2000 ; Watanabe et al. 2002). Since the standard composition values of The 5th Table are decided from the viewpoint of national averages when taken ordinarily throughout the year, they are shown by values per 100g of edible part with one value of standard composition per one foodstuff as a rule.

2. Construction

The original copies of The 5th Table are sold by Printing Bureau of Ministry of Finance (renewed to National Printing Bureau). The composition is shown in Table 2. On the other hand, the composition tables generally being used widely were taken mainly from Chapters 2 and 3 of the original table and edited by various publishing companies. These tables had some points added by each publishing company, and have become readily useful for reference. However, the Explanation (Chapter 1) and Reference Data (Chapter 4), which are the most important, are rarely adapted for general use.

3. Outline and characteristics

1) Name of food

The foodstuffs are described with the scientific name or customary name, and the process foods with their general name or public name in the food standard. Other names or marketing brand names are shown in the reference column of the table and in the Reference Data (Chapter 4).

2) Arrangement of the food groups

Arrangement order of food groups is plant, animal, and processed food group (Table 1).

Table 1. Food numbers and Ingredients items in Standard Tables of Food Composition in Japan by the food group

		The first edition	A revised edition	Third revised edition	Fourth revised edition	Fifth revised edition	
						(Tables)	(Remarks)
The year of issue		1950	1954	1963	1982	2000	
Food number	1. Cereals	55	60	74	134	143	5
	2. Potatoes and Starches	8	10	17	34	40	0
	3. Sugars and Sweeteners	21	13	17	25	23	1
	4. Pulses	22	27	37	61	73	5
	5. Nuts and Seeds	12	15	23	35	37	0
	6. Vegetables	118	122	128	255	326	8
	7. Fruits	48	59	76	133	156	8
	8. Mushrooms	9	11	13	31	36	0
	9. Algae	20	24	26	44	47	0
	10. Fish and Shellfish	73	159	205	333	388	0
	11. Meats	43	57	65	207	244	0
	12. Eggs	10	12	7	20	20	0
	13. Milks	11	21	32	50	52	0
	14. Fats and Oils	12	5	6	7	22	3
	15. Confectioneries	56	60	85	114	120	3
	16. Beverages	22	35	50	65	55	0
	17. Seasonings and Spices	–	5	17	55	84	2
	18. Prepared foods	–	–	–	18	16	6
	The total	540	695	878	1621	1882	41
Ingredients item		14	15	19	19	36	

Table 2. Composition of Standard Tables of Food Composition in Japan Fifth Revised Edition

Chapter 1	Explanation	About the arrangement of the food group, the item Number, the measurement, the indication, the cooking condition, the weight changes by cooking, etc.
Chapter 2	Standard Tables of Food Composition in Japan Fifth Revised Edition (Table)	Element value except for the manganese is shown. The sentence of the reference column is written in English in the margin
Chapter 3	Standard Tables of Food Composition in Japan Fifth Revised Edition (Attached Table)	Table of Manganese
Chapter 4	Reference Data	Tables of notice points by the food group, the scientific name of the food and ingredients items, the outline of the cookery, etc.
Appendix		The member of the Resources Council and concernec, etc.
Index		By the food group, the part of meat, the cookery

Table 3. Cooked Foods in Standard Tables of Food Composition in Japan Fifth Revised Edition

Food group	Food number	Account
1. Cereals	17	Boiled 12, Cooked rice 5
2. Potatoes and Starches	9	Boiled 6, Steamed 2, Fried 1
4. Pulses	8	Boiled 8
5. Nuts and Seeds	2	Boiled 2
6. Vegetables	112	Boiled 84, Salted pickles 13, Nukamiso-zuke 6, Sauted 6, Leached in water 2, fried 1
8. Mushrooms	11	Boiled 11
9. Algae	11	Desalted 6, Soaked in water 4, Boiled 1
10. Fishes and Shellfishes	62	Baked 37, Boiled 24, Steamed 1
11. Meats	14	Boiled 7, Baked 7
12. Eggs	5	Boiled 2, Baked 2, Poached 1

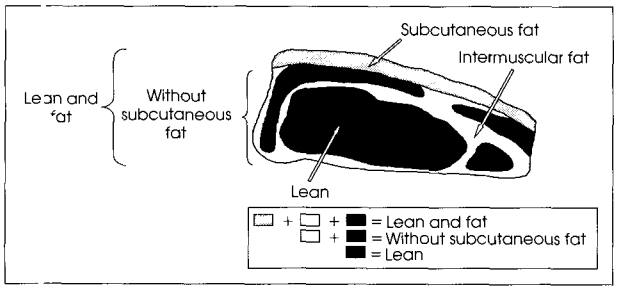

Fig. 1. Subdivision of Cattle and Swine.

3) Item number

Item numbers are indicated with five digits, the first two digits indicating food group (01 − 18 group), and the following three digits indicating the order within the group.

4) Number of items

1923 Foodstuffs and composition items are carried, including the items in the reference column of the table (Table 1). For the items in the reference column, the composition values of the table are used except for the composition item in the reference column. The number of items is increasing, because of 1) various seasons, 2) domestic productions or imports, 3) raw or freezing, 4) natural or cultured fish, 5) various cookery (Table 3), 6) subdivision . For example, the meats of cattle or the swine are subdivided to "lean with fat", "Without subcutaneous fat", "lean", and "fat" (Fig. 1). "Lean with fat"is the general type for sale. "Fat"is subcutaneous fat and intramuscular fat. The composition values of lean meat are rarely used for nutritive value calculation. But the range of the values of lean is small, so that it is meaningful from the viewpoint of dietary study.

5) Composition items

The table head of the 5th edition is shown in Fig. 2, including items and indication units. All the composition items are added with Manganese to Fig. 2. The table of Manganese is also considered and established as the main table, so that the table of Manganese can be utilized in the same manner. The methods of analysis are shown in the commentary of the analytical manual of Standard Tables (Resources Council, Science and Technology Agency, Japan 2000 ; Japan Food Research Laboratories 2001).

(1) Energy

Energy conversion coefficient varies in food. In Chapter 1, the energy conversion coefficients of each food are shown. For mushrooms, Algae, Jerusalem-artichoke, Konjac, Kobucha, the energy conversion coefficients of Atwater are applied, because of the large difference of energy use rate among individual items. The values calculated with Atwater coefficients are halved as to be a temporary energy value.

(2) Carbohydrates

Basically the values of carbohydrate are determined by deduction. It is the value of the total amount (g) of water, protein, fat and ash as deducted from 100g. Dietary fibers are contained in the carbohydrate.

(3) Vitamin A

Vitamin A is divided to Carotene, Retinol, Retinol equivalents (Fig. 2). α-Carotene, β-carotene and cryptoxanthin are measured, and then carotene is indicated as β-Carotene equivalents (Formula (1)).

$$\beta\text{-Carotene equivalents}(\mu g) = \beta\text{-carotene}(\mu g) + 1/2\ \alpha\text{-Carotene}(\mu g) + 1/2\ \text{cryptoxanthin}(\mu g) \quad \text{----------} (1)$$

(4) Vitamin E

Though vitamin E is described as Vitamin E in the table

head (Fig. 2), it means α-tocopherol equivalents which is derived from the amount of α-, β-, γ-, δ-tocopherol.

(5) Composition in the reference column

In the reference column amount of NO_3, alcohol, acetic acid, caffeine, tannin, theobromine and others are shown.

4. Contrivances for determining the actual amount of intake nutrition

Mostly people eat cooked foodstuffs. In The 5th Table there are some contrivances for determining the actual amount of intake nutrition.

1) Weight change rate by cooking

In the cooking process, foodstuffs absorb water or oil, and lose a part of their composition. There are also changes in weight and composition between before and after cooking. Though the range of change varies depending on the foodstuff and cookery, the weight change rates of all foodstuffs per 100g raw by cooking are shown in The 5th Table. Table 4 is a part of this.

2) Outline of cookery

In The 5th Table, the cookery of cooked foodstuffs is shown. Table 5 is a part of them. Though the standardization of cookery is difficult, this table is one guideline in Japan.

3) Actual amount of intake nutrition

To utilize the composition values of cooked foodstuffs for

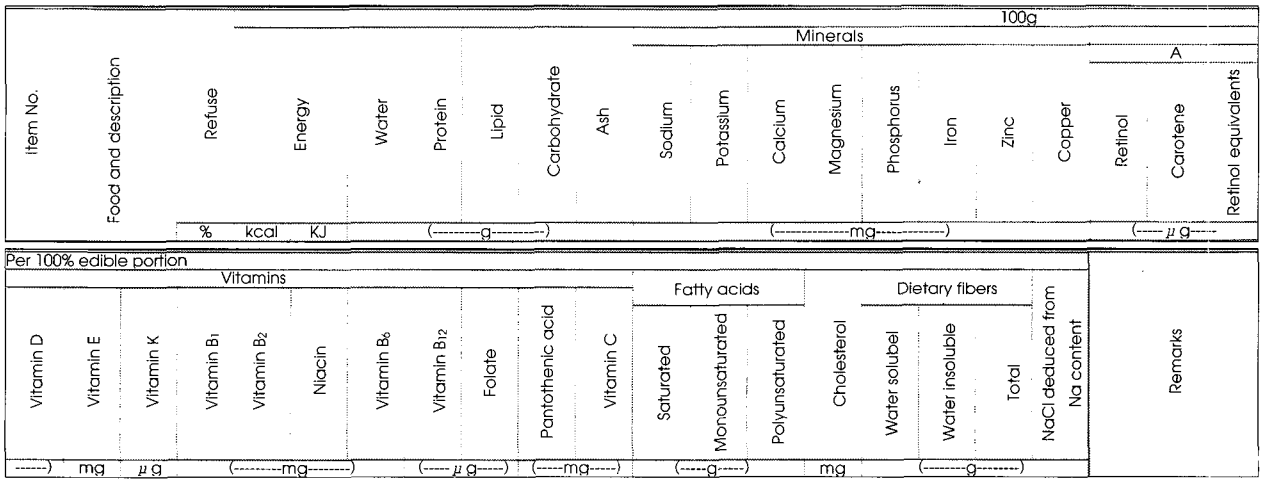

Fig. 2. Table Head of Standard Tables of Food Composition in Japan Fifth Revised Edition (Number of the food composition and the indication).

Table 4. The weight change rate (extract from table 12 in Standard Tables of Food Composition in Japan Fifth Revised Edition)

Item No.	Food and description	The weight change rate (%)
	1 Cereals	
	Barley	
	Noodles	
01009	Dry form, boiled	260
	Wheat	
	[Japanese noodles]	
	Udon	
01039	Wet form, boiled	180
	Hoshi-udon	
01042	Dry form, boiled	240
	Somen and Hiyamugi	
01044	Dry form, boiled	270
	Tenobe-somen and Tenobe-Hiyamugi	
01046	Dry form, boiled	290
02020	Fried potato	52
	(Yams)	
	Chinese yam	
	Nagaimo	
02024	Tuberous root, boiled	81
	<Starches and starch products>	
	(Starch products)	250
	Kudzu starch noodles	
	Boiled	
04002	**4 Pulses**	230
	Adzuki beans	
	Whole, dried, boiled	
	Kidney beans	
04008	Whole, dried, boiled	230
06021	Sayaendo	98
	Immature pods, boiled	
	Green peas	
06024	Boiled	88
	Osaka-shirona	
06028	Leaves, boiled	81
06029	Salted pickles	59
	Saltwort	
06031	Stems and leaves, boiled	93
	Okra	
06033	Pods, boiled	97
	Turnip	
06035	Leaves, boiled	93
06037	Root, with skin, boiled	87
06039	Root, without skin, boiled	89

calculation, Formula (2) is shown. By this formula it is possible to calculate while considering that composition changes and the values from this formula are similar to the actual amount.

Composition Values per total weight of cooked food = Composition values of cooked food × Weight (g) except refuse before cooking/100g × Weight change rate (%)/100-------- (2)

4) Cooked food

Cooked food from one foodstuff with some seasonings is grouped by the foodstuff in the composition table. For example, Budo-mame (soy beans cooked sugar and salt) in the Pulses group, or Tamagoyaki (Japanese type omelet) in the eggs group. Furthermore, cooked food from some foodstuffs and seasonings like curry or croquettes are grouped as Prepared foods, which are produced industrially. Among the cooked foods which have the same name, there are some differences on foodstuff, combination rate, cooking process and so on. Normally it is cooked food which is consumed, so that it is important in the future to include them in the composition table, in particular to standardize values for cooked food.

5) Refuse and cookery

Refuse is indicated as weigh % of refuse part shown in the remarks column of the table. The formula (3) to indicate purchased amount of food is shown below.

Total weight (g) including refuse part = Weight (g) except refuse before cooking × 100/(100 − refuse (%)) ----- (3)

5. Details of foodstuffs in tables

1) Notes by food group

Notes are shown by food group with their references. This makes it possible to obtain valuable notes which could not be shown in the remarks column.

2) Scientific name of the foodstuffs

Scientific names of the foodstuffs are useful for explaining to persons whose native language is neither Japanese nor English.

3) Index

The 5th Table was indexed by food group, part of meat, cookery, which are easy for reference.

4) English version

Information regarding foodstuffs and composition items in the table, and important matters in the reference column are concurrently presented in English.

6. System for queries and maintenance

Office of Resources, Policy Division, Science and Technology Policy Bureau, the Ministry of Education, Culture, Sports, Science and Technology (phone : 03-5253-4111, Ext. 7031) answers the question of The 5th Table. Corrected information for The 5th Table has been introduced to the public (URL : http://food.tokyo.jst.go.jp). An element table as a data base is being carried tentatively on the homepage of the Japan Sci-

Table 5. Cookery details

Item No.	Food and description	Cookery	Refuse part in preparations	Cooking form	Add water volume, Oil and Salt volume	Refuse part after cooking	Cooking process
06002	6 Vegetables Artichoke Flower bud, boiled	Boiled	–	Whole	2.5 times	Base and a part of involucre	Boil→Drain off the hot water
06004	Asatsuki Leaves, boiled	Boiled	–	Whole	5 times	–	Boil→Drain off the hot water
06006	Ashitaba Stems and leaves, boiled	Boiled	Base	Whole	3 times	–	Prepare→Boil→Drain off the hot water→ Leached in water→ Drain off the water→ Squeeze the water
06008	Asparagus Shoots, boiled	Boiled	Base	Half	5 times	–	Prepare→Boil→Drain off the hot water
06011	Kidney beans Sayaingen Immature pods, boiled	Boiled	Strings and ends	Whole	5 times	–	Prepare→Boil→Drain off the hot water

ence and Technology Corporation.

Related Research and Topics

Users should be able to understand the contents of The 5th Table, and so devise effective ways for utilizing it. For example, it is arranged according to the name by which a food name is often understood in the area and a group. On the other hand, research of the commentary of A and its use is reported for the users (Watanabe 2001, 2002 ; Watanabe et al. 2001 ; Watanabe et al. 2002 ; Watanabe et al. 2003)

1. Related research

1) Liquid food

Milk and alcoholic drinks are taken in the following capacity. Tables of Food Composition in Liquid Food Per 100ml is reported (Watanabe et al. 2001).

2) Nutrition contents considering of the cooking loss

Table for Calculation of Nutrition Contents Considering Changes in Weight Induced by Cooking is reported (Watanabe et al. 2002) .These are the Nutrition Contents of the weight after 100g of the food has been cooked. When this table is used, the (1) equation becomes easy (Formula (4)).

Composition Values per total weight of cooked food = Composition values of This Table (Watanabe et al. 2002) × Weight (g) except refuse before cooking/100g ------ (4)

3) Saccharine Contents

Saccharine Contents of the Confectioneries and their estimates are reported (Watanabe et al. 2001, 2002) .

4) Cooking extant rate

The list of the composition extant rate after cooking in The 5th Table is reported (Watanabe et al. 2003).

2. Remaining topics

The 5th Table is the compilation of the composition table of Japan at present. However, there are no values presented according to Vitamin E (Tocopherols) and the amino acid. Thus, Standard Tables of Food Composition in Japan Amino Acid Composition of Foods Revised Edition (1986) (Resources Council, Science and Technology Agency, Japan 1986) and Standard Tables of Food Composition in Japan (1989) (Resources Council, Science and Technology Agency, Japan 1989) are used. A calculation for The 5th Table is necessary for these two Composition tables. Also, there are fewer foods in the two Composition tables than in The 5th Table. A revision of the two Composition tables is therefore desired.

Conclusion

This has been a short introduction about the outline of "current composition table of Japanese foods", its characteristics and related research. It is hoped that this has been useful for an understanding of the "composition table of Japanese foods" and more useful for the public dietetics development in South Korea. Readers are encouraged to see the original "Standard Tables of Food Composition in Japan, Fifth Revised Edition". There is also a need for the completion of The 5th Table as a data base and for its own homepage.

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