

## Chapter 3 References (Notes on Foods)

See “Chapter 3 1 Notes on Foods” in Food Composition Tables 2015 for detailed descriptions of each food. The following describes notes related to fatty acids.

On compiling the current Composition Tables, the data of newly analyzed foods and the data in the 4th Follow-up Composition Tables and the 5th Enlarged Fatty Acids Composition Tables are used. Additionally, from the viewpoint of increasing the number of foods as much as possible and ensuring the users’ convenience, contents are estimated by the methods mentioned below for some foods.

[1] For foods when analytical the values of “Raw” forms are available, the contents of different forms including “Boiled” and “Baked” are imputed based on the analytical values.

[2] For foods when whose values cannot be estimated by [1] and there are similar foods in foreign food composition tables, their component data were borrowed.

[3] For processed foods with a known proportion of raw ingredients and fatty acid contents of raw ingredients, the contents were calculated using such data.

Because the estimated values by the method in [1], [2] or [3] do not consider possible changes of the composition by cooking nor differences between the foods available in Japan and other countries, they are shown in parenthesis ( ) and are also mentioned in the Remarks. [See Chapter 1 2 1) (2) “Outline of listed foods” of the current Composition Tables for the method of calculating the estimated values.]

For foods whose component values were estimated using the [1] and [2] methods and referring to other foods, the referenced foods are shown in the Remarks or in Table 7 at the end of this chapter.

For foods whose component values were calculated using the [3] method based on the proportion of raw ingredients, the proportions shown in Chapter 3 of Standard Tables of Food Composition in Japan - 2015 - (Seventh Revised Edition) were used for the calculation.

### 1 Cereals

For processed foods using fat/oil such as bread, instant Chinese noodles, dried by frying, popcorn, the compositions of fatty acids differ considerably according to the fat/oil used. For this reason, information on ingredient labeling, and other sources should be referred to for processed foods on the market.

In the Food Composition Tables 2015, “wheat, whole grains” were grouped into “01012 Common wheat”, “01013 Imported, soft, raw”, and “01014 Imported, hard, raw”, while flour (first grade) was grouped into “01015 Weak flour”, “01018 Medium-strength flour”, and “01020 Strong flour”. On the other hand, because the result of fatty acid analyses of the respective foods showed that there was little difference in the compositions between each grain and flour, it was decided that these foods have the same fatty acid composition.

Because the fatty acid composition of “rice” is known to change by the difference in atmospheric temperature during grain filling, for “01080 Brown rice” and “01083 Non-glutinous, well-milled”, early ripening, mid-season ripening, and late ripening cultivars were analyzed as samples, and the component

values were determined using the averaged values of them.

## 2 Potatoes and starches

The component values of foods cooked using fat/oil differ significantly according to the type of fat/oil used. For "02047 Sweet potato tempura", component values were determined based on the analytical values of foods cooked using "14008 Rapeseed oil". The component values of "02020 Potatoes, fried potato" were estimated based on the component values of "02021 Potatoes, dehydrated mashed potato" and "14008 Rapeseed oil".

## 4 Pulses

The fatty acid composition of pulses vary considerably by the difference in the atmospheric temperature during ripening. The component values of foods processed/cooked using fat/oil differ considerably according to the type of fat/oil used. The component values of "Aburaage (fried thin slices of pressed tofu) (04040, 04084

04086)" were determined based on the analytical values of products on the market. Those of "04039 Namaage (fried slices of drained tofu)" and "04041 Ganmodoki (fried mixture of crushed tofu, vegetables and ground yam)" were calculated from the component values of "04040 Aburaage" and "04042 Koridofu (freeze dried tofu), uncooked".

## 5 Nuts and seeds

Because fatty acid composition of peanuts differed between Virginia type and Spanish type, peanuts "raw" and "roasted" were grouped into "Virginia" and "Spanish" types. Some cultivars bred by crossbreeding between the two types have large grain as Virginia type but have the fatty acid composition of Spanish types.

## 6 Vegetables and 8 Mushrooms

The fatty acid compositions of foods cooked using fat/oil differ according to the fat/oil used. The values of vegetables cooked in the "tempura" and "deep-fried" styles were determined based on the analytical values of foods cooked using "14008 Rapeseed oil", except the component value of "06194 Eggplant, western type, deep-fried", which was calculated based on the component values of "06193 Eggplant, western type, raw" and "14008 Rapeseed oil"). The fatty acid contents of vegetables and mushrooms cooked by "stir-frying" were calculated based on the component values of raw vegetables and mushrooms and "14008 Rapeseed oil". The contents of fatty acids of "08051 Mushrooms, Maitake, stir-fried" was determined based on the analytical values of foods cooked using "14008 Rapeseed oil".

## 9 Algae

Of "Algae, purple laver", "09005 Algae, purple laver, dried, seasoned and toasted" is seaweed that has been applied with liquid seasoning made up mainly of sugar and other ingredients, and dried by heating. Compared to "09003 Algae, purple laver, dried", the analytical value of fat has not increased, suggested that oil is not used in the liquid seasoning. For this reason, the fatty acid composition of "09005 Algae,

purple laver, dried, seasoned and toasted” was imputed based on that of “09003 Algae, purple laver, dried”. In the case of Korean seaweed product, because seasonings include oil, its component value differs from that of “09005 Algae, purple laver, dried, seasoned and toasted” of the current Composition Tables.

The component values of “09023 Algae, kombu, “Tsukudani (simmered in soy sauce and sugar)” were determined based on the analytical values of products on the market made by simmering with liquid seasoning consisting mainly of soy sauce and with sesame seeds. Due probably to the fatty acids from the sesame seeds, its component value differed from those of “Kizamikombu (dried and cut into thin strips)” and “Kezurikombu (dried and thinly shaved)”. For this reason, information on ingredient labeling, and other sources should be referred to for Kombu Tsukudani on the market.

#### 10 Fish, mollusks, and crustaceans

Even in the same species, the fat content and composition of fish, mollusks, and crustaceans differ considerably according to the fished areas, seasons, fish size and physiological conditions. For this reason, a broad variety of samples were analyzed. The distribution style of fish, mollusks, and crustaceans is diverse, but fresh samples were purchased mainly from fish markets. Samples of processed foods were purchased from organizations such as producers or manufacturer groups or from areas where they are consumed. Those whose production sites and brands and other information were obscure at the time of purchase were not used.

The cooking methods of fresh fish and processed foods are the same as the Food Composition Tables 2015 (see Chapter 3 of Food Composition Tables 2015). The changes in fatty acid composition due to the cooking were small except for foods prepared using oil, while changes in fatty acid content due to cooking were based mainly on the changes in water and fat content. Those foods cooked using oil increased with the adherence or absorption of the oil used.

The component values of the fatty acid of “canned flaked light meat in oil” of (10097, 10263, 10264) skipjack tuna and frigate mackerel which are processed foods on the market are affected by the type of added oil, and in the case of “0093 Fish, skipjack tuna and frigate mackerel, processed products, “Kezuribushi” (shaved “Katsuobushi”), simmered in soy sauce and sugar”, etc., the fat of added sesame, etc. affects the component values of the products, and differ widely from the component values of the fish, mollusks, and crustacean ingredients. For these processed foods, information on ingredient descriptions and other sources should be referred to.

For “baked” small fish, the fish is baked as a whole with the viscera unremoved, and after baking, the head, bones, and viscera are removed. For this reason, there is a lack of inconsistency in component values between “raw” and “baked” due to the decrease in water content during “baking” and migration of abdominal fat to edible parts.

For newly included “skinless” and “sashimi” categories to “Japanese jack mackerel”, “rainbow trout, cultured in sea”, “Pacific saury”, “red sea bream, cultured”, “olive flounder, cultured”, and “yellowtail, young, cultured”, because samples differ between “skinless, sashimi” and existing listed “with skin, raw”, and other forms, component values differ. For this reason, the component values of “with skin,

raw” forms and of “sashimi” form prepared from same fish are tabulated in a table at the end of Chapter 2.

Fat compositions of foods cooked using fat and oil differ according to the fat/oil used. For fried fish, mollusks, and crustaceans (tempura, deep-fried, and breaded and fried), the component values were determined based on the analytical values of foods cooked with ”14008 Rapeseed oil”.

## 11 Meats

The fat-soluble component values of most meats differ according to the livestock type, feed, breeding method, etc. For this reason, component values were determined by analyzing foods distributed to the market presently according to the 2015 Food Composition Table categories. The component values of processed meat products prescribed by JAS were determined based on the component values of products on the market that meet those specifications.

Of beef and pork by-products, considerable fat is found around the stomach and intestines, thus the fat content differs considerably according to the processing and forming methods. In order to clarify the fat-soluble components consumed as food, analyzed samples from which attached fat was removed as much as possible was used. Attached fat is also removed from most of the by products sold on the market as food. However, of beef small intestines, tubular small intestines are supplied without removing much of the attached fat, thus they differ from the component values of ”11098 Cattle offal and by-products, small intestine” of the current Food Composition Tables.

Component values of foods cooked using oil differ according to the oil used. In the current Food Composition Tables, for fried meat (Tonkatsu (breaded and fried pork) and fried), the component values of foods cooked using “14008 Rapeseed oil” are listed.

Of fried foods, ”11276 Pork, large type breed, loin, lean and fat, "Tonkatsu"(breaded and fried pork)”, ”11289 Chicken, broiler, thigh, meat with skin, “Karaage (floured and deep-fried chicken)”, and ”11290 Chicken, broiler, thigh, meat without skin, “Karaage"(floured and deep-fried chicken)” show component values of samples different from those of “raw” that are already listed, etc. For this reason, the component values of raw forms of fried samples are listed in the separate table at the end of Chapter 2.

## 12 Eggs

Most fat-soluble components of eggs are considerably affected by feed. In the current Composition Tables, the component values of normal eggs for which feed has not been fortified with special nutrients were determined.

Raw eggs are divided into “12010 Eggs, hen, yolk, raw” and “12014 Eggs, hen, white, raw” and analyzed. The component values of “12004 Eggs, hen, whole, raw” were calculated based on the percentages of the yolk and egg white. “Boiled” eggs were analyzed by separating the whole egg into egg white and yolk after boiling. For this reason, a small increase in fat thought to be from the yolk were found in “12015 Eggs, hen, white, boiled”.

### 13 Milk and milk products

Most of the fatty acid composition of milk and milk products is affected by the type of milk and feed, etc. The type, component standards, labeling, etc. of most milk and milk products are prescribed by “Ministerial Ordinance on Milk and Milk Products Concerning Compositional Standards, etc. (Ministry of Health and Welfare Ordinance No. 52, 1951, hereinafter referred to as “Ministerial Ordinance concerning Milk”) based on the Ordinance for Enforcement of the Food Sanitation Act (Ordinance of the Ministry of Health and Welfare No. 223 of 1947). The component values of milk products for which names are prescribed by the ordinance were determined based on the component values of milk and milk products meeting the component standards prescribed by the ordinance.

Of the “cream”, “whipping cream”, and “coffee whitener” (13014-13024 Cream), for those that contain vegetable fat, the fatty acid composition differs according to the vegetable oil of ingredients used for concerned foods.

### 14 Fats and oils

For vegetable oils, the fatty acid composition differs considerably according to the type of plant ingredient. Some products have compositions that differ considerably from others even though they are made of the same plant species. In the current Composition Tables, “Safflower oil” is divided into “14004 high linoleic” and “14025 high linoleic”, and “Sunflower oil” is divided into “14011 high linoleic”, “14026 mid-oleic”, and “14027 high oleic”, and the respective component values were listed.

For “14006 Vegetable oil, blend”, the percentages of the ingredient oils (soybean oil and rapeseed oil) differ considerably according to the product. In the current Composition Tables, component values of products containing soybean oil and rapeseed oil at a ratio of 1 to 1 were calculated.

Large-seeded and small-seeded types of peanuts are produced and small-seeded types are mainly used for peanut oil. For this reason, products made up mainly of small-seeded types were listed as “14014 Peanut oil”.

Most margarine products such as “Soft type margarine (14020, 14029) ” and “14021 Fat spread”, and “Shortening (14022, 14030, 14031) ” are made of oils whose properties have been changed by hydrogenation. This process reduces the unsaturation of unsaturated fatty acids in the fat, but at the same time, produces regioisomers and geometrical isomers. At the same time, the component values of the fatty acid compositions of these food products differ considerably according to the fat ingredient and hydrogenation.

In the 5th Enlarged Composition Tables, the amounts of trans-fatty acids are indicated in the Remarks column for margarine and shortening. However, in recent years, given the decrease in the trans-fatty acid amount of these foods, the trans-fatty acids were analyzed again. The results of analyzing margarine and shortening are shown in Table 6. Compared to the past, the amount has decreased sharply. However, since the trans-fatty acids of these foods may differ considerably according to the product, they were not included in the current Composition Tables. In the calculation of nutrition, information on the nutritional component descriptions of products actually used, etc. should be referred to.

**Table 6 Trans fatty acids of margarine and shortening (gram per 100g of edible fat)**

Food No.	Food name	2003/2004 analysis (Reference)				2014 analysis			
		Lipid	Trans fatty acid			Lipid	Trans fatty acid		
			18:1 t	18:2 t	18:3 t		18:1 t	18:2 t	18:3 t
14020	Soft type margarine for household use	83.1	6.27	0.53	0.06	83.1	0.71	0.23	0.22
14029	Soft type margarine for commercial use	-	-	-	-	84.3	0.39	0.26	0.05
14021	Fat spread	69.1	4.83	0.21	0.08	69.1	0.13	0.27	0.28
14022	Shortening for household use	99.9	7.61	-	-	99.9	0.06	0.27	0.13
14030	Shortening for commercial use, making confectionery	-	-	-	-	99.9	0.17	0.30	0.05
14031	Shortening for commercial use, for frying food	-	-	-	-	99.9	0.18	0.30	0.06

#### 15 Confectioneries

The component values of most confectioneries were calculated using the proportion of ingredients and nutrient contents of ingredients. Consequently, depending on the type of ingredients used and proportion, the nutrient values of products differ. For this reason, information on ingredient labeling, and other sources of products on the market should be referred to.

In the 5th Enlarged Composition Tables, the trans-fatty acids of confectioneries were calculated based on the analytical values of ingredient margarine and shortening and indicated in the Remarks. However, given that the trans-fatty acids of margarine and shortening have been decreasing in recent years, and that they may differ considerably according to the ingredients of the products, the trans-fatty acid content was not calculated in the current Composition Tables.

#### 16 Beverages

“Alcoholic beverages” contain little fats. Because, by analysis, no fatty acid was detected in several foods, their contents were expressed as “0” for these products.

#### 18 Prepared dishes

For processed foods, component values vary considerably, even they have the same name, compared with other food groups depending on the type and proportion of ingredients, and processing method. For this reason, component values were not estimated based on the recipe, and only those of four foods for which marketed products were analyzed in the past were included. Table 7 Foods for which component values in foreign food composition tables were borrowed for estimation

The foreign food composition tables used for estimations are USDA: Composition of Foods, Raw, Processed, Prepared, National Nutrient Database for Standard Reference, Release 27 (2014). The numbers preceding food names are the NDB No of the USDA food composition tables.