

**Development of new menus using foods with health claims in Japan, and evaluation of survey results for users**

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**Summary** When the system of food with health claims was enacted in 2001, it consisted with foods for specified health uses and foods with nutrient function claims. Furthermore, foods with functional claims were added to the system in 2015. Since no complicated application is required to register foods with functional claims, the number of these has exceeded 5,000 in the eighth year after the system establishment. In the current study, we investigated the recent state of those health foods. It was clarified that Japanese health foods, unlike health foods in foreign countries, contain large number of general foods including fresh foods. However, there is little information on the beneficial use general foods with health functions. Therefore, we have reported 101 potential menus using these foods with helpful guidance for people with health problems such as metabolic syndrome. In order to investigate whether such menus are useful as menus for those who are aiming to improve their constitution, we conducted a questionnaire survey in public lectures. We tallied the questionnaire and evaluated it and it was suggested that menus using food with health claims are useful.

**Key words:** Health food, Health claim, FOSHU, FNFC, FFC

## 1. Introduction

The system of food with health claims in Japan for food labelling with ingredient functions and for special uses was enacted in 2001, it consisted of foods for specified health uses (FOSHU) and foods with nutrient function claims (FNFC)<sup>1,2)</sup>. Furthermore, in 2015, foods with functional claims (FFC) were added to the system<sup>3)</sup>. As shown in Fig. 1, FNFC is intended to supplement the nutritional components required for one day when they tend to be insufficient. Currently, only 6 minerals, 13 vitamins and n-3 fatty acids are approved. FNFC policy has no requirements for the notification if those foods meet certain criteria. FFC allow the labeling of health functions at the responsibility of the manufacturing companies. Moreover, clinical trials are not mandatorily required for FFC to show the scientific basis for their health function, as long as their health function can be proved by a systematic review of the literature<sup>4)</sup>. Since labeling of health claims is not rigorous to be approved, the number of notification items has exceeded 5,000 in the 8th year after the establishment of the system of FFC<sup>5)</sup>. In order to label foods with health function, FOSHU must undergo through clinical trials and national review<sup>1)</sup>. In FOSHU and FFC, the recommended daily intake amount, the

amount of functional ingredients, and the intake method are displayed.

As to a large difference of the system of food with health claims in Japan from that in foreign countries<sup>6)</sup>, the system of food with health claims in Japan covers all kinds of food from the ingredients packed in tablet or capsules to food forms such as general processed foods including fresh foods. When the system of FOSHU was founded, the form of general foods was obligatory, so that tablet or capsule type foods were not allowed. Whereas, FFC system covers general processed foods, fresh foods, and tablet or capsule type food products. Therefore, there are far more numbers of tablet or capsule type food products could be registered than FOSHU, but the gross number of fresh foods and general processed foods is still close to half of the total number of FFC. In other words, contrary to the current situation of the health food system in Japan, the general foods are not applicable for dietary supplements system in foreign countries such as United States<sup>6)</sup>.

The major reason for the demand for the form of general foods in food with health claims system in Japan is that this system aims to use food ingredients as a means of improving eating habits rather than taking them like a medicine. In fact, all foods with health claims are required to label that it is important to have a balanced diet consisting of meals including a staple food, a main dish and side dishes<sup>4)</sup>.

On the other hand, since the enforcement of the FFC system, the number of tablet or capsule type health foods have increased in Japan as in Western and Asian countries. This system is good for eliminating inferior health foods that are not regulated at all, that is, "so-called health foods", but there are many problems in the evidence and advertisements of their health function. Several issues of these problems have already pointed out<sup>7-12)</sup>.

However, there are not many reports and advertisements on how to use the function of large number of products from general foods. Many of the health functions which foods with health claims advocate are highly effective against lifestyle-related diseases as described later. In addition, improvement of eating habits is a particularly key factor for measures against lifestyle-related diseases, and the national government entrusts registered dietitians with the management of improvement of eating habits especially for people with metabolic syndrome<sup>13)</sup>. Registered dietitians are worried that the object persons would not obey our guidance easily<sup>13)</sup>. One of the reasons that the object persons do not obey the guidance by registered dietitians is that it is difficult for registered dietitians to persuade the object persons of the menu in addition to the significance of

the menu, even if they would explain the menu to the object persons in detail by arranging the ingredients. Therefore, an easy-to-understand and persuasive teaching medium is needed for evoking behavior change from the object persons.

It is hard to say good that the status of registered dietitians' understanding and efforts of FFC is favorable and there is little idea that they use foods with health claims for nutritional guidance<sup>14)</sup>. Therefore, we made a specific health-oriented menu using foods with health claims in the form of general foods with functional claims such as reducing body fat, suppressing high blood pressure, and suppressing postprandial blood glucose elevation and publicized the menu. This our way to make and publicize the menu was surprisingly popular with consumers, and the response was so great that the newspaper introduced the way in the national edition<sup>15~17)</sup>. Therefore, at the lecture, we conducted a questionnaire survey on foods with health claims and the significance of menus using them. We tallied the questionnaire and evaluated it and it was found that many people took the effect of labeling of foods with health claims positively.

In this report, we will discuss the results of a survey on the current state of the health food system in Japan and the use of the results.

## **2. Materials and methods**

### Basic survey of foods with health claims

We investigated the number of each food with health claim registered, the type of food, the functional ingredients contained in that food, and its health claims. The survey of FFC in foods with health claims was executed based on the data of the Consumer Affairs Agency, Government of Japan (CAA) website. The survey of FOSHU was conducted based on the data of CAA website and Japan Health Food & Nutrition Food Association website. Since FNFC need not be registered for CAA, there is no data published by the relevant ministries and agencies. Therefore, it was based on the data published on the Internet and the homepage of the National Agriculture and Food Research Organization.

### Development of a balanced diet with health function

Foods with health claims which were used to make the menu were determined by searching for the

notification information published on the homepage of CAA<sup>5)</sup>. One meal menu which was nutritionally balanced based on the scientific bases of various expectable functions such as the health improvement of blood pressure, blood sugar, blood lipid, and bone was mainly made. In addition, we have developed a wide range of menus such as desserts that emphasize fun and single dish menus.

One meal nutritious value was based on "smart meal" criteria<sup>18)</sup>. It is used in the "healthy diet and food environment" authentication system which is mainly performed by the Japanese society of nutrition and dietetics aiming for "Nutritional Balanced Meals, including factors that contribute to health". This promotion project is based on "Estimated diet provided for the purpose of preventing lifestyle-related diseases and other health promotion" by the Ministry of Health, Labor, and Welfare and the Dietary Reference Intakes for Japanese 2015 version<sup>19)</sup>. The certification criteria of smart meal are required for the scientific bases based on 7 items of "staple food, main dish, side dish", 2 items for "Protein Fat Carbohydrate (PFC) ratio", 4 items for "salt equivalent", and "70 g or more of vegetables" <sup>20)</sup> and other research results.

Of the several smart meal criteria, adopted criterion in this study was as follows; a part the "well eat" classification criteria set for women and middle-aged and older men who want to eat with nutritional balance.

The amount of energy per meal was from 450 to 650 kcal, and the energy-producing nutrient balance was PFC % Energy (%E); protein from 13 to 20 %E, fat from 20 to 30 %E, and carbohydrate from 50 to 65 %E. In addition, vegetables, mushrooms, potatoes, and seaweed were used, resulting in a total amount of 140 g or more, and the salt equivalent was less than 3.0 g.

The nutritional value was calculated using Smart Nutrition Calculation Ver.5, which is based on the Standard Tables of Food Composition in Japan, 2015 (seventh revision) of the Ministry of Education, Culture, Sports, Science and Technology<sup>21)</sup>. Since the amount of functional ingredients contained in the FFC is labeled on each food, it was estimated from the labeled amount. The amount of FFC used was set to the upper limit of the recommended daily intake and harmonized the amount and taste of the whole meal, and the total amount was set to be within the set nutritional value range. For the menu of this research, the energy amount standard was set to from 450 to 650 kcal in order to carry out a wide range of menu development. As with many recipe books, each menu will be prototyped and examined among the menu creators to determine the amount so that positive opinions can be obtained. In the above way we created 101 menus.

Lecture of food with health claims and survey of participant's reaction

We talked about the menu we created at two times of delivery lecture held by Tsu City College. Participants were men and women between the ages of from 34 to 87. As shown in the table1, the outline of the lecture contents was carried out as follows: 1. An explanation to understand Food with health claims. 2. An explanation of the importance of recognizing your health and what Food with health claims are to support your health. 3. Introduction of menus with Food with health claims to change your eating habits.

After the lecture, 67 in the first lectures and 20 in the second lectures were given a questionnaire regarding changes in consciousness before and after the lecture. The questions were as follows: the question 1 "Did you think you could prevent the aggravation of your illness compared to before the lecture?", the question 2 "Did you think you could control your diet better than before the lecture?", the question 3 "Did you think you could manage your physical condition?", the question 4 "Did you have a higher awareness of improving your life than before the lecture?" The level of consciousness was 5 levels from not applicable at all to very applicable, and the one that felt the closest was selected. The survey was carried with the approval of the Clinical Research Ethics Review Committee of Suzuka University of Medical Sciences.

### 3. Results

Current status of foods with health claims

As shown in Fig 1, foods with health claims are composed of FOSHU, FNFC, and FFC. The FOSHU system was established in 1991 as a Food for Special Dietary Uses that is individually licensed for specified health claims. In 2001, FNFC containing some minerals and vitamins which can display the function of the nutrient were added to FOSHU, and the system of foods with health claims was established and the functional food system was launched. Furthermore, FFC were added in 2015, and the system of foods with health claims continues to this day. Foods for Special Dietary Uses are broadly classified into five categories. Foods for Special Dietary Uses are foods that have been approved by the Consumer Affairs Agency for labeling that they are suitable for "special uses" based on the Health Promotion Act. The special uses indicate that it is suitable for the development and maintenance / recovery of health of subjects who need medical / nutritional

consideration such as infants, pregnant / lactating women, and sick people. FOSHU is one of the categories.

Of these three systems of foods with health claims, Fig. 2 shows Changes in the number of FOSHU and FFC by food type whose numbers can be grasped. The number of FOSHU founded in 2001 was 870 in 2016, but the number has not increased significantly since then. On the other hand, the number of FFC founded in 2015 is 2689 for tablets and capsules, 2297 for processed foods of general food type, and 134 for fresh foods, and the total number of FFC exceeds 5,000 in 2022. As shown in Table 4 , the types of FFC on the market in the form of general foods are for those who use them for daily menus in ordinary households. In this figure, only FFC shows the form of food, because FOSHU does not need to classify the form of food for registration, so the current situation of it cannot be accurately grasped. But, since FOSHU was not approved only for general foods from 1991 to 2001, most of them are still general foods.

No food with health claims can be labeled as "preventing disease" except for FOSHU containing calcium and folic acid. Even if foods with health claims contain ingredients that have the effect of lowering blood sugar or blood pressure, they cannot be labeled as effective for "diabetes" or "hypertension". This is because the treatment of illness should be corresponded to "medicines" and so-called foods should be used as "means of healthy eating habits". Foods with health claims produced from such a historical process have large number of general food forms including fresh foods, but the use of these forms of foods has not progressed as a "means for a healthy diet".

We investigated the displayed functions of the FFC that increased rapidly. As shown in the table3, there are many functions related to fat, blood glucose, and blood pressure. Many of these are also found in FOSHU. On the other hand, many functions not found in FOSHU, such as fatigue, eye function, and stress, have been reported in FFC. Although not listed in this table due to the small number, products related to immune function were reported last year.

Table 4 shows list of ingredients used in many FFC. There are many ingredients registered in FOSHU such as indigestible dextrin, lactic acid bacteria and catechin, but many other components are not used in FOSHU.

#### Development of a balanced diet with health function

We devised a way to motivate people to improve their eating habits by showing how to make menu, the

target person, and the target of the health function,

An example of a balanced diet "Sardine ginger vinegar" using 30 g of canned sardine<sup>22)</sup> included eicosa pentaenoic acid (EPA) and docosahexaenoic acid (DHA) for those who are concerned about triglyceride levels in blood is shown in Fig3. This menu was made up of the staple food rice, the main dish pork marinated with miso sauce, the side dish marinated Japanese mustard spinach, and the simmered dried Japanese radish, and Sardine ginger vinegar salad. The total energy value of one meal is 624 kcal, P ratio 16.3%, F ratio 26.3%, C ratio 57.4%. The amount of vegetables was 180 g, and the salt equivalent was 2.9 g.

In this way, we have developed about 101 menus, including single dish menu and desserts, focusing on balanced meals that take into consideration the nutritional value, which can be expected to improve blood pressure, blood sugar, blood lipids, bone health, etc. Table 5 shows the keywords of the health claims of the 101 menus we created and the functional ingredients contained in the menus. Then, we gave presentations of these menu at academic conferences<sup>15-16)</sup> and gave lectures in the region, and it was published in national newspapers<sup>17)</sup>.

#### Participant's reaction to the lecture

As shown in Fig.4, the results of the survey carried after the lecture, the answer to the question 1 "I thought I could prevent the seriousness of the disease compared to before the lecture " was slightly applicable (10.3 %), A little applicable (26.4 %), somewhat true (24.1 %), quite true (23.0 %), and very true (10.3 %), except for not applicable at all 5.7 %, approximately 94 % feel that they can do it, although there is a stage of consciousness. (n = 87). The answer to the question 2 "I thought I could control my diet better than before the lecture" was approximately 92 % feel that they can do it, although there is a stage of consciousness. (n = 87). The answer to the question 3 " I thought I could manage my physical condition compared to before the lecture" was approximately 90 % feel that they can do it, although there is a stage of consciousness. (n = 87). The answer to the question 4 " I became more aware of improving my life compared to before the lecture" was approximately 94 % feel that they can do it, although there is a stage of consciousness. (n = 87). Furthermore, only in the second lecture, the question was asked, "Do you want to incorporate or continue to incorporate foods with health claims into your diet for health promotion compared to before the lecture?" The result of

the question was that all the respondents wanted to incorporate or continue to incorporate foods with health claims with varying degrees (n = 20).

#### 4. Discussion

More than half of the foods with health claims are the forms of general foods including fresh foods. Although such large number of general foods as foods with health claims are on the market, no guidelines have been issued regarding their use. Therefore, we tried to develop a balanced diet that can utilize foods with health claims. Our menu is clearly made for the target person and by the cooking method by using familiar ingredients of foods with health claims and is an appropriate volume for fitting the set nutritional value, so that the menu can be expected to motivate the awareness of improving eating habits.

Smart meal which was used as a reference for the nutritional value standard of our menu in this study was established for establishing a healthy diet by repeatedly eating a nutritionally balanced meal<sup>18,20</sup>. This concept is based on the proposal of "In order to extend healthy life expectancy, a continuous diet is an essential condition, not the intake of specific foods only or specific nutrients" by the Ministry of Health, Labor, and Welfare's.

Imai et al. educated diabetic patients to 'eat vegetables before carbohydrate' for long-term glycemic control. They reported that the effect of suppressing blood glucose level by one meal is not large, but if it continues for half a year, there is a large difference in HbA1c level<sup>23</sup>).

Such a diet is the basis for improving illness and maintaining and improving health, but its effects can be obtained only when taking this diet is continued over an extended period. From this point of view, if a balanced diet using foods with health claims can be taken continuously, a better effect can be expected for those who have specific physical problems.

Based on the result of the change in consciousness before and after our lecture on the use of health-functional foods, utilizing foods with health claims for health management as an aid to improve eating habits indicated a possibility that self-efficacy could be improved through growing of expectations for health. As Bandura advocates, self-efficacy is a sense of accomplishment for a certain behavior and is a crucial factor for improving eating habits<sup>24</sup>).

However, there are some problems in the case that foods with health claims are used for menus. For example, in the menu shown in Fig3, 30 g of canned sardine was used as a side dish, but according to the recommended daily intake of 100 g indicated on the canned sardine product, the used amount of canned sardine is larger than that of pork, which is the main dish, resulting in the excessive amount of energy and nutrients including protein.

Kurotani K. et al.<sup>25)</sup> and Oba S. et al.<sup>26)</sup> reported that those who ate according to the Japanese Food Guide Spinning Top had a lower risk of total mortality, especially cardiovascular disease, especially cerebral vascular disease. Thus, a continuous balanced diet is useful for maintaining good health.

In a balanced diet using food with health claims, the amount of functionally ingredients contained therein may be less than the recommended daily intake. However, the primary purpose of taking a balanced diet can be achieved by eating this diet. Even if the amount of ingredients is a bit small, it is very important to keep these balanced meals daily. In other words, we need to propose a lot of such menus that many people want to eat constantly, because if people eat the same menu every day, they will get tired of it. Therefore, in order to develop dietary habits improvement guidance, it is required that many foods with health claims in the form of general foods including fresh foods are on the market. If it becomes possible to create many such menus, a registered dietitian who excels in nutritional guidance<sup>27)</sup> will be able to use it for daily nutritional guidance.

Looking at the status of foods with health claims, the number of FFC is steadily increasing and this increase in the number of FFC is influenced largely by the fact that companies are not necessarily required to conduct the clinical trial of FFC if FFC have scientific basis for sales. As to the required functionality, there are many indications related to fat, blood sugar, and blood pressure, which are closely related to dietary habits and lifestyle-related diseases. Since the sale of fresh food forms is tended to increase recently, an increase in the number of general foods with functional claims which can be used for balanced food menus with health functions will be expected.

We are thinking that the results of this study are limited in terms of confirmation. Since the number of attendees for the lecture was as small as 87, it was not possible to tally questionnaires by gender, age group, and whether having a sick.

### **Conflicts of interest**

There are no conflicts of interest in this study.

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**Table 1 . Outline of the lecture "Let's use Foods with Health Claims"**

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<b>1. Let's understand Foods with Health Claims correctly</b>
Background of Foods with Health Claims Explanation of FOSHU, FNFC and FFC It is very important to use these foods on balanced diet.
<b>2. Let's use these foods according to your own situation</b>
Recognize your health condition based on your own health diagnosis results Set goals for improving your diet Choose Foods with Health Claims that help improve your health
<b>3. Let's use foods with health claims for your daily diet</b>
Presentation of nutritionally balanced menus using Foods with Health Claims Explanation of the health benefits you can expect from the menu

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FOSHU: Foods for Specified Health Uses , FNFC: Foods with Nutrient Function Claims, FFC: Foods with Function Claims

See text for details.

**Table2. Examples of general food forms of Foods with Health Claims**

<b>Foods for Specified Health Uses (FOSHU)</b>	Beverages such as tea and juice, noodles, rice porridge, natto, yogurt, soup, cereals, kamaboko, sausages, instant noodles, tofu, soy milk, cooking oil ,ham, bread, hamburgers, etc.
<b>Foods with Nutrient Function Claims (FNFC)</b>	Beverages such as tea and juice, rice porridge, rice, wafers, cookies, green pepper, pea sprouts, kaiware daikon, carrot, mini tomato, kiwi, strawberry, egg, etc.
<b>Foods with Function Claims (FFC)</b>	Beverages such as tea and juice, rice porridge, rice, bread, noodles, mochi wheat, boiled soybeans, salted plum, small fish, miso, jelly, yogurt, chocolate, soup, sausage, mackerel can, sardine can, bean sprouts, spinach, garlic, mandarin orange, apple, banana, melon, pineapple, blueberry, tomato, egg, yellowtail, sardine, amberjack, chicken breast ,etc.

Data of FOSHU were created from Japan Health and Nutrition Food Association Tokuho Goannai 2021 Edition' and those of FFC from websites of Consumer Affairs Agency<sup>9)</sup>. Those of FNFC were created from advertising on the net. (accessed 2022. 3.1)

Table 3 List of keywords of displayed function of foods with function claims

<b>Displayed functions (Keyword)</b>	<b>General Foods (Number of items)</b>	<b>Fresh Foods (Number of items)</b>	<b>Tablets, Capsules (Number of items)</b>	<b>Total (Number of items)</b>
Fat (Triglyceride, Bodyfat, etc)	343	7	269	619
Blood sugar	274	1	197	472
Blood pressure	153	32	84	269
Fatigue (excluding eye fatigue)	80	3	139	222
Eye function	50	5	163	218
Cognitive function	28	3	173	204
Stress	52	3	138	193
Sleep	33	0	138	171
Skin	49	6	113	168
Memory	23	2	137	162
Joint	12	0	94	106
Bone	20	18	67	105
Exercise	47	0	52	99
Bowel movement	35	0	49	84
Cholesterol	19	4	35	58

Data were created from websites of Consumer Affairs Agency<sup>5)</sup> . (accessed 2022. 3.1)

Keywords are words related to the health function of the ingredients of product.

**Table 4. List of ingredients used in various Foods with Health Claims**

<b>Functional ingredients</b>	<b>General Foods (Number of items)</b>	<b>Fresh Foods (Number of items)</b>	<b>Tablets, Capsules (Number of items)</b>	<b>Total (Number of items)</b>
GABA	301	41	218	560
Indigestible dextrin	408	0	15	423
DHA	99	10	145	254
EPA	90	10	133	233
Lutein	21	8	201	230
Lactic acid bacteria	98	0	109	207
Black ginger derived polymethoxyflavone	24	0	149	173
Bifidobacterium	63	0	84	147
Glucocerebroside	44	3	87	134
Isoflavone derived from kudzu flower	64	0	69	133
Zeaxanthin	2	0	128	130
Theanine	34	0	92	126
Astaxanthin	14	0	103	117
Catechin	72	0	41	113
Inulin	94	2	12	108
Anthocyanin derived from Bill Berry	1	2	90	93
Citric Acid	74	0	10	84
Soy isoflavone	27	12	44	83
Hyaluronic acid	44	0	37	81
Monoglucosyl hesperidin	36	0	40	76
Tiliroside derived from rosehip	63	0	13	76

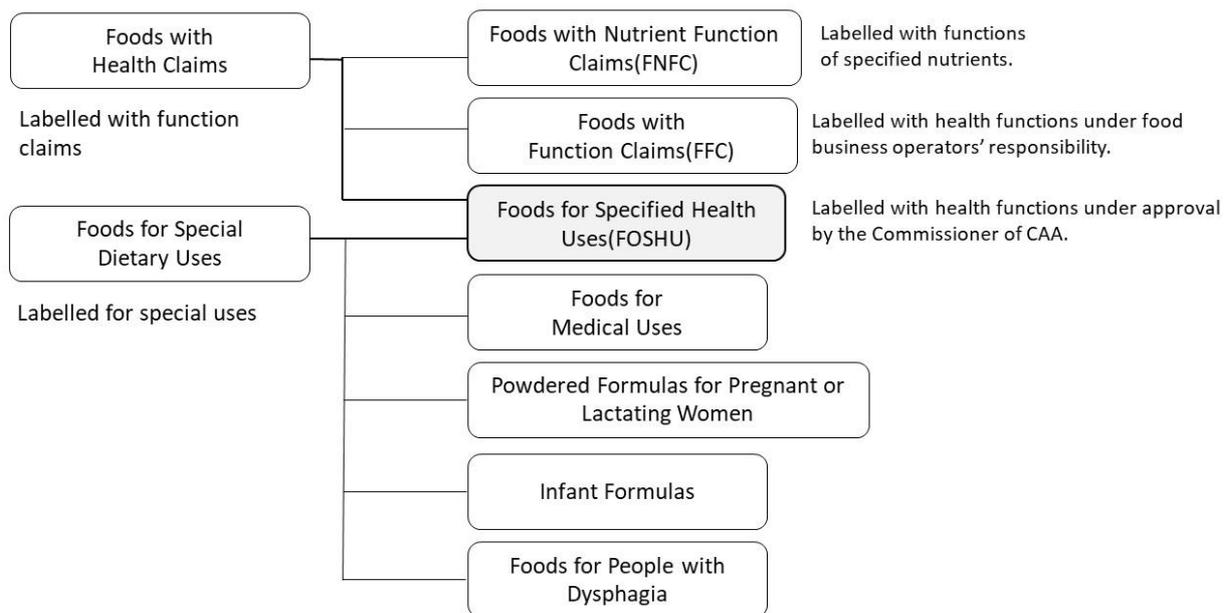
Data were from websites of Consumer Affairs Agency<sup>5)</sup> . (accessed 2022. 3.1)

GABA: gamma-Aminobutyric acid, DHA: docosahexaenoic acid, EPA: eicosapentenoic acid

**Table 5 Keywords of health claims and functional ingredients in our development menus using food with health claims**

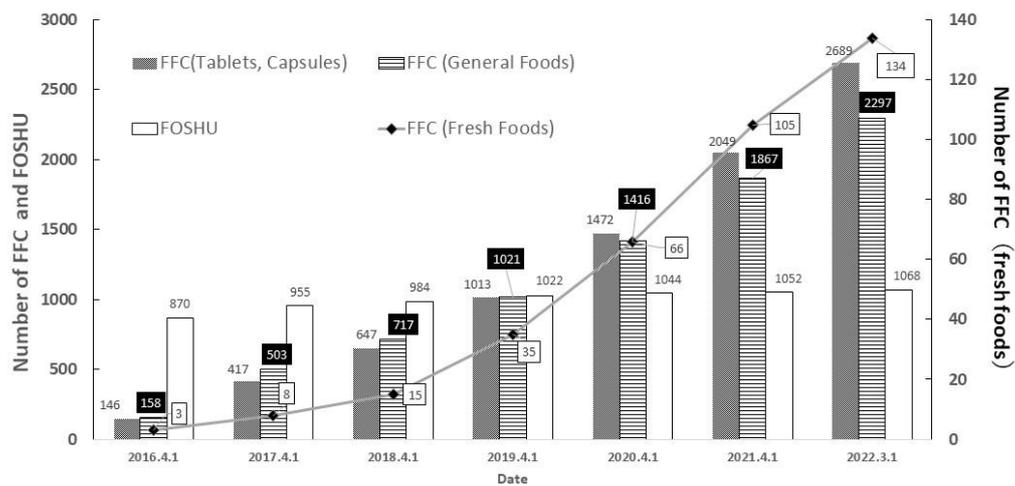
Health Claims of Menus (Keyword)	Ingredients contained in menus	Number of menus
Blood pressure	GABA, $\alpha$ -linolenic acid	11
Blood pressure, Blood sugar, Triglyceride, Cholesterol, Bone, Intestinal regulation	GABA, Barley $\beta$ -glucan, EPA, DHA, Lycopene, Soy isoflavone	1
Blood pressure, Blood sugar, Triglyceride, Intestinal regulation	$\alpha$ -linolenic acid, Barley $\beta$ -glucan, EPA, DHA	1
Blood pressure, Blood sugar, Cholesterol, Intestinal regulation	$\alpha$ -linolenic acid, GABA, Barley $\beta$ -glucan, Lycopene	3
Blood pressure, Triglyceride	EPA, DHA, GABA	2
Blood pressure, Triglyceride, Cognitive function	EPA, DHA, $\alpha$ -linolenic acid	1
Blood pressure, Triglyceride, Cholesterol	GABA, EPA, DHA, Lycopene	1
Blood pressure, Triglyceride, Bone	GABA, EPA, DHA, Soy isoflavone	1
Blood pressure, Triglyceride, Cholesterol, Bone	GABA, EPA, DHA, Lycopene, Soy isoflavone	1
Blood pressure, Cholesterol	GABA, $\alpha$ -linolenic acid, Lycopene	1
Blood pressure, Cholesterol, Body fat, Intestinal regulation	GABA, Lycopene, Lactobacillus gasseri SBT2055, Indigestible dextrin	1
Blood sugar	Salacia-derived salacinol, Isomaltodextrin, Barley $\beta$ -glucan, Indigestible dextrin	6
Blood sugar, Triglyceride	Indigestible dextrin	2
Blood sugar, Triglyceride, Cholesterol, Bone, Intestinal regulation, Cognitive function	Barley $\beta$ -glucan, Soy isoflavone	1
Blood sugar, Triglyceride, Cholesterol, Intestinal regulation	Barley $\beta$ -glucan, EPA, DHA	4
Blood sugar, Cholesterol, Bone, Intestinal regulation	Barley $\beta$ -glucan, Soy isoflavone	7
Blood sugar, Cholesterol, Bone, Intestinal regulation, Cognitive function	Barley $\beta$ -glucan, $\beta$ -Cryptoxanthin, DHA	1
Blood sugar, Cholesterol, Bone, Intestinal regulation	Barley $\beta$ -glucan, Soy isoflavone	1
Blood sugar, Cholesterol, Body fat, Intestinal regulation	Barley $\beta$ -glucan, Acetic acid	1
Blood sugar, Cholesterol, Body fat, Bone, Intestinal regulation	Barley $\beta$ -glucan, Acetic acid, Soy isoflavone	1
Blood sugar, Cholesterol, Intestinal regulation	Barley $\beta$ -glucan	1
Blood sugar, Cholesterol, Intestinal regulation, Cognitive function	Barley $\beta$ -glucan, DHA	2
Triglyceride,	EPA, DHA	17
Triglyceride, Cholesterol, Cognitive function, Bone	EPA, DHA, $\alpha$ -linolenic acid, Acetic acid, Soy isoflavone	1
Triglyceride, Cholesterol, Cognitive function, Bone, Intestinal regulation	EPA, DHA, $\alpha$ -linolenic acid, Acetic acid, Soy isoflavone, Indigestible dextrin	1
Triglyceride, Cholesterol, Bone	EPA, DHA, $\alpha$ -linolenic acid, Soy isoflavone	1
Triglyceride, Cholesterol, Intestinal regulation	EPA, DHA, $\alpha$ -linolenic acid, Indigestible dextrin	1
Triglyceride, Cognitive function	EPA, DHA	2
Triglyceride, Intestinal regulation	EPA, DHA, Indigestible dextrin	1
Cholesterol	$\alpha$ -linolenic acid	1
Cholesterol, Bone	Barley $\beta$ -glucan, $\alpha$ -linolenic acid, Soy isoflavone	3
Cholesterol, Body fat, Bone	$\alpha$ -linolenic acid, Acetic acid, Soy isoflavone, $\beta$ -Cryptoxanthin	1
Body fat	Acetic acid	2
Bone	Soy isoflavone, $\beta$ -Cryptoxanthin	16
Bone, Cognitive function	Soy isoflavone, DHA	1
Intestinal regulation	Indigestible dextrin	1
Stress	GABA	1
	<b>Total</b>	<b>101</b>

Keywords related to health claims and ingredients were abstracted from Japan Health and Nutrition Food Association Tokuhō Goannai 2021 Edition' and Consumer Affairs Agency<sup>5)</sup>. (accessed 2022. 3.1) GABA: gamma-Aminobutyric acid, DHA: docosahexaenoic acid, EPA: eicosapentenoic acid



**Fig.1 Outline of Food Labelling Systems for Health and Nutrition by CAA**

CAA: Consumer Affairs Agency



**Fig.2. Changes in the number of Foods with Health Claims and Foods for Specified Health Uses**

For people who are concerned about blood lipids

*Gohan* (Rice), *Tonniso* (Pork marinated with miso sauce), *Komatsuna no Okakae* (Japanese mustard spinach marinated with dried bonito shavings),  
 ©*Iwashi Syougani no Sunomono* (Sardine ginger vinegar salad), *Kiriboshidaikon no Nimono* (Simmered dried Japanese radish)  
 ©Menu for using foods with functional claims

How to cook main and side dishes.

*Tonniso* (Pork marinated with miso sauce)

Ingredients (for 1 people)	Pretreatment	Recipe
60 g thin sliced shoulder loin 50 g onion 8 g miso 4 g sugar 4 g mirin 3 g sake 1 g sesame seeds	(Cutting thin slices)	1. Boil and Drain thin sliced pork shoulder loin. 2. Boil and squeeze onion. 3. Cook A at low heat. 4. Mix 1, 2, 3 and sesame seeds.

*Komatsuna no Okakae* (Japanese mustard spinach marinated with dried bonito shavings)

Ingredients (for 1 people)	Pretreatment	Recipe
40 g Japanese mustard spinach 10 g shimeji mushroom 3 g dark soy sauce 1 g sugar	(Cut into 3 cm length) (Separate into small bunches)	1. Boil and squeeze Japanese mustard spinach and shimeji mushroom separately. 2. Add A and shavings of dried bonito to 1. and toss.

©*Iwashi Syougani no Sunomono* (Sardine ginger vinegar salad)

Ingredients (for 1 people)	Pretreatment	Recipe
30 g Iwashi Syougani 10 g cucumber 20 g celery 10 g red paprika 5 g vinegar 3 g sugar Small amount salt	(Cutting round slices) (Cutting round slices) (Julienning)	1. Iwashi Syougani is divided into 2 or 3 pieces. 2. Pickle cucumber, celery and red paprika in A. 3. Leave it for a while and add 1. Marinate them to hold shape.

*Kiriboshidaikon no Nimono* (Simmered dried Japanese radish)

Ingredients (for 1 people)	Pretreatment	Recipe
5 g dried shredded Japanese radish 20 g carrot 10 g fried fish cake 4 g dark soy sauce 2 g sugar 1 g mirin 150 g soup stock	(Soak in plenty of water) (Julienning) (Cutting into rectangles)	1. Simmer dried shredded Japanese radish, carrot, and fried fish cake in soup stock with A. Adjust the amount of soup stock. 2. Boil green peas quickly 3. Serve 1 on a plate and decorate with green peas.

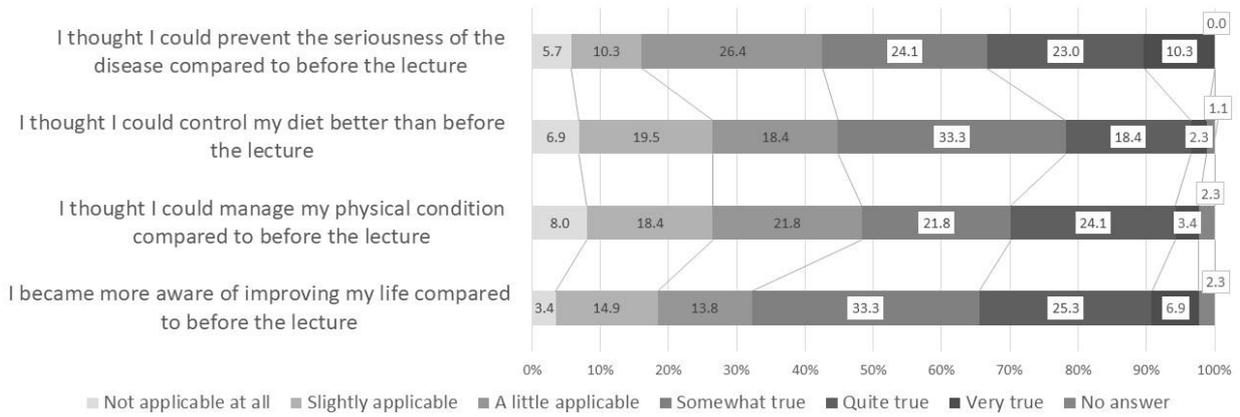
Total energy 624 kcal, PFC%E 16.3:26.3:57.4  
 Total usage of vegetables, mushrooms, seaweed and potatoes 180 g, Salt equivalents 2.9 g

Functionality

Company and Product	Functional ingredient	Function and effect
Company: NS Product: EPA + DHA combination Iwashi syougani, (Simmered Sardine with ginger)	EPA, DHA	It has been reported that EPA and DHA have the effect of lowering the triglyceride level.

Fig. 3 .An example of a well-balanced meal menu using Foods with Health Claims for people who are concerned about triglyceride levels in the blood

EPA: eicosapentenoic acid, DHA: docosahexaenoic acid



**Fig.4. Changes in consciousness after lectures by participants (n=87)**