

Session F Round Table Discussions

General Situation on Utilization of Vegetable Proteins for Foods in Japan

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ABSTRACT

This is a brief review of the situation on the utilization of vegetable proteins for foods in Japan.

Japan has a long history of utilizing soybeans as essential protein foods for humans in a great quantity. Table I shows how we consume soybeans and soybean meals as traditional foods in Japan. Miso, soysauce, tofu, natto and other traditional soybean foods have played an important role for the diets of the Japanese as a protein source. Total consumption of soybeans for traditional foods has not changed for the past several years, and it is about one million tons. It is believed that this figure will not change very much in the future.

The current situation of vegetable protein production is shown in Table II. This industry is still young, and its level of consumption is very low yet in comparison with traditional foods. However, it is believed that there is a growing need for vegetable protein to meet the desire for more proteins in Japan, especially after implementation of the 200 mile fishing restriction in the world. There are not official statistics data specified by the items in more detail. However, I have estimated production in 1977 based on my personal knowledge in Table III, in spite of some difficulties and risks. In Japan SPC is made mainly by water extraction of soybean meal. This means the SPC is

soybean protein concentrate with whey but not fiber. In Table III this product was named Extracted Soybean Protein, "ESP," for convenience.

Production of Foods related to Vegetable Proteins is shown in Table IV.

Table V gives a rough idea how we consume fish paste. At the present time, in total about 640,000 tons of fish paste is consumed. However, the fish paste seems to be getting tight in supply for the future.

Table VI shows results of market investigation done by Japan Vegetable Protein Food Association in Tokyo. It is understood that vegetable protein is getting popular among those food industries. Especially appreciated is the functionality of vegetable protein. In more detail, the market investigation cards (809) were delivered to the whole related food manufacturing companies in Japan out of which 325 companies answered.

In the upper columns, it is expected that about 68% of the major food industry are using vegetable protein. In the lower columns, vegetable protein is being used for 282 of manufactured food items as ingredients. Some of the companies seem to be using more than two types of vegetable protein in one food item simultaneously. Of these food manufacturers 227 realized major merits and reasons to use vegetable protein for their products as shown in the table. There also seem to be some manufacturers who appreciate more than two of favorable functions for using

TABLE I
Consumption of Soybean and Soybean meal
as Traditional Japanese Foods

	1971	1972	As soybeans 1,000 metric ton		1975	1976
			1973	1974		
Soysauce	226 (163) ^a	235 (167)	255 (182)	246 (176)	226 (161)	229 (166)
Miso	185 (4)	189 (3)	197 (3)	194 (2)	180 (1)	184 (1)
Tofu	426	439	452	441	431	435
Natto	67	68	68	69	69	69
Kori-tofu	28	30	30	29	29	29
Total	932	961	1,002	979	935	946

^a(): Soybean meal.

TABLE II
Vegetable Protein Production in Japan

	Metric ton				
	1973	1974	1975	1976	1977
Total	35,593	33,306	37,047	41,149	43,986
Powder	17,925	17,134	16,268	18,515	19,552
Textured (Dry)	3,849	3,837	3,932	4,581	6,213
Textured (Wet)	13,819	12,342	16,850	18,053	18,221
From soybean	12,783	11,742	13,259	15,775	16,958
From wheat	22,810	21,564	23,788	25,374	27,028

TABLE III

Metric ton, estimated, 1977				
Soybean 17,000 Protein (16,000)	Powdered	9,500	ISP 6,000 SPC 3,500	ESP 3,200 SPC 300
	Textured Fibrous (Wet)	6,000 1,500		
Wheat 27,000 Protein (16,000) ^a	Powdered	10,100		
	Textured	12,200	(Dry) 200 (Wet) 12,000	
Total 44,000 (32,000) ^a	Gluten paste (wet)	4,700		

^a() Dry basis.

TABLE IV

Production of Foods Related
to Vegetable Proteins

	Tons	
	1975	1976
Fish Paste Products (Total)	1,165,398	1,210,036
Kamaboko, naruto, hanpen	446,689	417,637
Chikuwa	258,883	295,094
Fried kamaboko	348,558	375,262
Fish sausages	79,183	89,881
Fish ham	32,085	32,162
Processed Meat Products (Total)	299,221	334,170
Roase, boneless, etc.	36,800	41,517
Press, mixed press, chopped ham	101,738	113,425
Bacon	16,950	18,887
Sausages	143,740	160,341
Minced meat products (Total)	145,955	156,957
Croquette	62,191	59,040
Hamburg steak	28,769	33,063
Chinese dishes	54,995	64,844
Bread	1,082,000	1,098,000
Noodles	1,261,000	1,284,000
Ice cream	94,732	82,272

TABLE V

Forecast of Fish Paste Demand in 1977

	1,000 metric ton		
	Production	Ratio of fish paste used	Fish paste demand
Kamabokos			
Kamaboko	320	55%	176
Packed kamaboko	15	55%	8
Naruto, hanpen	90	50%	45
Total	425	54%	229
Chikuwas	275	60%	165
Fried kamaboko	326	47%	153
Fish ham and sausages			
Sausages	90	45%	40
Ham	35	20%	7
Special ham	14	30%	4
Total	139	36%	51
Others			
Daily dishes	20		20
Processed meat	15		15
Frozen and seasoned foods	8		8
Total	43		43
Grand total	1,208	53%	641

vegetable protein as an ingredient.

Table VII shows potential demands of powdered vegetable protein for fish paste products. It is considered that there is enough room for more vegetable protein to be consumed in this industry. In addition to possible short

supply of fish paste, further improvement of quality of powdered vegetable protein will enlarge the demand as a major ingredient in the processed foods. In addition to this, there is a market for ham and sausage industries, which are said consume more than 3,000 tons of ISP for

TABLE VI

Market Investigation of Vegetable Proteins

	Percent, 1977			
	Fish paste	Fish sausages	Processed meat	Minced meat
In use	54	81	91	62
Not now in use	14	13	5	6
No experience	32	6	4	32
Total	100	100	100	100
ISP	33	24	58	19
SPC	6	18	28	8
Gluten (powder)	79	53	32	14
Textured soy	9	3	9	62
Textured GLU. (frozen)	0	12	0	13
Others	18	36	13	21
Total	145	146	140	137
Reasons for use				
Economical	40	77	36	56
As binder for meat	33	54	35	16
Improvement of texture	33	15	14	26
Moisture retention or emulsifier	30	39	55	29
Nutritional or other function	43	23	42	38
Total	179	208	182	165

TABLE VII

Potential Demand of Powdered Vegetable Proteins for Fish Paste Products in 1977

Fish paste products	Fish paste needed	Per cent of powdered vegetable protein per fish paste	1,000 ton
			Potential demand of powdered vegetable protein
Kamaboko	229	1-2	2-5
Chikuwa	165	3-5	5-8
Fried kamaboko	153	5-8	8-12
Fish ham and sausages	51	3-6	2-3
Total	598	2.8-4.7	17-28

TABLE VIII

Vegetable Protein (%) as Ingredients in Food Products

	Vegetable protein (%)					Total
	<5	5-14	15-29	30-49	50<	
Food industry	<5	5-14	15-29	30-49	50<	Total
Ham	76.5	23.5	--			100
Sausages	86.5	11.5	2.0			100
Fish ham and sausages	28.6	57.1	14.3			100
Fish paste products	54.5	18.2	18.2	9.1		100
Hamburg, meat ball	25.0	31.8	22.7	13.6	6.9	100

inspection. This consumption may be increased at a rate of about 10% per year.

Textured protein is already being used at more than 12% of minced meat as a meat extender in Japan and consumption of ground meat is increasing. If we can upgrade the quality, and if we can use up to 20% of textured protein from 12%, the demand for the textured protein will become progressively larger.

Table VII shows utilization of vegetable protein in the food industry.

Vegetable protein percent is shown as wet basis. Therefore, figures of percentage of using vegetable protein are still very small.

DISCUSSION

Man seems to be most conservative in his eating habits. And Japanese are critical of any ingredients in processed foods. Vegetable protein foods are quite new. Therefore, promotion and campaign strategy certainly have been

needed in terms of labeling, standardization, education and contacting government. These efforts have been made by the Japan Vegetable Protein Food Association chaired by Y. Sakaguchi. We think highly of their activities jointly with related organizations conducting seminars, round table discussions, and food exhibits. The association also contributed most to the enforcement of Japan Agricultural Standard and Labeling Standard on vegetable protein to supply good quality products to consumers with safety. This will force our manufacturers to further improve the quality of the products. Due to these activities of the Association plus those of the government, scientists, the American Soybean Association and entire industries, vegetable protein is getting a good reputation, and 68% of total food processors in Japan are now using vegetable protein as ingredients. However, the level of demand for vegetable protein is very low yet. In order to expand the demand, we have to continue our efforts to improve the quality of the products by cooperation among the scientists all over the world.