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RADIOACTIVITY SURVEY DATA in Japan

Part 2
= Dietary Materials =

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National Institute of Radiological Sciences
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Contents

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Environmental and Dietary Materials*

(Japan Chemical Analysis Center)

1. Collection and pretreatment of samples

(1) Rain and dry fallout

Rain and dry fallout was collected monthly on a sampling tray, approximately 5000 cm^2 in area, which was filled with water to a depth of 1 cm at the beginning of every month.

Strontium and cesium carrier solutions were added after the sample was filtered. The tray was washed with 5 ℓ of distilled water and the washing was combined to the filtrate.

The sample was passed through a cation exchange column (500 mℓ of Dowex 50W X8, 50～100 mesh, Na form) at a rate flow of 80 mℓ/min.

(2) Airborne dust

Airborne dust was collected by an electrostatic precipitator or a filter air sampler for every three months at a rate of more than 3000 m^3 per month. The sampling was done 1 to 1.5 meters above the ground.

(3) Service water and freshwater

Service water, 100 ℓ each, was collected at the intake of the water-treatment plant and at the tap after water was left running for five minutes. Strontium and cesium carriers were added to the filtered water sample. The subsequent process was the same as that described in the section (1). Freshwater was treated in the same way as the service water.

(4) Soil

Soil was collected from the location in the spacious and flat area without past surface disturbance caused by duststorms, inflow and outflow due to precipitation, etc.. Any places located under trees in a forest, in a stony area or inside of river banks were avoided. Soil was taken from two layers of different depths, 0-5cm and 5-20cm. The soil lumps were crushed by hands and dried in a drying oven regulated 105 ℃. The soil was then passed through a 2 mm sieve to remove plant roots and pebbles.

(5) Sea water

Sea water was collected at the fixed stations where the effect of terrestrial fresh water from rivers was expected to be negligibly small. A special consideration was also given to weather conditions. The sampling was carried out when there was no rainfall for the last few days. To prevent contamination, water samples were collected at the bow of a sampling boat just before she stood still by scooping surface water using a polyethylene bucket. Immediately after the collection, the samples were acidified to a pH lower than 3 by adding concentrated hydrochloric acid in a ratio of 1 mℓ to 1 ℓ of sea water, and then stored in 20 ℓ polyethylene containers. The sampling equipments as well as containers were thoroughly rinsed with dilute hydrochloric acid and then with distilled water before use. Two hundred milliliters of sea water was also collected at the same stations for the determination of chlorinity.

(6) Sea sediments

Sediment was collected in the same area as that for the sea water sample, taking the following criteria into account:

a. The depth of water exceeds 1 m at low tide.
b. No significant sedimental movement is observed in the vicinity of concern.
c. Mud, silt and fine sand are preferable.

A conventional sediment sampling device was used for collecting the top few centimeters of surface sediment. Approximately 4kg of the sample in wet weight was spread on a stenless steel dish after removed of the pebbles, shells and other foreign materials, and dried in a drying oven regulated at 105℃.

(7) Total diet

A full one day ordinary diet including three meals, water, tea and other in-between snacks for five persons was collected as a sample of "total diet". The sample in a large stainless steel pan was carbonized carefully by direct application of gas flame, and was transfered to a porcelain dish and then ashed at 450 ℃ in an electric muffle furnace.

(8) Rice

Polished rice was collected in producing districts at the harvest and in consuming areas when new crops were first put on sale. The sample was carbonized and ashed in a porcelain dish.

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* Samples were sent to the Center from 32 contracted prefectures.

(9) Milk

Raw milk was collected in producing districts and commercial milk was purchased in consuming districts. Milk in a stainless steel pan or a porcelain dish was evaporated to dryness followed by carbonization and ashing.

(10) Vegetables

Spinach and Japanese radish were selected as the representatives for leaf vegetables and for non-starch roots, respectively. After removing soil, the edible part of vegetable sample was dried and carbonized in a stainless steel pan or a porcelain dish.

(11) Tea

Five hundred grams of manufactured green tea was collected, carbonized and ashed in a stainless steel pan or a porcelain dish.

(12) Fish, shellfish and seaweeds

a. Sea fish and freshwater fish

Fish was rinsed with water and blotted with a filter paper. Only the edible part was used in case of larger sized fish, and the whole part was used in case of smaller ones. Each sample was weighed and placed in a stainless steel pan or a porcelain dish. After carbonized, the sample was ashed in an electric muffle furnace.

b. Shellfish

Approximately 4 kg of shellfish including the shells was collected or purchased. After removing the shells, it was treated in the same way as that for the sea fish.

c. Seaweeds

Edible seaweeds were collected and rinsed with water to remove sand and other adhering matters on the surface. These were removed of excess water, weighed dried and ashed.

Table 1 shows detailes of sample collection.

Table 1 Details of sample collection

Sample	Frequency of sampling	Quantity of sample
=Environmental materials=		
(1) Rain and dry fallout		
1. For domestic program	monthly	
2. For WHO program	monthly	
(2) Airborne dust	quarterly	>3000 m^3/month
(3) Service water and freshwater		
1. Service water (source water)	semiyearly	100 ℓ
2. Service water (tap water)	semiyearly	100 ℓ
3. Freshwater	yearly (fishing season)	100 ℓ
(4) Soil		
1. 0～5 cm	yearly	4 kg
2. 5～20cm	yearly	4 kg
(5) Sea water	yearly	40 ℓ
(6) Sea sediments	yearly	4 kg
=Dietary materials=		
(7) Total diet	semiyearly	daily amount for 5 persons
(8) Rice		
1. Producing districts	yearly (harvesting season)	5 kg (polished rice)
2. Consuming districts	yearly (harvesting season)	5 kg (polished rice)
(9) Milk		
1. Producing districts for WHO program	quarterly (February, May, August and November)	3 ℓ
2. Producing districts for domestic program	semiyearly (February and August)	3 ℓ

Sample	Frequency of sampling	Quantity of sample
3. Consuming districts	semiyearly (February and August)	3 ℓ
4. Powdered milk	semiyearly (April and October)	2～3 kg
(10) Vegetables		
1. Producing districts	yearly (harvesting season)	4 kg
2. Consuming districts	yearly (harvesting season)	4 kg
(11) Tea	yearly (the first harvesting season)	500g (manufactured tea)
(12) Fish, shellfish and seaweeds		
1. Sea fish	yearly (fishing season)	4 kg
2. Freshwater fish	yearly (fishing season)	4 kg
3. Shellfish	yearly (fishing season)	4 kg
4. Seaweeds	yearly (fishing season)	2～3 kg

2. Preparation of samples for analysis

(1) Rain, service water and freshwater

Strontium and cesium were eluted with hydrochloric acid from the cation exchange column. The residue of rain sample on the filter paper was ashed in an electric muffle furnace and the ash was dissolved in hydrochloric acid. The insoluble part was filtered and washed. The filtrate and the washings were combined to the previous eluate and used for radiochemical analysis.

(2) Soil and Sea sediment

Dried soil was crushed to smaller ones than 0.25 mm in size by a crusher. The sieved sample was ashed in an electric muffle furnace regulated at 450℃. The sample was then heated with hydrochloric acid, strontium and cesium carrier solutions and the mixture was heated. The insoluble constituent was filtered off and washed with water.

The dried sample was crushed to smaller ones than 0.25 mm by a crushing machine. The further preparation of the sample was the same as that described in the section 2-(2).

(3) Rice

The ashed sample was pulverized with a porcelain mortar and passed through a 0.35 mm sieve. The sieved sample to which both strontium and cesium carriers were added, was digested with nitric acid by heating. After the sample was heated again with nitric acid to dryness, strontium and cesium were extracted with hydrochloric acid and water. The insoluble constituent was filtered and washed. The filtrate and washings were combined for subsequent radiochemical analysis.

(4) Airborne dust, diet, milk, vegetables, fish and shellfish, seaweeds, tea and others

These ashed samples were treated with the same procedure as that described in the section 2-(4).

3. Separation of strontium-90 and cesium-137

(1) Strontium-90

Sample solutions, prepared as in the foregoing sections 2-(1) through 2-(4), were neutralized with sodium hydroxide. After sodium carbonate was added, the precipitate of strontium and calcium carbonates was separated. The supernatant solution was retained for cesium-137 determination. The carbonates were dissolved in hydrochloric acid and strontium and calcium were precipitated as oxalates. The precipitate was dissolved in nitric acid and strontium was separated from calcium by successive fuming nitric acid separation. Iron scavenge was made after addition of ferric iron carrier followed by barium chromate separation after addition of barium carrier to remove radium, its daughters and lead. Strontium was recovered as carbonate, and the precipitate was dried and weighed to determine strontium recovery. The strontium carbonate was dissolved in hydrochloric acid and iron carrier was added. The solution was allowed to stand for two weeks for strontium-90 and yttrium-90 to attain equilibrium. Yttrium-90 was coprecipitated with ferric hydroxide and the precipitate was filtered off, washed and counted.

(2) Cesium-137

The supernatant separated from the strontium fraction was acidified with hydrochloric acid. While stirring, cesium was adsorbed on the ammonium molyb-

dophosphate added.

After filtered off and washed with hydrochlotric acid the precipitate was dissolved in 2.5N sodium hydroxide solution. The solution was adjusted to pH 8.2 with hydrochloric acid and allowed to cool. Resultant molybdenum hydroxide which separated out in the solution, was filtered off and washed with water. EDTA was added to the filtrate and washings. Cesium and rubidium were adsorbed on a cation exchange column and cesium was separated from rubidium by eluting with hydrochloric acid.

The eluate was evaporated to dryness and was dissolved. The solution was filtered. Chloroplatinic acid was added to precipitate cesium. The precipitate was filtered onto a tared paper using a demountable filter and washed with water and then ethanol. After drying, the chemical yield of cesium was determined by weighing the precipitate. Cesium-137 radioactivity was measured for this precipitate.

4. Determination of stable strontium, calcium and potassium

A weighed amount of soil or sea sediment was heated in a electric muffle furnace at 450 ℃ and then treated with hydrochloric acid for extraction. A weighed aliquot of ashed samples of total diet, vegetables, milk, fish, shellfish or seaweeds was digested with hydrofluoric acid and nitric acid.
The extract was made up to an appropriate volume with dilute hydrochloric acid. The sample solution was analyzed for calcium by titration with standard potassium permanganate solution after separating calcium as oxalate. Atomic absorption spectroscopy was applied when appropriate. Stable strontium and potassium were determined by atomic absorption and flame emission spectrometry, respectively.

5. Counting

After the radiochemical separation the mounted precipitates were counted for activity using low background beta counters normally for 60 to 90 min. Net sample counting rates were corrected for counter efficiency, recovery, self-absorption and decay to obtain the content of strontium-90 and cesium-137 per sample aliquot. From the results, concentrations of these nuclides in the original samples were calculated.

6. Results

(1) Strontium-90 and Cesium-137 in Total Diet
(from Dec. 1988 to Jul. 1989)

-continued from NO. 89 of this publication-

Table (1): Strontium-90 and Cesium-137 in Total Diet

Location	Ash	Ca	K	^{90}Sr		^{137}Cs	
	(g/p·d)	(mg/p·d)	(mg/p·d)	(Bq/p·d)	(Bq/gCa)	(Bq/p·d)	(Bq/gK)
December, 1988							
Wakayama, WAKAYAMA	12.4	525	1290	0.065±0.009	0.12 ±0.018	0.074±0.007	0.057±0.005
February, 1989							
Tsu, MIE	15.0	587	1850	0.060±0.010	0.10 ±0.016	0.070±0.008	0.038±0.004
May, 1989							
Nagasaki, NAGASAKI	11.0	424	1250	0.038±0.007	0.089±0.017	0.044±0.005	0.035±0.004
June, 1989							
Sapporo, HOKKAIDO	18.1	506	2430	0.080±0.013	0.16 ±0.026	0.15 ±0.011	0.060±0.005
Aomori, AOMORI	19.6	555	2260	0.11 ±0.016	0.19 ±0.029	0.10 ±0.012	0.045±0.005
Yamagata, YAMAGATA	13.6	284	1310	0.048±0.009	0.17 ±0.031	0.065±0.007	0.050±0.005
Fukushima, FUKUSHIMA	15.9	765	1900	0.049±0.010	0.064±0.014	0.053±0.010	0.028±0.005
Mito, IBARAGI	17.4	698	2540	0.076±0.014	0.11 ±0.019	0.081±0.011	0.032±0.004
Shinjuku, TOKYO	7.47	166	1020	0.036±0.005	0.22 ±0.033	0.062±0.004	0.061±0.004
Tochigi-ken, TOCHIGI	14.9	418	2070	0.065±0.011	0.16 ±0.027	0.070±0.008	0.034±0.004
Toyama-ken, TOYAMA	14.1	599	1860	0.068±0.010	0.11 ±0.016	0.072±0.007	0.039±0.004
Kanazawa, ISHIKAWA	24.2	778	2320	0.12 ±0.014	0.15 ±0.018	0.083±0.010	0.036±0.004
Fukui, FUKUI	13.5	548	1950	0.062±0.010	0.11 ±0.018	0.15 ±0.011	0.079±0.005
Nagano, NAGANO	15.4	688	2110	0.089±0.012	0.13 ±0.017	0.10 ±0.008	0.049±0.004
Koufu, YAMANASHI	12.5	521	1720	0.074±0.011	0.14 ±0.021	0.11 ±0.009	0.062±0.005
Shizuoka, SHIZUOKA	19.3	955	2380	0.093±0.015	0.098±0.015	0.15 ±0.013	0.063±0.006
Tsu, MIE	16.0	464	1640	0.067±0.012	0.14 ±0.026	0.042±0.009	0.026±0.006
Kyoto, KYOTO	18.1	757	2510	0.060±0.012	0.079±0.016	0.18 ±0.012	0.071±0.005
Kakogawa, HYOGO	14.6	577	1790	0.055±0.010	0.096±0.017	0.044±0.006	0.025±0.003
Fukube-mura, TOTTORI	13.2	347	1630	0.093±0.011	0.27 ±0.032	0.076±0.007	0.047±0.004
Okayama, OKAYAMA	16.6	490	2160	0.044±0.011	0.089±0.022	0.074±0.008	0.034±0.004
Yamaguchi, YAMAGUCHI	15.6	605	2320	0.051±0.011	0.085±0.019	0.084±0.010	0.036±0.004
Matsuyama, EHIME	13.3	471	1930	0.031±0.009	0.065±0.019	0.030±0.005	0.015±0.002
Kochi, KOCHI	15.0	593	2150	0.077±0.012	0.13 ±0.020	0.061±0.007	0.028±0.003
Takamatsu, KAGAWA	15.0	440	2160	0.051±0.011	0.12 ±0.026	0.051±0.009	0.024±0.004
Dazaifu, FUKUOKA	13.0	351	1840	0.043±0.009	0.12 ±0.025	0.077±0.007	0.042±0.004
Saga, SAGA	11.2	227	1470	0.018±0.008	0.081±0.034	0.023±0.006	0.016±0.004

Location	Ash	Ca	K	^{90}Sr		^{137}Cs	
	(g/p·d)	(mg/p·d)	(mg/p·d)	(Bq/p·d)	(Bq/gCa)	(Bq/p·d)	(Bq/gK)
Ooita, OOITA	17.4	560	2270	0.080 ± 0.014	0.14 ± 0.024	0.066 ± 0.010	0.029 ± 0.005
Miyazaki, MIYAZAKI	16.3	476	2150	0.064 ± 0.011	0.13 ± 0.022	0.11 ± 0.009	0.049 ± 0.004
Ookuchi, KAGOSHIMA	15.9	431	1800	0.066 ± 0.012	0.15 ± 0.028	0.089 ± 0.008	0.049 ± 0.004
Naha, OKINAWA	15.1	457	2280	0.072 ± 0.012	0.16 ± 0.026	0.085 ± 0.010	0.037 ± 0.004
July, 1989							
Akita, AKITA	12.8	438	1690	0.045 ± 0.008	0.10 ± 0.019	0.16 ± 0.011	0.098 ± 0.006
Neyagawa, OSAKA	14.0	443	1840	0.045 ± 0.011	0.10 ± 0.024	0.10 ± 0.010	0.057 ± 0.006

(2)-1 Strontium-90 and Cesium-137 in Rice(producing districts)
(from Sep. 1988 to Dec. 1989)

-continued from NO. 89 of this publication-

Table (2)-1: Strontium-90 and Cesium-137 in Rice

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
September, 1988							
Matsusaka, MIE	0.576	0.039	0.915	0.0021 ± 0.0091	0.05 ± 0.23	0.0051 ± 0.0055	0.0055 ± 0.0060
August, 1989							
Sadowara-machi, MIYAZAKI	0.489	0.040	0.713	0.0000 ± 0.0078	0.00 ± 0.20	0.0034 ± 0.0064	0.0048 ± 0.0090
September, 1989							
Utsunomiya, TOCHIGI	0.570	0.044	0.912	0.014 ± 0.0026	0.33 ± 0.060	0.034 ± 0.0050	0.037 ± 0.0054
Matsusaka, MIE	0.530	0.037	1.02	0.0000 ± 0.0080	0.00 ± 0.22	0.017 ± 0.0075	0.017 ± 0.0073
October, 1989							
Mito, IBARAGI	0.560	0.046	1.01	0.0041 ± 0.0094	0.09 ± 0.21	0.038 ± 0.0086	0.037 ± 0.0085
Toyoshina-machi, NAGANO	0.579	0.042	0.937	0.0043 ± 0.0021	0.10 ± 0.050	0.0065 ± 0.0030	0.0069 ± 0.0032
Tsuda-machi, KAGAWA	0.696	0.040	1.06	0.0014 ± 0.0060	0.03 ± 0.15	0.0013 ± 0.0034	0.0012 ± 0.0032
Usa, OOITA	0.605	0.043	1.03	0.0041 ± 0.0027	0.097 ± 0.063	0.0076 ± 0.0035	0.0073 ± 0.0034
November, 1989							
Ishikari-machi, HOKKAIDO	0.579	0.040	0.926	0.0087 ± 0.0055	0.22 ± 0.14	0.021 ± 0.0040	0.022 ± 0.0043
Takisawa-mura, IWATE	0.628	0.043	1.05	0.011 ± 0.0056	0.25 ± 0.13	0.41 ± 0.014	0.39 ± 0.013
Fukushima, FUKUSHIMA	0.592	0.044	1.09	0.010 ± 0.0025	0.23 ± 0.056	0.011 ± 0.0039	0.0098 ± 0.0035
Kosugi-machi, TOYAMA	0.604	0.038	0.839	0.021 ± 0.0063	0.55 ± 0.17	0.027 ± 0.0057	0.033 ± 0.0068
Nagasaka-machi, YAMANASHI	0.596	0.038	0.774	0.0000 ± 0.0022	0.00 ± 0.057	0.011 ± 0.0037	0.014 ± 0.0048
Kasai, HYOGO	0.361	0.034	0.534	0.0069 ± 0.0021	0.20 ± 0.063	0.0046 ± 0.0026	0.0086 ± 0.0048
Kagoshima, KAGOSHIMA	0.541	0.039	0.757	0.0028 ± 0.0019	0.072 ± 0.049	0.088 ± 0.0071	0.12 ± 0.009
December, 1989							
Tajiri-machi, MIYAGI	0.695	0.041	0.924	0.0069 ± 0.0025	0.17 ± 0.060	0.024 ± 0.0051	0.026 ± 0.0056
Yamaguchi, YAMAGUCHI	0.598	0.048	0.843	0.0043 ± 0.0026	0.090 ± 0.054	0.049 ± 0.0054	0.058 ± 0.0064
Chikushino, FUKUOKA	0.603	0.041	0.970	0.0044 ± 0.0026	0.11 ± 0.064	0.014 ± 0.0040	0.014 ± 0.0041

(2)-2 Strontium-90 and Cesium-137 in Rice(consuming districts) (from Dec. 1988 to Dec. 1989)

-continued from NO. 89 of this publication-

Table (2)-2: Strontium-90 and Cesium-137 in Rice

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
December, 1988							
Matsue, SHIMANE	0.392	0.036	0.705	0.012 ± 0.0081	0.33 ± 0.22	0.15 ± 0.011	0.21 ± 0.016
January, 1989							
Nagasaki, NAGASAKI	0.432	0.038	0.781	0.0000 ± 0.0082	0.00 ± 0.22	0.041 ± 0.0073	0.052 ± 0.0093
February, 1989							
Shinguu, WAKAYAMA	0.562	0.034	1.02	0.0089 ± 0.010	0.26 ± 0.30	0.013 ± 0.0055	0.012 ± 0.0054
Yonagusuku-mura, OKINAWA	0.473	0.037	0.969	0.0090 ± 0.010	0.24 ± 0.28	0.022 ± 0.0065	0.023 ± 0.0067
September, 1989							
Kanazawa, ISHIKAWA	0.556	0.045	1.16	0.0042 ± 0.0096	0.09 ± 0.22	0.012 ± 0.0082	0.010 ± 0.0071
October, 1989							
Akita, AKITA	0.474	0.032	0.734	0.019 ± 0.0049	0.60 ± 0.15	0.13 ± 0.007	0.18 ± 0.010
Mito, IBARAGI	0.504	0.041	0.851	0.0000 ± 0.0074	0.00 ± 0.18	0.011 ± 0.0069	0.013 ± 0.0081
Fukui, FUKUI	0.525	0.038	0.740	0.0041 ± 0.0047	0.11 ± 0.012	0.028 ± 0.0041	0.038 ± 0.0056
Matsuyama, EHIME	0.478	0.045	0.970	0.0000 ± 0.0041	0.00 ± 0.090	0.0016 ± 0.0024	0.0016 ± 0.0024
November, 1989							
Sapporo, HOKKAIDO	0.545	0.041	0.975	0.0089 ± 0.0053	0.22 ± 0.13	0.011 ± 0.0033	0.012 ± 0.0034
Yamagata, YAMAGATA	0.534	0.034	0.694	0.015 ± 0.0052	0.44 ± 0.15	0.039 ± 0.0046	0.056 ± 0.0067
Shizuoka, SHIZUOKA	0.513	0.042	0.677	0.014 ± 0.0028	0.34 ± 0.067	0.049 ± 0.0054	0.073 ± 0.0079
Kyoto, KYOTO	0.671	0.041	1.13	0.0090 ± 0.0061	0.22 ± 0.15	0.0013 ± 0.0051	0.0011 ± 0.0045
Osaka, OSAKA	0.560	0.044	1.01	0.014 ± 0.0027	0.32 ± 0.060	0.019 ± 0.0050	0.019 ± 0.0049
Kobe, HYOGO	0.503	0.043	0.819	0.0038 ± 0.0021	0.088 ± 0.050	0.033 ± 0.0040	0.040 ± 0.0049
Saga, SAGA	0.671	0.038	1.32	0.0000 ± 0.0056	0.00 ± 0.15	0.014 ± 0.0040	0.011 ± 0.0030
Yonagusuku-mura, OKINAWA	0.519	0.040	1.08	0.0079 ± 0.0022	0.20 ± 0.055	0.023 ± 0.0048	0.021 ± 0.0044
December, 1989							
Yokohama, KANAGAWA	0.505	0.041	0.737	0.017 ± 0.0026	0.41 ± 0.063	0.065 ± 0.0059	0.087 ± 0.0080
Nagoya, AICHI	0.521	0.039	0.724	0.0053 ± 0.0024	0.14 ± 0.062	0.031 ± 0.0042	0.043 ± 0.0057
Tottori, TOTTORI	0.539	0.039	0.759	0.0092 ± 0.0026	0.24 ± 0.067	0.046 ± 0.0049	0.061 ± 0.0064
Seto-machi, OKAYAMA	0.529	0.037	0.798	0.0065 ± 0.0025	0.18 ± 0.067	0.0018 ± 0.0025	0.0022 ± 0.0031
Hiroshima, HIROSHIMA	0.463	0.044	0.754	0.012 ± 0.0021	0.27 ± 0.049	0.035 ± 0.0044	0.046 ± 0.0058
Kasuga, FUKUOKA	0.494	0.043	0.815	0.020 ± 0.0030	0.46 ± 0.070	0.010 ± 0.0031	0.012 ± 0.0038

(3)-1 Strontium-90 and Cesium-137 in Milk(producing districts for domestic program)
(from Dec. 1988 to Oct. 1989)

-continued from NO. 89 of this publication-

Table (3)-1: Strontium-90 and Cesium-137 in Milk

Location	Component			^{90}Sr		^{137}Cs	
	Ash(g/ℓ)	Ca(g/ℓ)	K(g/ℓ)	Bq/ℓ	Bq/gCa	Bq/ℓ	Bq/gK
December, 1988							
Oouchiyama-mura, MIE	7.38	1.19	1.66	0.038±0.009	0.032±0.008	0.020±0.005	0.012±0.003
February, 1989							
Takisawa-mura, IWATE	7.38	1.13	1.76	0.036±0.009	0.032±0.008	0.10 ±0.009	0.058±0.005
March, 1989							
Oouchiyama-mura, MIE	7.24	1.14	1.65	0.028±0.009	0.025±0.008	0.015±0.005	0.009±0.003
June, 1989							
Yamato-machi, SAGA	7.12	1.06	1.61	0.031±0.009	0.029±0.008	0.026±0.005	0.016±0.003
August, 1989							
Aomori, AOMORI	7.00	1.08	1.56	0.24 ±0.014	0.22 ±0.013	0.21 ±0.012	0.13 ±0.008
Takisawa-mura, IWATE	7.53	1.13	1.73	0.031±0.005	0.027±0.004	0.12 ±0.009	0.069±0.005
Mito, IBARAGI	6.69	1.20	1.66	0.038±0.005	0.031±0.004	0.030±0.007	0.018±0.005
Nishinasuno-machi, TOCHIGI	7.33	1.11	1.72	0.060±0.010	0.055±0.009	0.029±0.006	0.017±0.004
Tonami, TOYAMA	7.37	1.19	1.47	0.039±0.005	0.033±0.004	0.028±0.005	0.019±0.004
Oshimizu-machi, ISHIKAWA	7.18	1.16	1.58	0.031±0.004	0.027±0.004	0.65 ±0.020	0.41 ±0.013
Takane-machi, YAMANASHI	6.44	1.04	1.38	0.029±0.004	0.028±0.004	0.016±0.004	0.011±0.003
Mihara-machi, HYOGO	7.16	1.13	1.57	0.034±0.005	0.030±0.004	0.081±0.007	0.052±0.005
Matsuyama, EHIME	7.64	1.23	1.65	0.033±0.009	0.027±0.007	0.004±0.006	0.003±0.004
Takasa-machi, KAGAWA	7.41	1.15	1.67	0.016±0.004	0.014±0.004	0.016±0.005	0.009±0.003
Kujuu-machi, OOITA	6.55	1.04	1.46	0.031±0.004	0.029±0.004	0.12 ±0.008	0.083±0.006
Takahara-machi, MIYAZAKI	6.75	1.04	1.57	0.022±0.008	0.021±0.007	0.31 ±0.014	0.20 ±0.009
October, 1989							
Yamato-machi, SAGA	7.43	1.24	1.56	0.032±0.005	0.026±0.004	0.019±0.005	0.012±0.003

(3)-2 Strontium-90 and Cesium-137 in Milk(producing districts for WHO program) (from May 1989 to Jan. 1990)

-continued from NO. 89 of this publication-

Table (3)-2: Strontium-90 and Cesium-137 in Milk

Location	Component			^{90}Sr		^{137}Cs	
	Ash(g/ℓ)	Ca(g/ℓ)	K(g/ℓ)	Bq/ℓ	Bq/gCa	Bq/ℓ	Bq/gK
May, 1989							
Sapporo, HOKKAIDO	7.37	1.15	1.59	0.042 ± 0.008	0.037 ± 0.007	0.10 ± 0.010	0.065 ± 0.006
Hachijo-Island, TOKYO	6.95	0.975	1.38	0.087 ± 0.010	0.089 ± 0.010	0.17 ± 0.011	0.13 ± 0.008
Katsuyama, FUKUI	7.16	1.10	1.50	0.047 ± 0.008	0.042 ± 0.007	0.081 ± 0.008	0.054 ± 0.006
Nose-machi, OSAKA	7.27	1.06	1.50	0.032 ± 0.007	0.030 ± 0.007	0.043 ± 0.007	0.029 ± 0.005
Hikawa-machi, SHIMANE	7.75	1.17	1.90	0.059 ± 0.010	0.051 ± 0.008	0.032 ± 0.007	0.017 ± 0.004
Takamiya-machi, HIROSHIMA	6.92	1.07	1.48	0.028 ± 0.007	0.026 ± 0.007	0.018 ± 0.006	0.012 ± 0.004
Kochi, KOCHI	7.08	1.09	1.48	0.097 ± 0.010	0.089 ± 0.009	0.040 ± 0.008	0.027 ± 0.005
Fukuma-machi, FUKUOKA	7.73	1.24	1.57	0.018 ± 0.008	0.014 ± 0.006	0.060 ± 0.008	0.038 ± 0.005
Kajiki-machi, KAGOSHIMA	7.10	1.10	1.53	0.020 ± 0.007	0.018 ± 0.007	0.045 ± 0.008	0.029 ± 0.005
August, 1989							
Sapporo, HOKKAIDO	7.50	1.15	1.64	0.042 ± 0.009	0.037 ± 0.008	0.16 ± 0.011	0.097 ± 0.007
Hachijo-Island, TOKYO	7.05	1.04	1.35	0.086 ± 0.006	0.082 ± 0.006	0.11 ± 0.008	0.078 ± 0.006
Katsuyama, FUKUI	7.34	1.22	1.51	0.048 ± 0.009	0.040 ± 0.007	0.12 ± 0.010	0.080 ± 0.007
Nose-machi, OSAKA	7.40	1.11	1.53	0.033 ± 0.005	0.030 ± 0.005	0.025 ± 0.005	0.016 ± 0.004
Hikawa-machi, SHIMANE	7.45	1.06	1.56	0.057 ± 0.009	0.053 ± 0.008	0.081 ± 0.007	0.052 ± 0.005
Takamiya-machi, HIROSHIMA	6.06	0.918	1.33	0.018 ± 0.006	0.020 ± 0.007	0.009 ± 0.005	0.007 ± 0.004
Kochi, KOCHI	7.36	1.09	1.54	0.064 ± 0.010	0.059 ± 0.009	0.044 ± 0.008	0.029 ± 0.005
Fukuma-machi, FUKUOKA	7.13	1.18	1.56	0.028 ± 0.005	0.024 ± 0.004	0.17 ± 0.011	0.11 ± 0.007
Kajiki-machi, KAGOSHIMA	6.95	1.07	1.44	0.024 ± 0.004	0.022 ± 0.004	0.064 ± 0.008	0.044 ± 0.006
November, 1989							
Sapporo, HOKKAIDO	7.29	1.14	1.67	0.055 ± 0.006	0.048 ± 0.005	0.068 ± 0.008	0.041 ± 0.005
Katsuyama, FUKUI	7.68	1.25	1.67	0.049 ± 0.006	0.039 ± 0.005	0.056 ± 0.007	0.034 ± 0.004
Nose-machi, OSAKA	7.77	1.25	1.63	0.030 ± 0.008	0.024 ± 0.006	0.026 ± 0.005	0.016 ± 0.003
Kochi, KOCHI	7.53	1.21	1.62	0.068 ± 0.006	0.056 ± 0.005	0.024 ± 0.005	0.015 ± 0.003
Fukuma-machi, FUKUOKA	7.60	1.24	1.69	0.040 ± 0.008	0.033 ± 0.007	0.040 ± 0.007	0.024 ± 0.004
Kajiki-machi, KAGOSHIMA	7.40	1.17	1.57	0.033 ± 0.008	0.028 ± 0.007	0.045 ± 0.007	0.029 ± 0.005
December, 1989							
Takamiya-machi, HIROSHIMA	7.24	1.12	1.56	0.021 ± 0.007	0.019 ± 0.006	0.010 ± 0.006	0.006 ± 0.004
January, 1990							
Nose-machi, OSAKA	7.56	1.18	1.59	0.027 ± 0.007	0.023 ± 0.006	0.025 ± 0.007	0.016 ± 0.004

(3)-3 Strontium-90 and Cesium-137 in .lk(consuming districts)
(from Aug. 1988 to Jan. 1990)

-continued from NO. 89 of this publication-

Table (3)-3: Strontium-90 and Cesium-137 in Milk

Location	Component			^{90}Sr		^{137}Cs	
	Ash(g/ℓ)	Ca(g/ℓ)	K(g/ℓ)	Bq/ℓ	Bq/gCa	Bq/ℓ	Bq/gK
August, 1988							
Nagasaki, NAGASAKI	6.67	1.04	1.51	0.019±0.023	0.019±0.022	0.000±0.010	0.000±0.006
February, 1989							
Shinguu, WAKAYAMA	6.14	0.999	1.35	0.036±0.008	0.036±0.008	0.005±0.004	0.004±0.003
May, 1989							
Sendai, MIYAGI	7.24	1.15	1.64	0.025±0.008	0.022±0.007	0.009±0.006	0.006±0.004
Kyoto, KYOTO	7.19	1.09	1.56	0.027±0.008	0.025±0.007	0.047±0.008	0.030±0.005
June, 1989							
Yonagusuku-mura, OKINAWA	7.11	1.11	1.66	0.029±0.008	0.026±0.007	0.010±0.006	0.006±0.004
August, 1989							
Sapporo, HOKKAIDO	7.40	1.13	1.58	0.036±0.009	0.032±0.008	0.17 ±0.012	0.11 ±0.007
Akita, AKITA	7.16	1.03	1.46	0.054±0.010	0.052±0.009	0.038±0.007	0.026±0.005
Yamagata, YAMAGATA	7.45	1.16	1.66	0.024±0.008	0.021±0.007	0.060±0.008	0.036±0.005
Shinjuku, TOKYO	7.07	1.08	1.56	0.025±0.004	0.023±0.004	0.028±0.005	0.018±0.003
Nagano, NAGANO	7.11	1.19	1.60	0.045±0.012	0.038±0.010	0.018±0.007	0.011±0.004
Shizuoka, SHIZUOKA	7.02	1.11	1.60	0.022±0.008	0.020±0.007	0.048±0.007	0.030±0.005
Osaka, OSAKA	6.98	1.06	1.49	0.049±0.008	0.047±0.008	0.058±0.008	0.039±0.005
Yonago, TOTTORI	7.80	1.09	1.51	0.042±0.009	0.038±0.008	0.034±0.007	0.023±0.005
Matsue, SHIMANE	7.39	1.17	1.66	0.032±0.005	0.028±0.004	0.067±0.007	0.040±0.004
Okayama, OKAYAMA	7.13	1.10	1.61	0.019±0.004	0.017±0.004	0.028±0.005	0.018±0.003
Hiroshima, HIROSHIMA	6.56	1.03	1.47	0.016±0.006	0.015±0.006	0.016±0.006	0.011±0.004
Yamaguchi, YAMAGUCHI	7.21	1.11	1.61	0.026±0.005	0.023±0.004	0.027±0.007	0.017±0.004
Matsuyama, EHIME	7.00	1.09	1.55	0.022±0.008	0.020±0.007	0.029±0.007	0.019±0.004
Kochi, KOCHI	6.88	1.06	1.54	0.047±0.009	0.044±0.008	0.014±0.006	0.009±0.004
Chikushino, FUKUOKA	7.38	1.12	1.66	0.019±0.008	0.017±0.007	0.056±0.008	0.033±0.005
Nagasaki, NAGASAKI	6.79	1.05	1.51	0.021±0.004	0.020±0.004	0.016±0.007	0.011±0.005
Kagoshima, KAGOSHIMA	7.40	1.13	1.55	0.022±0.004	0.020±0.004	0.071±0.009	0.046±0.006
September, 1989							
Sendai, MIYAGI	7.16	1.14	1.66	0.034±0.009	0.030±0.008	0.013±0.006	0.008±0.004
October, 1989							
Fukushima, FUKUSHIMA	7.35	1.16	1.62	0.025±0.004	0.021±0.004	0.036±0.007	0.022±0.004

Location	Component			^{90}Sr		^{137}Cs	
	Ash(g/ℓ)	Ca(g/ℓ)	K(g/ℓ)	Bq/ℓ	Bq/gCa	Bq/ℓ	Bq/gK
Kyoto, KYOTO	7.38	1.14	1.59	0.030±0.005	0.026±0.005	0.044±0.008	0.027±0.005
December, 1989 Akita, AKITA	6.08	0.953	1.29	0.024±0.004	0.026±0.004	0.061±0.006	0.048±0.005
January, 1990 Osaka, OSAKA	7.28	1.12	1.56	0.038±0.008	0.034±0.007	0.031±0.007	0.020±0.005

(3)-4 Strontium-90 and Cesium-137 in Milk(powderd milk)

-continued from NO. 89 of this publication-

Table (3)-4: Strontium-90 and Cesium-137 in Milk

Market Milk	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
July, 1989							
Sample A	8.07	12.5	17.6	0.51 ± 0.034	0.040 ± 0.0027	1.0 ± 0.04	0.058 ± 0.0020
Sample B	2.35	3.36	5.45	0.078 ± 0.012	0.023 ± 0.0037	0.60 ± 0.021	0.11 ± 0.004
Sample C	7.94	12.1	17.8	0.80 ± 0.043	0.066 ± 0.0035	1.7 ± 0.05	0.097 ± 0.0025
Sample D	2.56	4.10	5.45	0.046 ± 0.010	0.011 ± 0.0024	0.26 ± 0.013	0.047 ± 0.0024
Sample E	2.54	4.01	5.23	0.12 ± 0.013	0.029 ± 0.0032	0.37 ± 0.016	0.070 ± 0.0030
Sample F	2.58	3.84	5.60	0.057 ± 0.012	0.015 ± 0.0030	0.62 ± 0.020	0.11 ± 0.004

*Skim milk

(4)-1 Strontium-90 and Cesium-137 in Vegetables(producing districts) (from Feb. 1989 to Dec. 1989)

-continued from NO. 89 of this publication-

Table (4)-1: Strontium-90 and Cesium-137 in Vegetables

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
(Japanese radish)							
February, 1989							
Shinguu, WAKAYAMA	0.582	0.200	2.13	0.36 ± 0.018	1.8 ± 0.09	0.006 ± 0.003	0.0027 ± 0.0014
May, 1989							
Tahara-machi, AICHI	0.976	0.236	4.13	0.092 ± 0.015	0.39 ± 0.065	0.009 ± 0.006	0.0022 ± 0.0014
August, 1989							
Ishikari-machi, HOKKAIDO	0.526	0.206	2.41	0.21 ± 0.020	1.0 ± 0.10	0.024 ± 0.007	0.0098 ± 0.0027
October, 1989							
Saku, NAGANO	0.539	0.354	2.28	0.20 ± 0.012	0.56 ± 0.035	0.029 ± 0.009	0.013 ± 0.0041
November, 1989							
Fukushima, FUKUSHIMA	0.471	0.277	1.69	0.098 ± 0.009	0.35 ± 0.032	0.000 ± 0.008	0.000 ± 0.0040
Kosugi-machi, TOYAMA	0.487	0.232	2.13	0.044 ± 0.013	0.19 ± 0.058	0.020 ± 0.006	0.0095 ± 0.0028
December, 1989							
Kokufu-machi, TOTTORI	0.449	0.166	1.97	0.21 ± 0.013	1.3 ± 0.08	0.000 ± 0.007	0.000 ± 0.0040
(Onion)							
July, 1989							
Kumatori-machi, OSAKA	0.369	0.109	1.71	0.034 ± 0.013	0.31 ± 0.12	0.009 ± 0.005	0.0052 ± 0.0029
(Spinach)							
May, 1989							
Tahara-machi, AICHI	1.22	0.384	5.19	0.017 ± 0.012	0.044 ± 0.032	0.002 ± 0.008	0.0005 ± 0.0020
August, 1989							
Ishikari-machi, HOKKAIDO	2.07	0.524	9.12	0.098 ± 0.017	0.19 ± 0.032	0.009 ± 0.006	0.0010 ± 0.0006
October, 1989							
Takamatsu, KAGAWA	1.68	0.521	8.04	0.11 ± 0.017	0.21 ± 0.033	0.000 ± 0.008	0.000 ± 0.0010
November, 1989							
Fukushima, FUKUSHIMA	1.50	0.811	6.22	0.11 ± 0.009	0.14 ± 0.011	0.027 ± 0.010	0.0044 ± 0.0015

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
Kasai, HYOGO	1.50	0.488	7.15	0.091±0.009	0.19 ±0.019	0.000±0.008	0.000 ±0.0010
Kurayoshi, TOTTORI	1.84	0.749	6.90	0.10 ±0.010	0.14 ±0.013	0.19 ±0.015	0.027 ±0.0022
(Chinese cabbage)							
February, 1989							
Shinguu, WAKAYAMA	0.616	0.237	2.29	0.098±0.011	0.41 ±0.046	0.011±0.004	0.0049±0.0015
October, 1989							
Tamayama-mura, IWATE	0.705	0.487	3.04	0.15 ±0.017	0.31 ±0.035	0.014±0.008	0.0046±0.0026
November, 1989							
Utsunomiya, TOCHIGI	0.621	0.488	2.54	0.07 ±0.008	0.14 ±0.015	0.008±0.008	0.0031±0.0031

(4)-2 Strontium-90 and Cesium-137 in Vegetables(consuming districts) (from Nov. 1988 to Nov. 1989)

-continued from NO. 89 of this publication-

Table (4)-2: Strontium-90 and Cesium-137 in Vegetables

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
(Japanese radish)							
September, 1989							
Sendai, MIYAGI	0.629	0.241	2.99	0.29 ± 0.022	1.2 ± 0.09	0.013 ± 0.006	0.0043 ± 0.0019
October, 1989							
Yamagata, YAMAGATA	0.511	0.270	2.31	0.19 ± 0.018	0.69 ± 0.066	0.011 ± 0.008	0.0047 ± 0.0033
November, 1989							
Akita, AKITA	0.467	0.259	2.05	0.40 ± 0.026	1.5 ± 0.10	0.076 ± 0.011	0.037 ± 0.0053
Kanazawa, ISHIKAWA	0.505	0.186	2.26	0.12 ± 0.015	0.65 ± 0.082	0.008 ± 0.005	0.0036 ± 0.0022
(Cabbage)							
November, 1989							
Akita, AKITA	0.624	0.727	2.30	0.36 ± 0.023	0.50 ± 0.032	0.082 ± 0.011	0.036 ± 0.0046
(Spinach)							
November, 1988							
Kyoto, KYOTO	1.68	0.890	5.70	0.068 ± 0.014	0.077 ± 0.015	0.007 ± 0.005	0.0012 ± 0.0009
May, 1989							
Sendai, MIYAGI	1.45	1.84	4.44	0.55 ± 0.028	0.30 ± 0.015	0.020 ± 0.006	0.0045 ± 0.0014
October, 1989							
Yamagata, YAMAGATA	1.77	0.394	8.27	0.051 ± 0.014	0.13 ± 0.036	0.001 ± 0.008	0.0002 ± 0.0010
November, 1989							
Shinjuku, TOKYO	1.51	0.753	6.07	0.18 ± 0.020	0.23 ± 0.026	0.055 ± 0.011	0.0090 ± 0.0017
Kanazawa, ISHIKAWA	1.42	0.294	6.53	0.048 ± 0.014	0.16 ± 0.046	0.016 ± 0.006	0.0025 ± 0.0009
Osaka, OSAKA	2.08	0.822	9.50	0.088 ± 0.009	0.11 ± 0.011	0.009 ± 0.010	0.0009 ± 0.0010
Saga, SAGA	1.80	1.59	6.58	0.033 ± 0.007	0.020 ± 0.004	0.047 ± 0.010	0.0072 ± 0.0016

(5) Strontium-90 and Cesium-137 in Tea(Japanese Tea)
(from May 1988 to Jun. 1989)

-continued from NO. 89 of this publication-

Table (5): Strontium-90 and Cesium-137 in Tea(Japanese Tea)

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kg	Bq/gCa	Bq/Kg	Bq/gK
May, 1988							
Kameyama, MIE	5.15	2.81	18.4	0.58±0.089	0.21 ±0.032	2.9 ±0.11	0.16 ±0.006
Oodai-machi, MIE	5.03	1.72	19.2	0.44±0.084	0.26 ±0.049	2.3 ±0.10	0.12 ±0.005
May, 1989							
Shuzenji-machi, SHIZUOKA	4.92	2.63	18.9	2.6 ±0.13	1.0 ±0.05	1.6 ±0.09	0.086±0.0047
Iwata, SHIZUOKA	4.74	2.48	18.5	0.44±0.068	0.18 ±0.028	0.49±0.055	0.027±0.0030
Kameyama, MIE	5.17	2.11	19.0	0.69±0.086	0.32 ±0.041	0.22±0.052	0.012±0.0027
Oodai-machi, MIE	5.02	1.82	21.0	0.38±0.080	0.21 ±0.045	1.9 ±0.10	0.089±0.0045
Uji, KYOTO	4.43	2.45	19.0	1.2 ±0.10	0.48 ±0.042	0.29±0.049	0.015±0.0026
Kaya-machi, KYOTO	4.82	3.36	25.7	1.9 ±0.13	0.56 ±0.039	0.84±0.070	0.033±0.0027
Kawaminami-machi, MIYAZAKI	4.89	2.28	22.4	1.1 ±0.10	0.46 ±0.045	5.0 ±0.15	0.22 ±0.007
Miyakonojou, MIYAZAKI	4.81	2.55	21.9	0.28±0.070	0.11 ±0.028	0.97±0.073	0.044±0.0033
June, 1989							
Miyanojou-machi, KAGOSHIMA	5.52	2.94	20.3	1.4 ±0.08	0.48 ±0.027	0.67±0.069	0.033±0.0034
Chiran-machi, KAGOSHIMA	4.73	2.68	19.2	0.33±0.076	0.12 ±0.029	1.6 ±0.09	0.081±0.0046

(6) **Strontium-90 and Cesium-137 in Sea Fish (from Feb. 1989 to Jul. 1989)**

-continued from NO. 89 of this publication-

Table (6): Strontium-90 and Cesium-137 in Sea Fish

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
(Trachurus japonicus) February, 1989 Shinguu, WAKAYAMA	1.23	2.77	1.18	0.009±0.009	0.0033±0.0033	0.087±0.009	0.074 ±0.0079
(Sebastiscus marmoratus) April, 1989 Hamada, SHIMANE	5.32	16.3	2.53	0.020±0.010	0.0012±0.0006	0.16 ±0.012	0.065 ±0.0049
(Katsuwonus pelamis) May, 1989 Tosa, KOCHI	1.31	0.176	4.44	0.000±0.010	0.000 ±0.056	0.49 ±0.020	0.11 ±0.005
(Chrysophrys major) July, 1989 Oga, AKITA	6.00	15.5	3.00	0.053±0.011	0.0034±0.0007	0.23 ±0.015	0.077 ±0.0048
(Caesio chrysozonus cuvier) February, 1989 Yonagusuku-mura, OKINAWA	3.31	7.56	4.33	0.019±0.010	0.0025±0.0013	0.17 ±0.012	0.040 ±0.0028
(Ammodytes personatus Girard) May, 1989 Akashi, HYOGO	2.23	2.69	4.46	0.000±0.008	0.000 ±0.003	0.12 ±0.009	0.026 ±0.0021

Sea Fish

Japanese name	English name	Scientific name
Aji	Horse mackerel	Trachurus japonicus
Kasago	Scorpion-fish	Sebastiscus marmoratus
Katsuo	Bonito	Katsuwonus pelamis
Tai	Sea bream	Chrysophrys major
Takasago	Black-tipped fusilier	Caesio chrysozonus cuvier
Ikanago	Sando lance	Ammodytes personatus Girard

(7) Strontium-90 and Cesium-137 in Shellfish (from Feb. 1989 to Jun. 1989)

-continued from NO. 89 of this publication-

Table (7): Strontium-90 and Cesium-137 in Shellfish

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
(Venerupis phillipinarum) May, 1989 Takaki-machi, NAGASAKI	1.41	0.615	1.60	0.000±0.027	0.000 ±0.044	0.012±0.020	0.007 ±0.012
(Turbo cornutus) June, 1989 Sakata, YAMAGATA	2.76	1.50	2.91	0.000±0.010	0.000 ±0.007	0.062±0.008	0.021 ±0.0027
(Pecter Yessoensis) February, 1989 Yamada-machi, IWATE	2.07	0.403	3.14	0.011±0.011	0.027 ±0.028	0.049±0.0075	0.016 ±0.0024

Shellfish

Japanese name	English name	Scientific name
Asari	Short-necked clam	Venerupis phillipinarum
Sazae	Wreath shell	Turbo cornutus
Hotategai	Scallop	Pecter Yessoensis

(8) Strontium-90 and Cesium-137 in Seaweeds
(from Apr. 1989 to Jun. 1989)

-continued from NO. 89 of this publication-

Table (8): Strontium-90 and Cesium-137 in Seaweeds

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
(Undaria pinnatifida)							
April, 1989							
Togi-machi, ISHIKAWA	3.94	0.971	8.57	0.023 ± 0.011	0.024 ± 0.012	0.053 ± 0.008	0.006 ± 0.0009
June, 1989							
Sakata, YAMAGATA	2.72	1.20	5.46	0.034 ± 0.012	0.028 ± 0.010	0.039 ± 0.007	0.007 ± 0.0012

Seaweeds

Japanese name	English name	Scientific name
Wakame	Wakame seaweed	Undaria pinnatifida

＊＊＊　Total Diet　＊＊＊

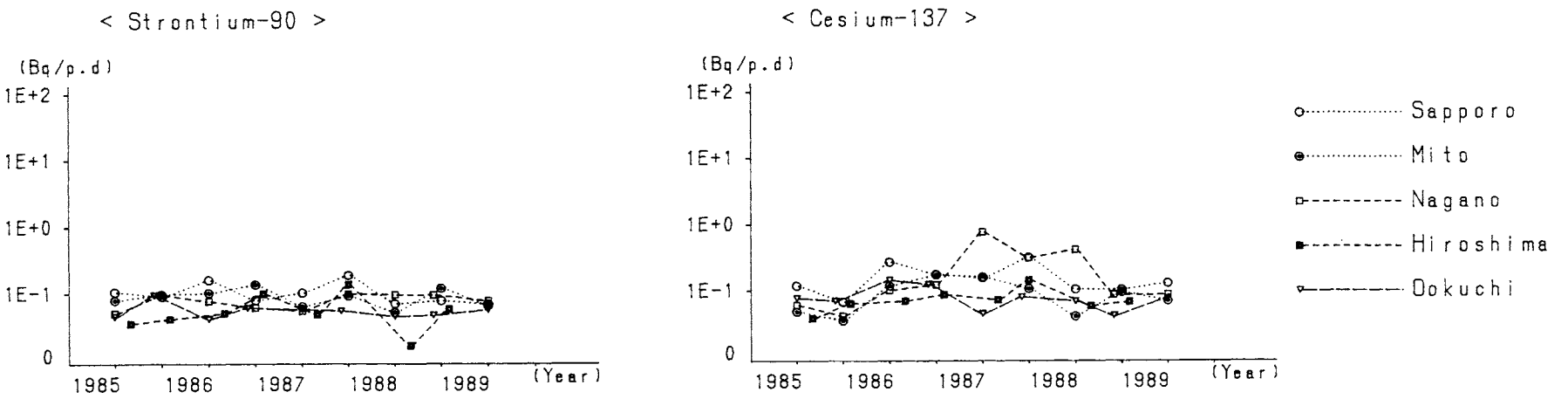

Fig. 1

* * * Rice(producing districts) * * *

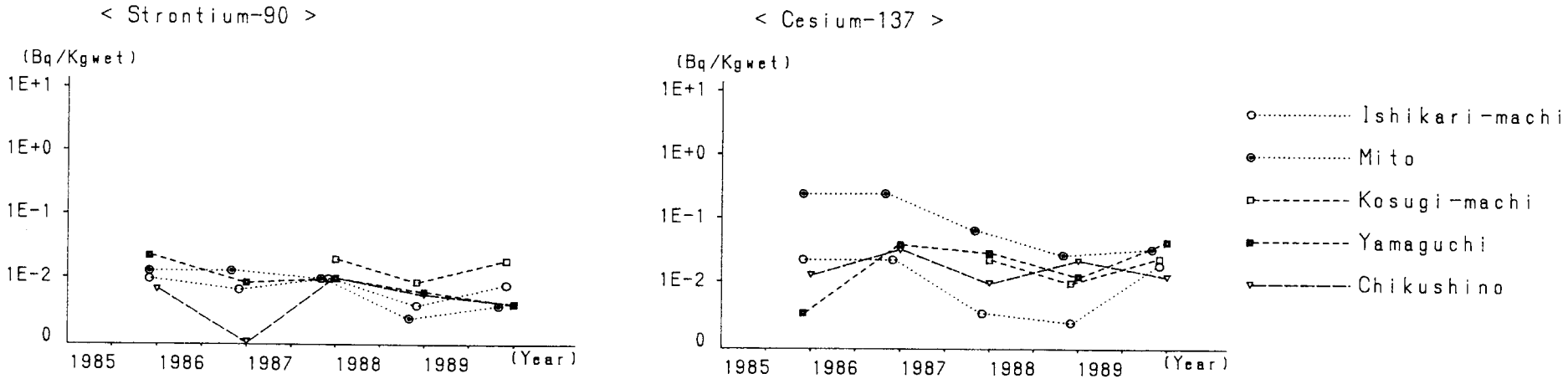

Fig.2-1

* * *　Rice (consuming districts)　* * *

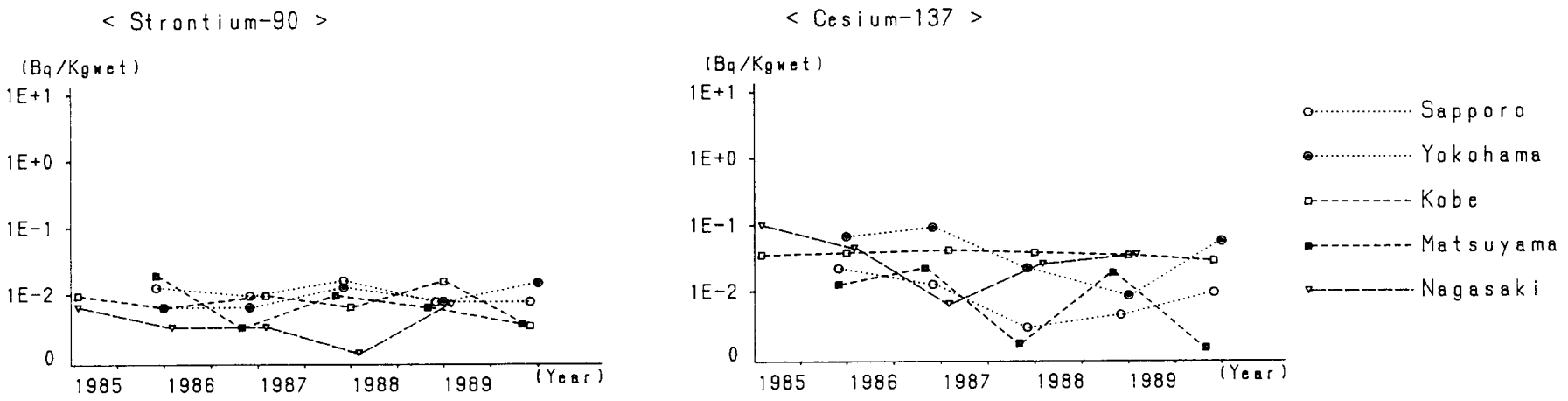

Fig. 2-2

＊ ＊ ＊　Milk(producing districts for domestic program)　＊ ＊ ＊

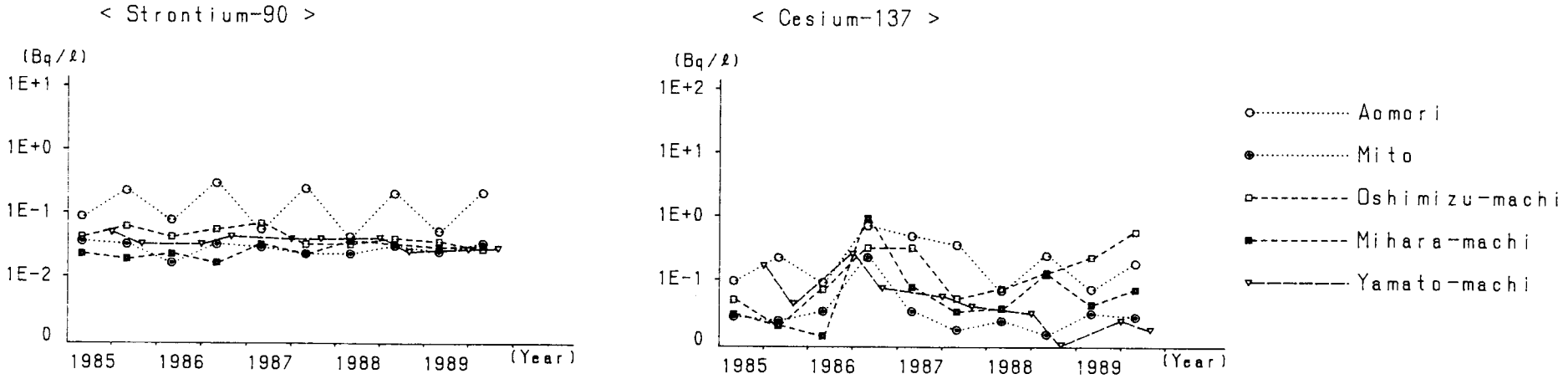

Fig.3-1

* * * Milk(producing districts for WHO program) * * *

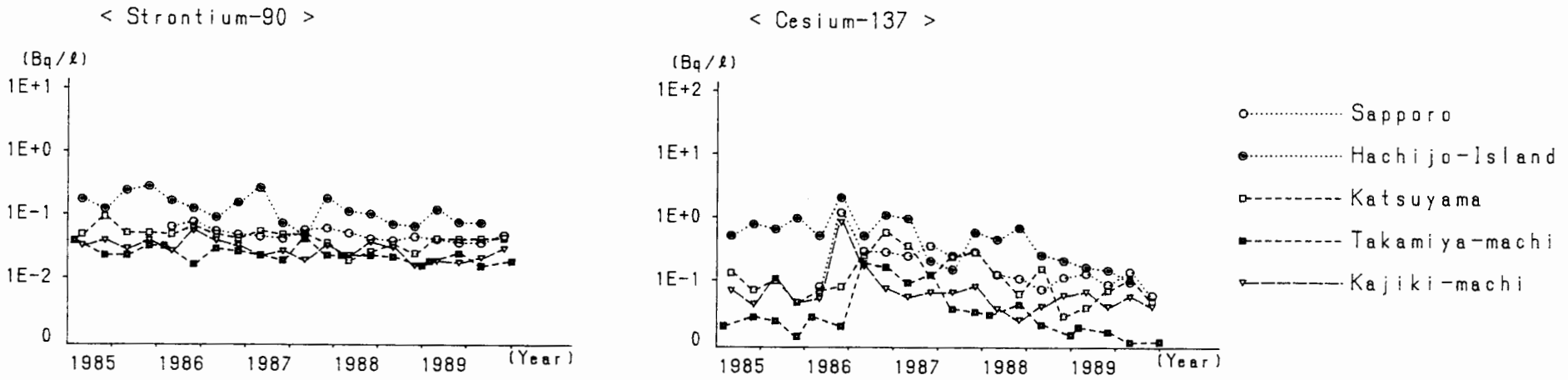

Fig.3-2

* * * Milk (consuming districts) * * *

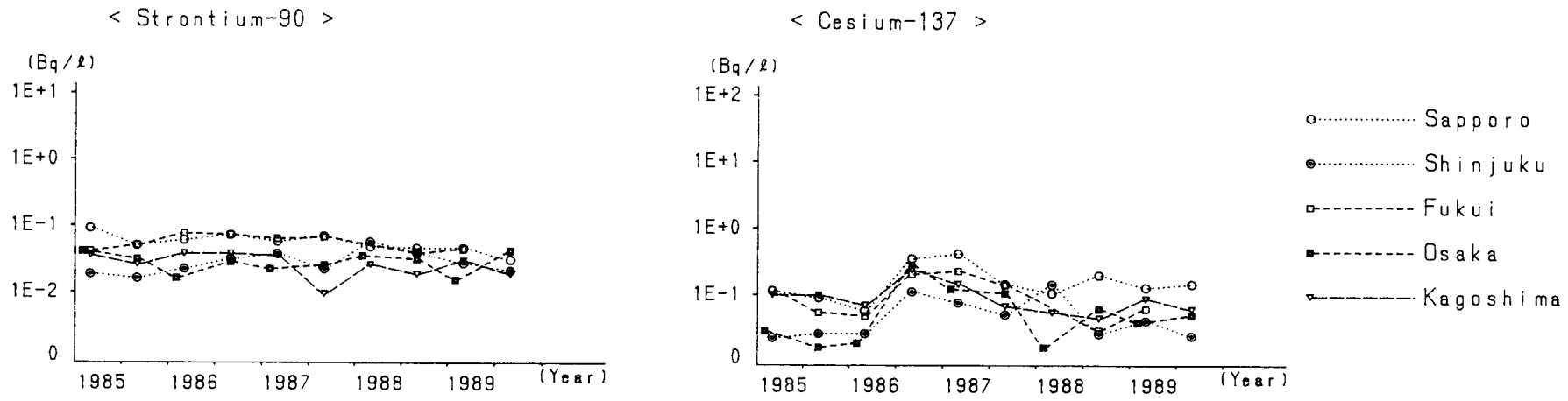

Fig. 3-3

* * * Vegetables(producing districts) * * *

[Spinach]

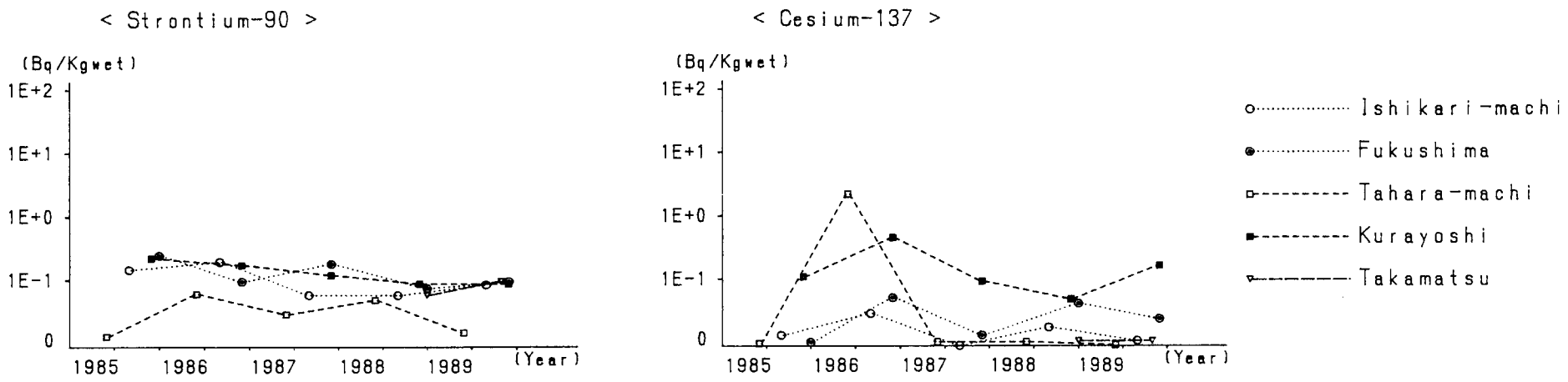

Fig.4-1

* * *　Vegetables (consuming districts)　* * *

[Spinach]

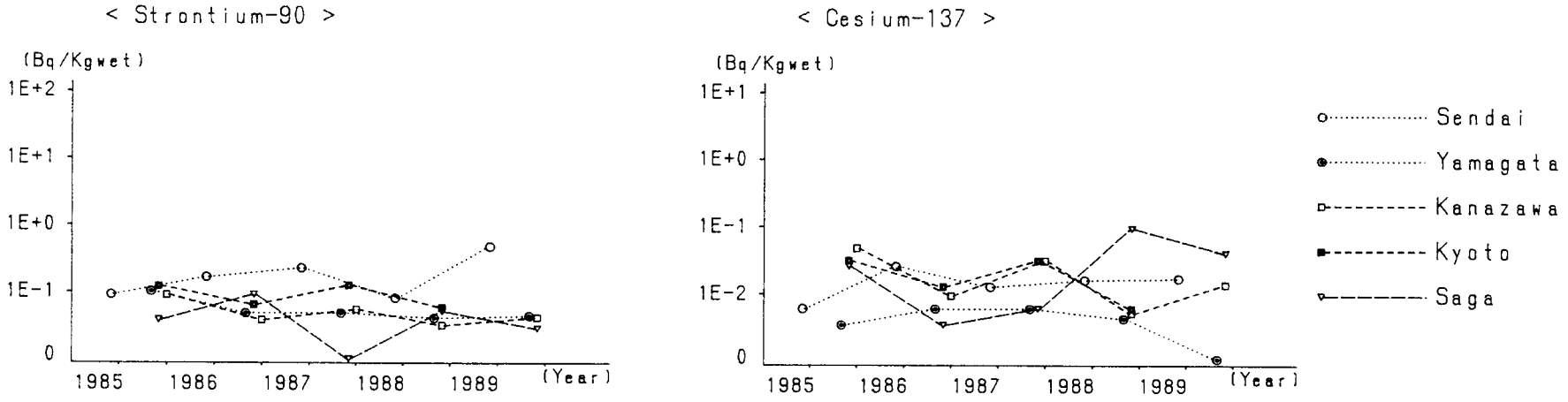

Fig. 4-2

* * * Tea(Japanese Tea) * * *

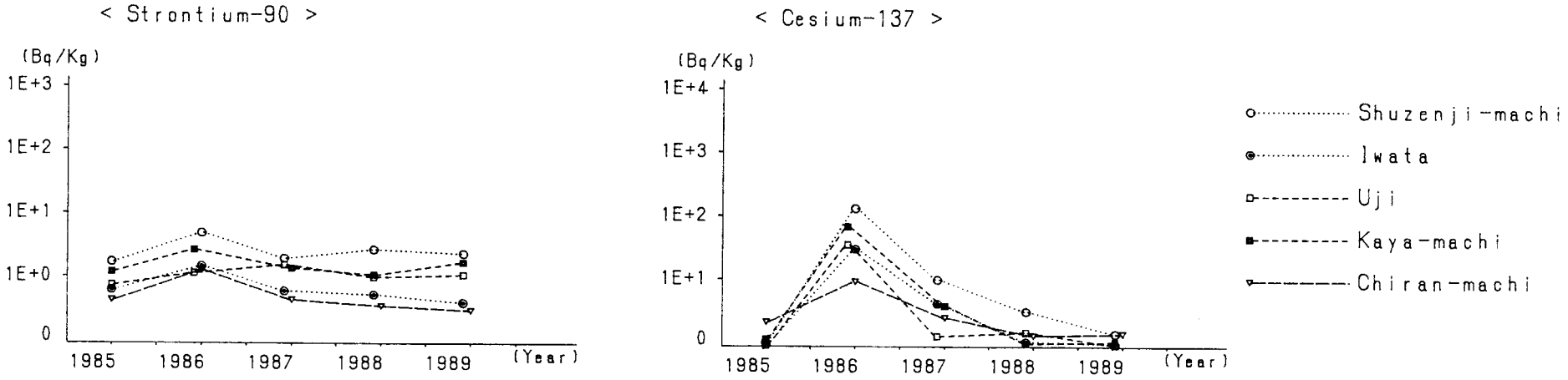

Fig.5

* * * Sea Fish * * *

(Scomber japonicus)

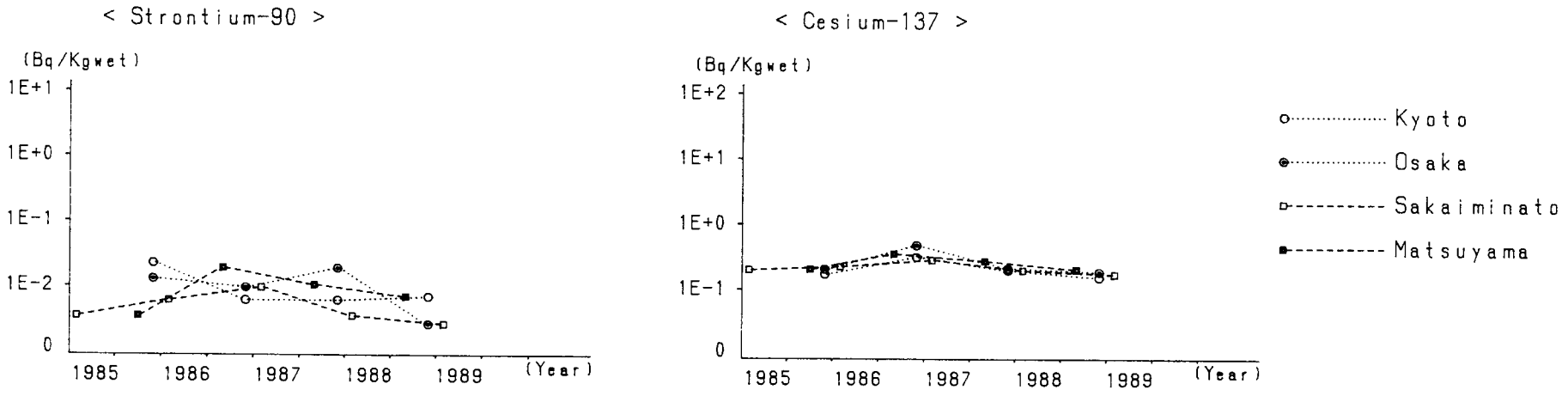

Fig.6

* * *　Shellfish　* * *

(Turbo cornutus)

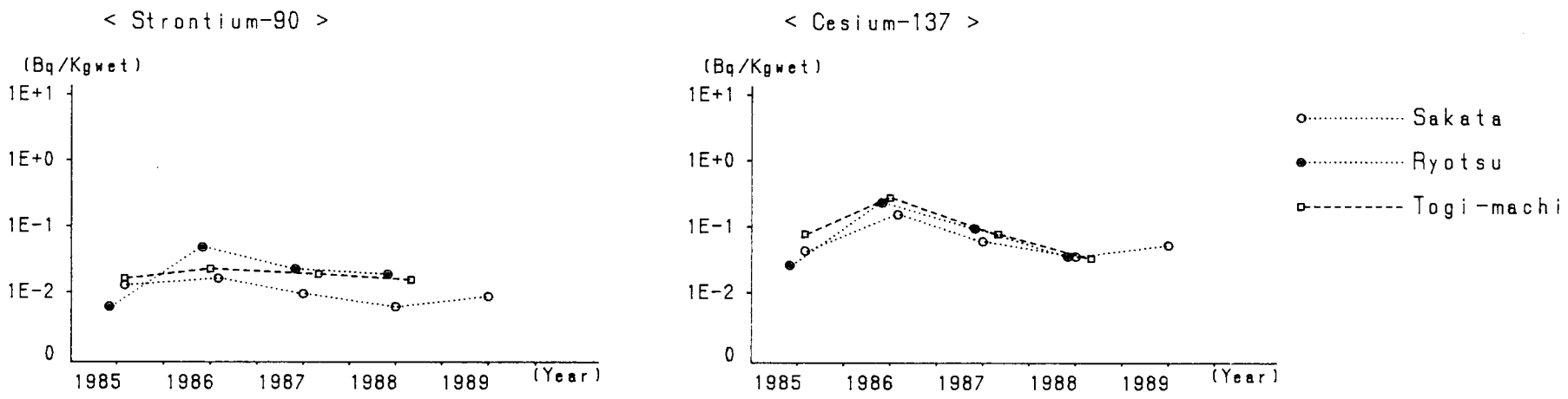

Fig.7

* * * Seaweeds * * *

[Undaria pinnatifida]

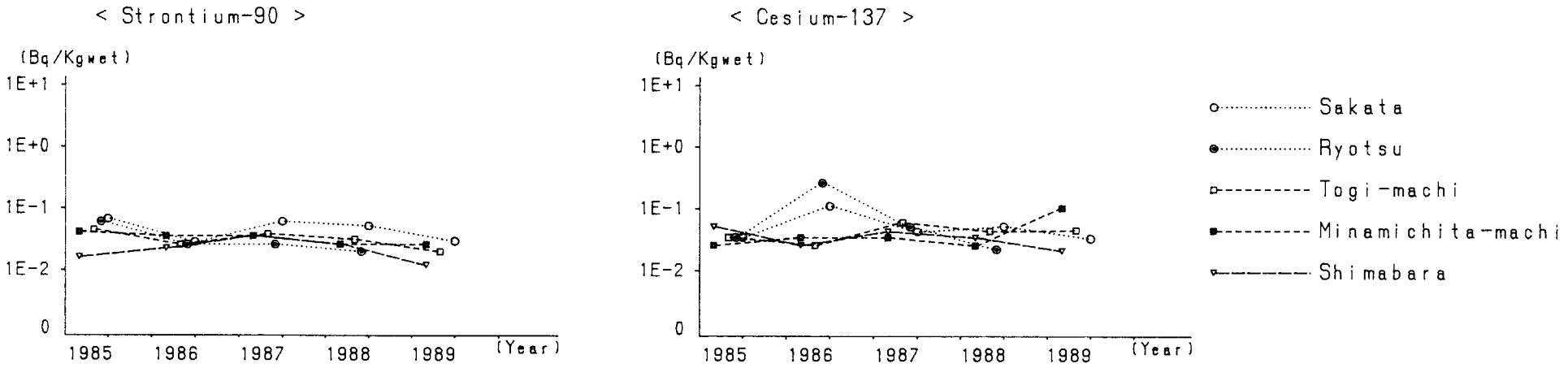

Fig. 8

<* Sampling Locations in Japan **

1 : Sapporo
2 : Aomori
3 : Morioka
4 : Akita
5 : Sendai
6 : Yamagata
7 : Fukushima
8 : Niigata
9 : Mito
0 : Utsunomiya
1 : Chiba
2 : Urawa
3 : Shinjuku
4 : Nagano
5 : Yokohama
6 : Kouhu
7 : Toyama
8 : Kanazawa
9 : Shizuoka
0 : Fukui
1 : Nagoya
2 : Ootsu
23 : Tsu
24 : Kyoto
25 : Osaka
26 : Tottori
27 : Kobe
28 : Wakayama
29 : Okayama
30 : Matsue
31 : Takamatsu
32 : Hiroshima
33 : Kochi
34 : Matsuyama
35 : Yamaguchi
36 : Ooita
37 : Fukuoka
38 : Saga
39 : Miyazaki
40 : Nagasaki
41 : Kagoshima
42 : Naha