RADIOACTIVITY SURVEY DATA in Japan

NUMBER 15
FEB. 1967

National Institute of Radiological Sciences
Chiba, Japan

Radioactivity Survey Data in Japan

Number 15

May 1967

Contents

Page

Meteorological Data

Strontium-90 and Cesium-137 in Rain and Dry Fallout
(*Japan Analytical Chemistry Research Institute*) 1

Strontium-90, Cesium-137 and Cerium-144 in Air-borne Dust
(*Japan Analytical Chemistry Research Institute*) 5

External Dose Data

External Dose of Radiation from Fallout
(*Institute of Physical and Chemical Research, National Institute of Radiological Sciences*) ... 8

Human Data

Strontium-90 Contents in Human Deciduous Teeth
(*National Institute of Health*)..... 9

The Concentration of Cesium-137 in Human Organs
(*National Institute of Radiological Sciences*)...11

Measurement of Radium-226 in Bone of Japanese People
(*National Institute of Radiological Sciences*)...12

Page

Dietary Data

Strontium-90 and Cesium-137 in Milk
(*National Institute of Animal Industry*).....14
(*Japan Analytical Chemistry Research Institute*) 16

Strontium-90 and Cesium-137 in Total Diet
(*Japan Analytical Chemistry Research Institute*) 18

Fish Data

The Concentration of Strontium-90 and Cesium-137 in Various Kinds of Fishes collected from Japan
(*National Institute of Radiological Sciences*)...20

Water Date

Strontium-90 and Cesium-137 in Source Water
(*Japan Analytical Chemistry Research Institute*) 24

Marine Data

The Concentration of Radionuclides in Surface Sea Water collected from Japanese Coast
(*National Institute of Radiological Sciences*)...27

National Institute of Radiological Sciences

Meteorological Data

Strontium-90 and Cesium-137 in Rain and Dry Fallout

(Japan Analytical Chemistry Research Institute)

Since May 1963, the Japan Analytical Chemistry Research Institute has measured the level of Strontium-90 and Cesium-137 in samples acquired at various locations throughout Japan. Sampling and pre-treatment for concentration were performed by 24 prefectural public health laboratories throughout Japan.

Sampling locations are indicated in Figure 1.

The collection tray has an area of 5,000 cm^2, and is exposed to rain and dust for about a month. The depth of water in the tray is kept at 10 mm to prevent dust from being blown away. At the end of each month, water in the tray and water used to wash the tray are combined with strontium and cesium carriers, and passed through a column filled with sodium type cation exchange resin (Dowex 50W~X8, 50~100 mesh). The column is then sent to the Japan Analytical Chemistry Research Institute for analysis.

After the fraction containing both Strontium-90 and Cesium-137 is eluted from the resin, radiochemical analysis is carried out using the method recommended by the Science and Technology Agency.

Results obtained during the period from March 1966 to February 1967 are indicated in Table 1.

Figure 1. Rain and Dry Fallout Sampling Stations

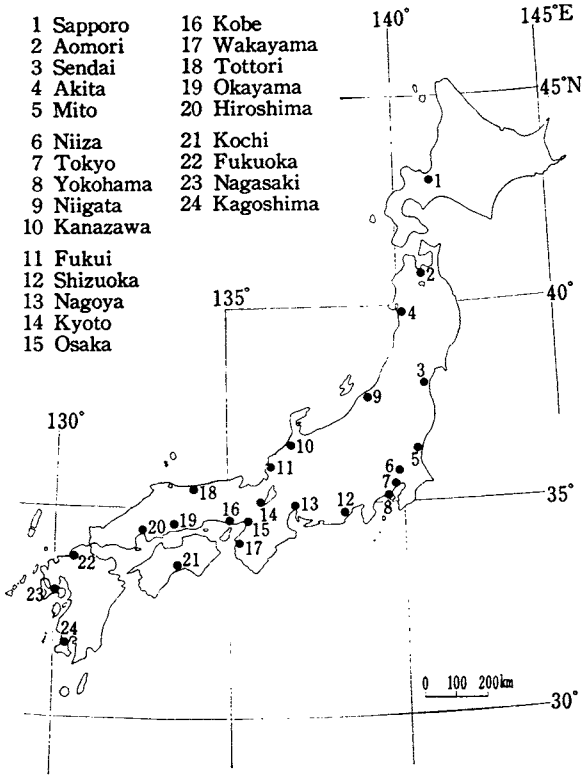


Table 1. ^{90}Sr and ^{137}Cs in Rain and Dry Fallout —Mar., 1966 to Feb., 1967—

By T. Asari, M. Chiba and M. Kuroda

(Japan Analytical Chemistry Research Institute)

(Continued from Table 2, Issue No. 9~10, of this Publication)

Station	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Mar. to May, 1966				
Sapporo, HOKKAIDO	32	66	0.20	0.33
Aomori, AOMORI	30	46	0.20	0.46
Sendai, MIYAGI	30	106	0.32	0.67
Akita, AKITA	29	95	0.25	0.45
Mito, IBARAGI	31	114	0.40	0.53
Niiza, SAITAMA	29	89	0.31	0.47
TOKYO	30	133	0.30	0.39
Yokohama, KANAGAWA	33	119	0.24	0.56
Niigata, NIIGATA	30	68	0.41	0.58
Fukui, FUKUI	31	83	0.36	0.75

Station	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Shizuoka, SHIZUOKA	28	282	0.35	0.49
Nagoya, AICHI	31	116	0.20	0.22
Kyoto, KYOTO	30	113	0.20	0.26
Osaka, OSAKA	30	106	0.15	0.14
Kobe, HYOGO	32	86	0.15	0.24
Wakayama, WAKAYAMA	30	119	0.20	0.28
Tottori, TOTTORI	31	92	0.36	0.50
Okayama, OKAYAMA	31	106	0.16	0.27
Hiroshima, HIROSHIMA	30	192	0.15	0.30
Kochi, KOCHI	38	268	0.43	0.31
Fukuoka, FUKUOKA	30	129	0.18	0.59
Nagasaki, NAGASAKI	30	135	0.28	0.43
Kagoshima, KAGOSHIMA	35	422	0.35	0.55
Apr. to Jun., 1966				
Sapporo, HOKKAIDO	30	40	0.31	0.53
Aomori, AOMORI	31	80	0.44	0.31
Sendai, MIYAGI	31	120	0.65	0.83
Akita, AKITA	31	103	0.56	0.70
Mito, IBARAGI	30	178	0.37	0.61
Niiza, SAITAMA	32	146	0.48	0.61
TOKYO	30	196	0.36	0.60
Yokohama, KANAGAWA	30	247	0.39	0.53
Niigata, NIIGATA	31	130	0.48	0.22
Kanazawa, ISHIKAWA	32	188	0.34	0.46
Fukui, FUKUI	30	169	0.38	0.61
Shizuoka, SHIZUOKA	32	289	0.42	0.71
Nagoya, AICHI	31	183	0.34	0.24
Kyoto, KYOTO	31	213	0.33	0.54
Osaka, OSAKA	30	170	0.34	0.39
Kobe, HYOGO	32	201	0.35	0.47
Tottori, TOTTORI	30	165	0.52	0.76
Okayama, OKAYAMA	30	186	0.32	0.39
Hiroshima, HIROSHIMA	32	170	0.33	0.42
Kochi, KOCHI	29	400	0.46	0.53
Fukuoka, FUKUOKA	31	81	0.25	0.37
Nagasaki, NAGASAKI	26	273	0.24	0.37
Kagoshima, KAGOSHIMA	26	273	0.24	0.37
May. to Jul. 1966				
Sapporo, HOKKAIDO	30	89	0.14	0.16
Aomori, AOMORI	30	150	0.23	0.30
Sendai, MIYAGI	30	250	0.05	0.06
Akita, AKITA	31	153	0.29	0.36
Mito, IBARAGI	30	313	0.39	0.43
Niiza, SAITAMA	30	471	0.39	0.57
TOKYO	30	510	0.17	0.25
Yokohama, KANAGAWA	31	487	0.46	0.27
Niigata, NIIGATA	30	122	0.23	0.30
Kanazawa, ISHIKAWA	33	169	0.39	0.36
Fukui, FUKUI	33	251	0.45	0.66
Shizuoka, SHIZUOKA	31	383	0.29	0.44
Nagoya, AICHI	32	173	0.23	0.35
Kyoto, KYOTO	30	180	0.30	0.38
Kobe, HYOGO	29	183	0.15	0.16
Wakayama, WAKAYAMA	30	181	0.18	0.17
Tottori, TOTTORI	30	250	0.40	0.42
Okayama, OKAYAMA	30	211	0.26	0.40
Hiroshima, HIROSHIMA	30	255	0.31	0.45
Kochi, KOCHI	30	345	0.71	0.82
Fukuoka, FUKUOKA	31	135	0.37	0.51
Nagasaki, NAGASAKI	30	161	0.17	0.23
Kagoshima, KAGOSHIMA	34	281	0.19	0.23
Jun. to Aug., 1966				
Sapporo, HOKKAIDO	31	50	0.11	0.14
Aomori, AOMORI	31	204	0.10	0.20
Sendai, MIYAGI	31	119	0.14	0.04
Akita, AKITA	32	401	0.32	0.27
Niiza, SAITAMA	31	101	0.14	0.16

Station	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
TOKYO	30	160	0.07	0.09
Yokohama, KANAGAWA	32		0.10	0.10
Niigata, NIIGATA	31	412	0.29	0.17
Kanazawa, ISHIKAWA	30	267	0.17	0.29
Fukui, FUKUI	27	219	0.13	0.18
Shizuoka, SHIZUOKA	31	268	0.13	0.13
Nagoya, AICHI	31	170	0.07	0.11
Kyoto, KYOTO	31	287	0.13	0.16
Osaka, OSAKA	30		0.13	0.17
Kobe, HYOGO	33	177	0.11	0.13
Wakayama, WAKAYAMA	31		0.05	0.09
Tottori, TOTTORI	31	147	0.11	0.19
Okayama, OKAYAMA	31	159	0.08	0.11
Hiroshima, HIROSHIMA	30	236	0.14	0.18
Kochi, KOCHI	31	279	0.08	0.11
Nagasaki, NAGASAKI	31	113	0.06	0.08
Kagoshima, KAGOSHIMA	28	501	0.04	0.06
Jul. to Sept., 1966				
Sapporo, HOKKAIDO	31	111	0.06	0.09
Aomori, AOMORI	31	125	0.10	0.14
Sendai, MIYAGI	31	46	0.07	0.23
Akita, AKITA	31	139	0.05	0.12
Mito, IBARAGI	31	25	0.03	0.03
Niiza, SAITAMA	31	102	0.04	0.06
TOKYO	31	54	0.03	0.09
Yokohama, KANAGAWA	32		0.06	0.07
Niigata, NIIGATA	31	51	0.04	0.05
Kanazawa, ISHIKAWA	31	85	0.06	0.10
Fukui, FUKUI	31	54	0.05	0.06
Shizuoka, SHIZUOKA	32	252	0.08	0.15
Nagoya, AICHI	31	147	0.04	0.10
Kyoto, KYOTO	31	87	0.06	0.04
Osaka, OSAKA	32		0.09	0.12
Kobe, HYOGO	32	97	0.02	0.03
Wakayama, WAKAYAMA	26		0.03	0.05
Tottori, TOTTORI	32	81	0.07	0.08
Okayama, OKAYAMA	31	71	0.06	0.07
Hiroshima, HIROSHIMA	32	55	0.03	0.08
Kochi, KOCHI	31	842	0.08	0.17
Nagasaki, NAGASAKI	31	142	0.04	0.10
Kagoshima, KAGOSHIMA	31	229	0.06	0.10
Aug. to Oct., 1966				
Sapporo, HOKKAIDO	31	97	0.07	0.09
Aomori, AOMORI	30	249	0.11	0.10
Sendai, MIYAGI	30	292	0.12	0.03
Akita, AKITA	30	143	0.08	0.10
Mito, IBARAGI	30	167	0.05	0.07
Niiza, SAITAMA	30	309	0.15	0.10
TOKYO	30	197	0.05	0.11
Niigata, NIIGATA	30	189	0.10	0.14
Kanazawa, ISHIKAWA	30	287	0.09	0.07
Fukui, FUKUI	30	313	0.03	0.10
Shizuoka, SHIZUOKA	31	253	0.04	0.06
Nagoya, AICHI	27	270	0.07	0.07
Kyoto, KYOTO	30	266	0.03	0.07
Osaka, OSAKA	35	141	0.06	0.08
Kobe, HYOGO	31	225	0.04	0.06
Wakayama, WAKAYAMA	30	211	0.04	0.01
Tottori, TOTTORI	31	532	0.10	0.15
Okayama, OKAYAMA	30	336	0.04	0.05
Hiroshima, HIROSHIMA	30	476	0.05	0.07
Kochi, KOCHI	30	643	0.07	0.12
Nagasaki, NAGASAKI	30	252	0.03	0.12
Kagoshima, KAGOSHIMA	30	296	0.03	0.06
Sept. to Nov., 1966				
Sapporo, HOKKAIDO	31	158	0.07	0.09
Aomori, AOMORI	31	149	0.10	0.11
Sendai, MIYAGI	31	81	0.10	0.12
Akita, AKITA	31	238	0.14	0.20
Mito, IBARAGI	31	91	0.05	0.07

Station	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Niiza, SAITAMA	31	103	0.07	0.07
TOKYO	31		0.02	0.20
Yokohama, KANAGAWA	32	112	0.06	0.09
Niigata, NIIGATA	31	263	0.18	0.23
Kanazawa, ISHIKAWA	31	247	0.11	0.17
Fukui, FUKUI	32	170	0.11	0.20
Shizuoka, SHIZUOKA	32		0.06	0.09
Nagoya, AICHI	34	114	0.05	0.07
Kyoto, KYOTO	31	74	0.03	0.04
Osaka, OSAKA	59	218	0.07	0.09
Kobe, HYOGO	32	77	0.04	0.04
Wakayama, WAKAYAMA	31	162	0.01	0.004
Tottori, TOTTORI	32	140	0.09	0.10
Okayama, OKAYAMA	31	65	0.04	0.08
Hiroshima, HIROSHIMA	31	40	0.04	0.05
Kochi, KOCHI	31	209	0.05	0.07
Fukuoka, FUKUOKA	31	87	0.05	0.08
Nagasaki, NAGASAKI	31	102	0.06	0.09
Kagoshima, KAGOSHIMA	31	190	0.07	0.07
Oct. to Dec., 1966				
Sapporo, HOKKAIDO	30	78	0.03	0.11
Aomori, AOMORI	30	108	0.24	0.24
Sendai, MIYAGI	30	16	0.02	0.16
Akita, AKITA	30	267	0.06	0.41
Mito, IBARAGI	30	42	0.04	0.05
Niiza, SAITAMA	30	18	0.03	0.03
TOKYO	30		0.02	0.02
Yokohama, KANAGAWA	31	24	0.09	0.02
Niigata, NIIGATA	30	195	0.06	0.15
Kanazawa, ISHIKAWA	30		0.14	0.17
Fukui, FUKUI	29	157	0.17	0.21
Shizuoka, SHIZUOKA	31		0.11	0.11
Nagoya, AICHI	30	41	0.05	0.05
Kyoto, KYOTO	30	54	0.04	0.04
Osaka, OSAKA	59	67	0.05	0.06
Kobe, HYOGO	31	53	0.05	0.05
Wakayama, WAKAYAMA	30		0.03	0.04
Tottori, TOTTORI	32	179	0.43	0.43
Okayama, OKAYAMA	30	59	0.10	0.03
Hiroshima, HIROSHIMA	30	105	0.06	0.08
Kochi, KOCHI	30	99	0.09	0.09
Fukuoka, FUKUOKA	30	116	0.04	0.08
Nagasaki, NAGASAKI	30	118	0.34	0.15
Kagoshima, KAGOSHIMA	31	81	0.06	0.06
Nov. 1966 to Jan., 1967				
Sapporo, HOKKAIDO	31	190	0.07	0.10
Aomori, AOMORI	31	238	0.13	0.19
Sendai, MIYAGI	33	39	0.03	0.12
Akita, AKITA	27	169	0.23	0.36
Mito, IBARAGI	35	11	0.03	0.04
Niiza, SAITAMA	36	11	0.04	0.05
TOKYO	34		0.10	0.05
Yokohama, KANAGAWA	32	13	0.05	0.05
Niigata, NIIGATA	31	243	0.05	0.29
Kanazawa, ISHIKAWA	34	400	0.49	0.63
Fukui, FUKUI	30	282	0.20	0.19
Nagoya, AICHI	36	36	0.06	0.06
Kyoto, KYOTO	24	40	0.04	0.07
Osaka, OSAKA	33	23	0.04	0.05
Kobe, HYOGO	36	34	0.04	0.06
Wakayama, WAKAYAMA	34	46	0.08	0.07
Tottori, TOTTORI	30	280	0.27	0.41
Okayama, OKAYAMA	35	32	0.06	0.06
Hiroshima, HIROSHIMA	31	31	0.05	0.07
Kochi, KOCHI	37	68	0.12	0.10
Fukuoka, FUKUOKA	31	65	0.10	0.16
Nagasaki, NAGASAKI	31	76	0.11	0.16
Kagoshima, KAGOSHIMA	38	84	0.11	0.20

Station	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km²)	^{137}Cs (mCi/km²)
Dec., 1966 to Feb., 1967				
Aomori, AOMORI	31	212	0.23	0.38
Akita, AKITA	31	104	0.41	0.56
Kyoto, KYOTO	31	89	0.08	0.12
Osaka, OSAKA	28	66	0.05	0.09
Kobe, HYOGO	28	51	0.07	0.11
Okayama, OKAYAMA	26	24	0.03	0.03
Hiroshima, HIROSHIMA	31	67	0.08	0.12
Nagasaki, NAGASAKI	31	71	0.20	0.33

Table 2 shows the monthly mean values of Strontium-90 and Cesium-137 collected by the 24 stations during the period from April, 1966 to February, 1967.

Table 3 shows the total amount of Strontium-90 and Cesium-137 deposits during the period from March, 1966 to February, 1967.

Table 2. Monthly Mean Values of the 24 Collection Stations —Apr., 1966 to Feb., 1967—

Month	Precipitation (mm)	^{90}Sr (mCi/km²)	^{137}Cs (mCi/km²)	$^{137}Cs/^{90}Sr$
Apr. 1966	134	0.27	0.43	1.6
May 〃	183	0.39	0.50	1.3
Jun. 〃	248	0.29	0.38	1.3
Jul. 〃	225	0.12	0.14	1.2
Aug. 〃	147	0.05	0.09	1.8
Sept. 〃	279	0.07	0.08	1.1
Oct. 〃	141	0.07	0.13	1.9
Nov. 〃	94	0.10	0.12	1.2
Dec. 〃	108	0.11	0.15	1.4
Feb. 1967	88	0.13	0.20	1.5
Average	165	0.16	0.22	1.43

Table 3. Total Deposits of ^{90}Sr and ^{137}Cs —Mar., 1966 to Feb., 1967—

Station	^{90}Sr (mCi/km²)	^{137}Cs (mCi/km²)
1 Hokkaido	1.06	1.64
2 Aomori	1.88	2.43
3 Miyagi	1.50	2.80
4 Akita	2.39	3.63
5 Ibaragi	1.50	1.99
6 Saitama	1.51	2.05
7 Tokyo	1.12	1.80
8 Kanagawa	1.45	1.69
9 Niigata	1.84	2.13
10 Ishikawa	1.79	2.25
11 Fukui	1.72	2.96
12 Shizuoka	1.42	2.24
13 Aichi	1.18	1.81
14 Kyoto	0.94	1.72
15 Osaka	0.98	1.19
16 Hyogo	1.02	1.35
17 Wakayama	0.62	0.71
18 Tottori	2.35	3.04
19 Okayama	1.15	1.49
20 Hiroshima	1.19	1.75
21 Kochi	2.09	2.32
22 Fukuoka	0.99	1.79
23 Nagasaki	1.53	2.07
24 Kagoshima	1.15	1.70

Strontium-90, Cesium-137 and Cerium-144 in Air-borne Dust

(Japan Analytical Chemistry Research Institute)

The Japan Analytical Chemistry Research Institute started the analyses of Strontium-90, Cesium-137 and Cerium-144 content in air-borne dust in April 1964.

Samples are collected by 8 prefectural public health laboratories, using a cottrell type dust collector (1,200 liters per hour). Figure 2 shows the locations of the laboratories.

Results obtained during the period from April to December 1966, are shown in Table 4.

Figure 2. Air-borne Dust Sampling Locations

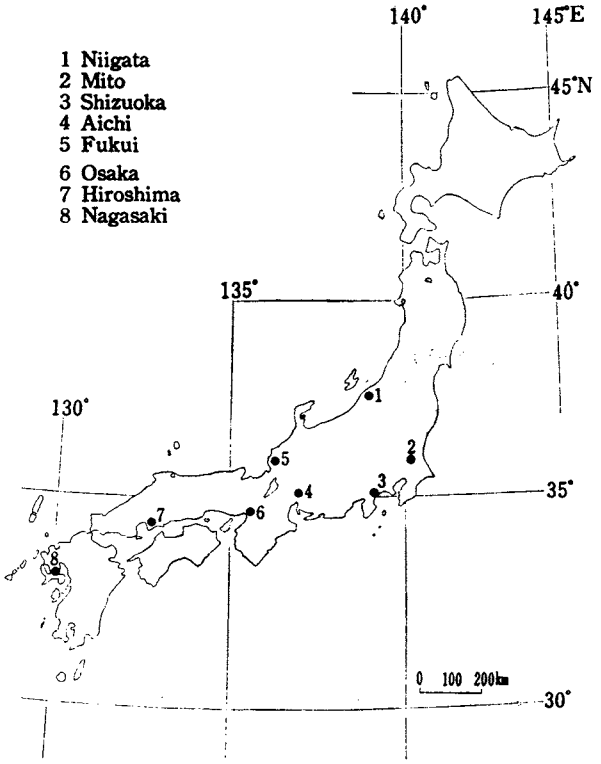


Table 4. ^{90}Sr, ^{137}Cs and ^{144}Ce in Air-borne Dust —Apr. to Dec.,1966 —

By T. Asari, M. Chiba and M. Kuroda
(*Japan Analytical Chemistry Research Institute*)

(Continued from Table 7, Issue No. 9~10, of this Publication)

Location	Duration (days)	Air Inhaled (m^3)	Efficiency of Cottrell (%)	^{90}Sr (pCi/m^3)$\times 10^{-3}$	^{137}Cs (pCi/m^3)$\times 10^{-3}$	^{144}Ce (pCi/m^3)$\times 10^{-3}$
Apr. 1966						
Mito, IBARAGI	28	6480	70	3.8	4.9	2.0
Niigata, NIIGATA	21	1296	95	4.3	6.4	1.4
Fukui, FUKUI	22	1008	96	24.8	39.0	21.2
Shizuoka, SHIZUOKA	28	6840	90	1.8	3.4	0.9
Nagoya, AICHI	15	3420	95	0.1	3.4	2.7
Osaka, OSAKA	16	3420	90	5.8	9.4	2.6
Hiroshima, HIROSHIMA	26	6100	80	4.6	6.8	5.6
Nagasaki, NAGASAKI	24	1800	90	9.5	11.7	4.6
May 66						
Mito, IBARAGI	29	11520	70	6.5	7.5	3.1
Niigata, NIIGATA	25	4752	95	4.8	8.9	1.8
Fukui, FUKUI	21	1680	96	29.2	53.5	47.4
Shizuoka, SHIZUOKA	30	7560	90	2.9	4.7	4.6
Nagoya, AICHI	12	5850	95	2.7	3.5	2.7
Osaka, OSAKA	21	3240	90	10.9	17.3	9.7
Hiroshima, HIROSHIMA	23	7300	80	6.0	9.9	9.5
Nagasaki, NAGASAKI	23	2200	90	9.9	21.6	8.0
Jun. 66						
Mito, IBARAGI	24	5760	70	1.5	1.8	8.9
Niigata, NIIGATA	30	1296	95	2.2	2.9	2.4
Fukui, FUKUI	15	720	96	26.9	32.9	30.4
Shizuoka, SHIZUOKA	25	6840	90	2.6	3.3	3.9
Nagoya, AICHI	24	3240	95	2.2	3.0	9.0
Osaka, OSAKA	21	4392	90	10.9	17.3	9.7
Hiroshima, HIROSHIMA	26	7000	80	4.3	6.0	9.6
Nagasaki, NAGASAKI	20	1800	90	3.2	24.4	9.6

Location	Duration (days)	Air Inhaled (m^3)	Efficiency of Cottrell (%)	^{90}Sr (pCi/m^3) $\times 10^{-3}$	^{137}Cs (pCi/m^3) $\times 10^{-3}$	^{144}Ce (pCi/m^3) $\times 10^{-3}$
Jul. 66						
Mito, IBARAGI	29	6480	70	1.4	2.4	7.4
Niigata, NIIGATA	20	1296	95	0.9	1.3	1.1
Fukui, FUKUI	28	1200	96	1.3	1.3	1.1
Shizuoka, SHIZUOKA	30	7560	90	1.3	1.3	1.1
Nagoya, AICHI	26	4680	95	12.3	1.1	1.6
Osaka, OSAKA	22	8910	90	2.0	3.3	5.9
Hiroshima, HIROSHIMA	26	6800	80	3.0	4.4	5.8
Nagasaki, NAGASAKI	25	1800	90	6.7	7.8	3.5
Aug. 66						
Mito, IBARAGI	29	6480	70	0.8	1.4	1.7
Niigata, NIIGATA	22	1296	95	1.0	1.2	2.5
Fukui, FUKUI	7	480	96	16.6	17.1	29.7
Shizuoka, SHIZUOKA	30	7560	90	0.8	1.5	1.6
Nagoya, AICHI	27	7629	90	0.1	0.1	6.3
Osaka, OSAKA	27	7629	90	0.1	0.1	6.3
Hiroshima, HIROSHIMA	27	6750	80	1.3	2.1	3.0
Nagasaki, NAGASAKI	23	1800	90	2.8	3.6	6.3
Sept. 66						
Mito, IBARAGI	31	6480	70	0.8	1.1	1.3
Niigata, NIIGATA	26	1296	95	1.3	1.6	2.0
Fukui, FUKUI	22	960	96	7.2	10.8	29.5
Shizuoka, SHIZUOKA	30	8640	90	0.9	1.3	1.1
Nagoya, AICHI	9	1980	95	0.7	0.7	5.5
Hiroshima, HIROSHIMA	25	7550	80	1.4	1.7	2.8
Nagasaki, NAGASAKI	27	1800	90	2.8	3.2	6.6
Oct. 66						
Mito, IBARAGI	28	8730	70	0.7	1.1	0.4
Niigata, NIIGATA	21	2592	95	1.2	2.3	2.7
Fukui, FUKUI	26	1152	96	6.8	10.1	13.2
Nagoya, AICHI	21	3870	95	0.3	1.0	0.9
Hiroshima, HIROSHIMA	26	7400	80	1.5	2.5	3.7
Nagasaki, NAGASAKI	27	2430	90	2.2	3.9	4.9
Nov. 66						
Mito, IBARAGI	28	14940	70	1.6	1.9	24.5
Niigata, NIIGATA	25	5184	95	1.3	1.9	9.9
Fukui, FUKUI	24	4200	96	3.6	4.9	4.7
Shizuoka, SHIZUOKA	30	6480	90	1.1	1.6	9.5
Hiroshima, HIROSHIMA	25	5900	80	2.1	3.2	20.0
Nagasaki, NAGASAKI	28	2900	90	4.4	6.1	59.0
Dec. 66						
Mito, IBARAGI	31	7200	70	0.5	0.4	2.6
Niigata, NIIGATA	29	2808	95	1.0	1.1	4.6
Shizuoka, SHIZUOKA	31	7560	90	1.0	1.4	21.1
Hiroshima, HIROSHIMA	29	7400	80	1.6	2.1	5.7
Nagasaki, NAGASAKI	24	2200	90	3.6	4.8	34.5

External Dose Data

External Doses of Radiation from Fallout

(*Institute of Physical and Chemical Research, National Institute of Radiological Sciences*)

External dosages of radiation from fallout materials have been observed in Tokyo since 1958, and in Chiba since 1962.*

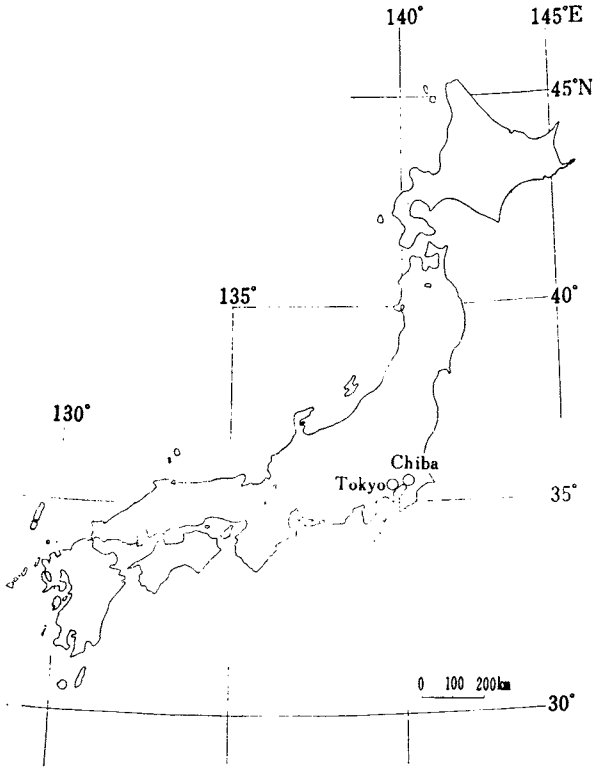
Observing locations are indicated in Figure 3. Direct dose measurements are made by spherical ionization chambers** and a scintillation counter with a specially designed shield around the NaI (Tl) crystal***. Scintillation survey meters are used for gamma-ray dosimetry.

In Tokyo, continuous measurements are made using an ordinary scintillation counter. An ionization chamber and the specially designed scintillation counter are used for comparison. In Chiba, a scintillation survey meter with a NaI (Tl) crystal is used and sometimes a plastic scintillation counter**** and an ionization chamber are used for comparison.

Measurements in Chiba are made in an open field at one meter above grassy ground. Measurements in Tokyo are made on the roof of the building of Institute of Physical and Chemical Research. Dose values at the level of one meter above the paved ground is obtained by correcting the results measured on the roof*.

Monthly external doses from fallout materials observed at these two locations during the period from 1965 to 1967 are shown in Table 5 and 6.

Figure 3. External Doses of Radiation Observing Locations



* F. Yamasaki, M. Okano, T. Nagahara and H. Watanabe: External Doses of Radiation from Fallout in Tokyo and its Vicinity, Journal of Radiation Research Vol. 5, No. 2 (1964) pp. 113~115.

** T. Doke, H. Takahashi, T. Higashimura, M. Takeuchi, Y. Nagahara, H. Watanabe, H. Otsuka, M. Okano, and F. Yamasaki : External Gamma Dose Rates from Natural Radionuclides in Japan, Science Papers Institute of Physical and Chemical Research, Vol. 56, No. 1 (1962) pp. 40~46.

*** M. Okano : Low Level Gamma Ray Dosimetry with Scintillation Counter, Reports Institute of Physical and Chemical Research, 37 : 355 (1961).

**** T. Doke, Y. Takami, A. Takamoto, and A. Sasaki : Measurements of Radiation Dose due to Background Gamma Rays by Plastic Scintillators, Journal Radiation Research, Vol. 1 (1960) pp. 46~53.

Table 5. Monthly External Doses due to Fallout in Tokyo —Jan., 1965 to Mar., 1967—

By M. Okano

(*Institute of Physical and Chemical Research*)

(Continued from Table 7, Issue No. 7, of this Publication)

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Monthly	**1965**	0.5	0.5	0.5	0.5	0.7	0.8	0.9	0.7	0.6	0.4	0.5	0.5
External	**1966**	0.4	0.3	0.2	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.3	1.0
Doses (mr)	**1967**	2.0	0.8	0.4									

Table 6. Monthly External Doses due to Fallout in Chiba —Jan., 1965 to Mar., 1967—

By H. Watanabe

(*National Institute of Radiological Sciences*)

(Continued from Table 7, Issue No. 7, of this Publication)

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Monthly	**1965**	0.4	0.6	1.1	0.5	1.0	1.1	0.6	0.8	0.6	0.6	0.3	0.1
External	**1966**	0.04	0.4	0.2	0.4	0.6	0.7	0.9	0.7	0.5	0.4	0.7	1.6
Doses (mr)	**1967**	4.3	0.8	1.2									

Human Data

Strontium-90 Contents in Human Deciduous Teeth

(*National Institute of Health*)

Since 1961, the Strontium-90 contents in human deciduous teeth were measured at the National Institute of Health for estimating the relationship between Strorntium-90 burden of children and the form of feeding.

More than 40,000 human deciduous teeth, consisted of incisors 64%, canines 23%, first molars 8%, and second molars 5%, have been collected from various parts of Japan. The Strontium-90 contents in human deciduous teeth have been measured using the analytical method recommended by Science and Technology Agency.

The results of analysis of the teeth from children born during the period from 1948 to 1959 in Kanto District are shown in Table 7 and Figure 4, which reveal the annual variation according to the form of feeding. The Strontium-90 contents increased slowly during the period from 1948 to 1953. The succeeding period from 1954 to 1959, however, the Strontium-90 contents increased markedly, and the teeth of bottle fed children contained approximately 40% more Strontium-90 than that of breast fed children.

The values obtained from Tokai District are also summarized Table 8, and it shows the same type of increment of Strontium-90 in Kanto District.

The survey for Strontium-90 contents in teeth of adult type was performed using permanent teeth aged 20 to 87 years. The results are shown in Table 9 and no significant variation is observed.

Table 7. ^{90}Sr in Human Deciduous Teeth (Kanto District) —1948 to 1959—

By T. Nagai, S. Okada, T. Komai, and E. Onishi

(*National Institute of Health*)

Birth Year	Breast Fed	Mixed Fed	Bottle Fed
1942~1948	0.04		
1949	0.07		
1950	0.17		
1951	0.19	0.14	
1952	0.21	0.19	
1953	0.26	0.25	
1954	0.33	0.55	0.54
1955	0.85	0.83	1.02
1956	0.85	0.97	1.31
1957	0.77	1.51	1.57
1958	1.24	1.53	2.45
1959	1.48	2.97	2.94

Figure 4. Deposition of ^{90}Sr in Human Deciduous Teeth (Kanto District)

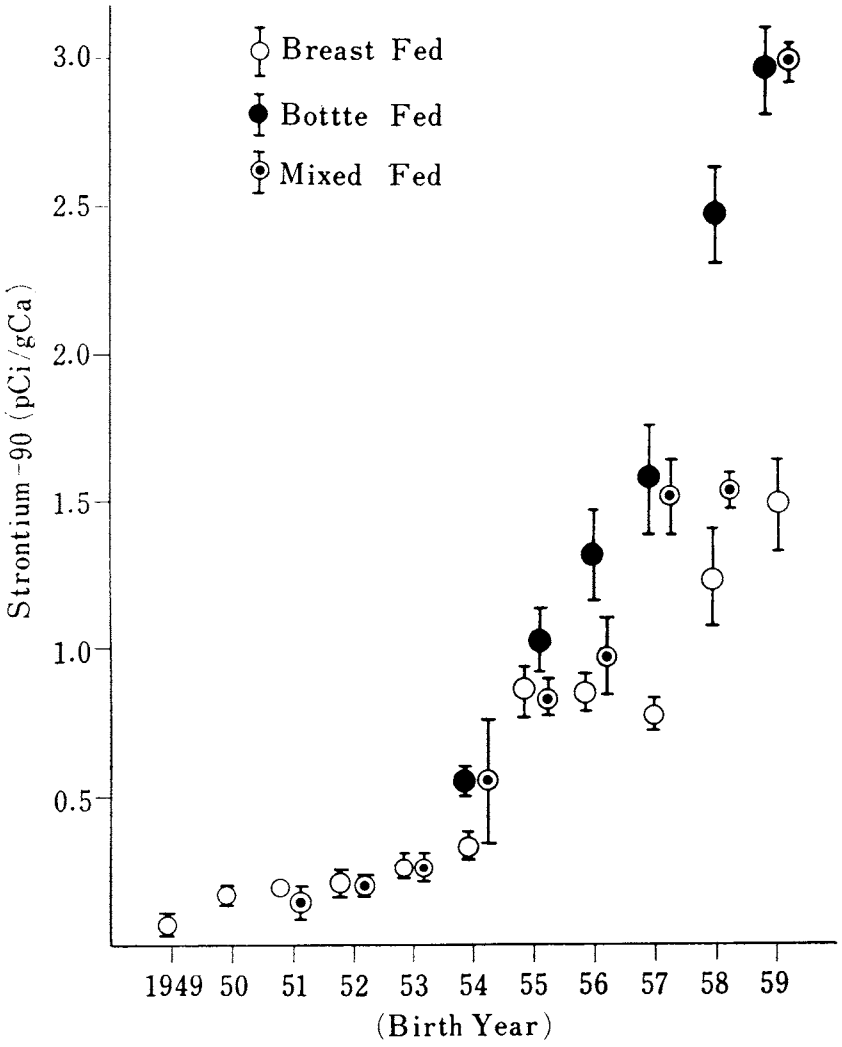


Table 8. ^{90}Sr in Human Deciduous Teeth (Tokai District) —1950 to 1959—

By. T. Nagai, S. Okada, T. Komai, and E. Onishi

(*National Institute of Health*)

Birth year	Infant Feeding	Tooth Type	Number of Tooth	Ash Wt. (g)	Calcium (g)	^{90}Sr (pCi/gCa)
1950	—	ABCDE	40	17.51	6.86	0.16
1954	Breast	C	81	12.72	4.96	0.30
1955	〃	〃	74	10.62	4.13	0.52
〃	〃	A B	98	9.07	3.53	0.67
1956	〃	〃	100	8.62	3.34	1.04
〃	Mixed	〃	90	6.91	2.68	1.12
1957	Breast	〃	92	6.78	2.65	1.08
〃	〃	〃	80	6.85	2.69	0.96
〃	Mixed	〃	91	8.03	3.20	1.19
1958	Breast	〃	95	6.21	2.41	1.01
〃	Mixed	〃	94	6.88	2.74	1.13
〃	Breast	〃	85	7.12	2.79	1.69
〃	Bottle	〃	82	6.53	2.58	2.68
1959	Breast	〃	86	5.72	2.24	2.25
〃	〃	〃	80	5.84	2.28	1.94
〃	Mixed	〃	80	5.94	2.32	2.09

Note, : Tooth type indicates (A)-Central Incisor, (B)-Lateral Incisor, (C)-Cuspid, (D)-First Molar, (E)-Second Molar, respectively.

Table 9. ^{90}Sr in Human Permanent Teeth
By T. Nagai, S. Okada, T. Komai, and E. Onishi
(*National Institute of Health*)

Sample	Age	Tooth Type	Number of Tooth	Ash Wt. (g)	Calcium (g)	^{90}Sr (pCi/gCa)
Crown	40~87	1~7	71	25	9.49	0.03
Root	40~87	1~7	71	19	7.03	0.02
Crown	30~39	8	48	15	5.70	0.02
Root	30~39	8	48	18	6.75	0.02
Crown	30~39	1~7	51	22	8.34	0.01
Root	30~39	1~7	51	20	7.39	0.03
Crown	20~29	8	44	16	5.99	0.02
Root	20~29	8	44	16	5.91	0.11
Crown	20~29	1~7	27	12	4.58	0.02
Root	20~29	1~7	27	8	3.25	0.04

Note : Tooth Type indicates (8)-Third Molar, (1~7)-Permanent Teeth except Third Molar.

The Concentration of Cesium-137 in Human Organs

(*National Institute of Radiological Sciences*)

The determination of Cesium-137 in human organs has been carried out to know the accumulated amount and the distribution of the radionuclide from the environmental contamination by radioactive fallout in Japan.

The samples of liver, kidney, spleen, small intestine and diaphragma were obtained from the Hospital of National Institute of Radiological Sciences in Chiba, during the period from August to September in 1965. The samples were stored in a deep freezer until they were analized.

Wet samples were dried at 110°C for two or three days, then heated to 450~500°C for about 12 hours.

The analytical procedure applied is outlined as follows : The ash (1~5 g) with the cesium carrier (50 mg) added was extracted with hot dilute hydrochloric acid. The extractant was made 6.5 N acidic by hydrochloric acid and shaken with an equal volume of methyl isobutylketone. The aqueous phase was evaporated to dryness and the residue was dissolved with dilute nitric acid. The solution was analized further by the usual method and the precipitate of cesium chloroplatinate was, after the usual processes, subjected to beta-counting by OMNI/GUARD of Tracer Lab. The recovery of added cesium was in the range of 85~88%.

The origin of the samples and the results of analyses are summarized in Table 10 and 11.

Table 10. The Concentration of ^{137}Cs in Human Organs —Aug. to Sept., 1965—
By G. Tanaka and A. Tomikawa
(*National Institute of Radiological Sciences*)

(Mixed Samples)

Sample Number	Organ	^{137}Cs		
		(pCi/1000 g · Wet Weight)	(pCi/g · Ash)	(pCi/g · Potassium)
2, 3	Kidney	65.8	6.07	32.1
2, 3, 4	Spleen	72.2	7.61	28.3

Table 11. The Concentration of ^{137}Cs in Human Organs —Aug. to Sept., 1965—

By G. Tanaka and A. Tomikawa
(*National Institute of RadiologicalSciences*)

(Single Sample)

Sample Number	Date of Death	Age	Sex	Organ	^{137}Cs (pCi/1000 g · Wet Weight)	^{137}Cs (pCi/g · Ash)	^{137}Cs (pCi/g · Potassium)
1	Aug. 1, 1965	32	female	Liver	29.2	2.62	13.1
				S. intestine	7.39	1.67	9.00
2	Sept. 25, 1965	29	female	Liver	17.2	2.22	13.1
				Kidney	37.5	3.59	17.9
				Lung	17.8	1.60	9.38
				S. intestine	7.50	2.25	10.5
3	Sept. 1, 1965	64	male	Liver	84.3	14.1	40.3
				S. intestine	13.3	5.97	26.7
4	Sept. 14, 1965	58	male	Liver	53.1	4.40	18.7
				S. intestine	22.9	3.53	27.2
5	Sept. 22, 1965	59	male	Kidney	68.6	6.86	37.1
				Lung	75.2	6.11	30.6
				S. intestine	30.5	7.25	32.2
				(Diaphragma)	100.0	4.20	16.8

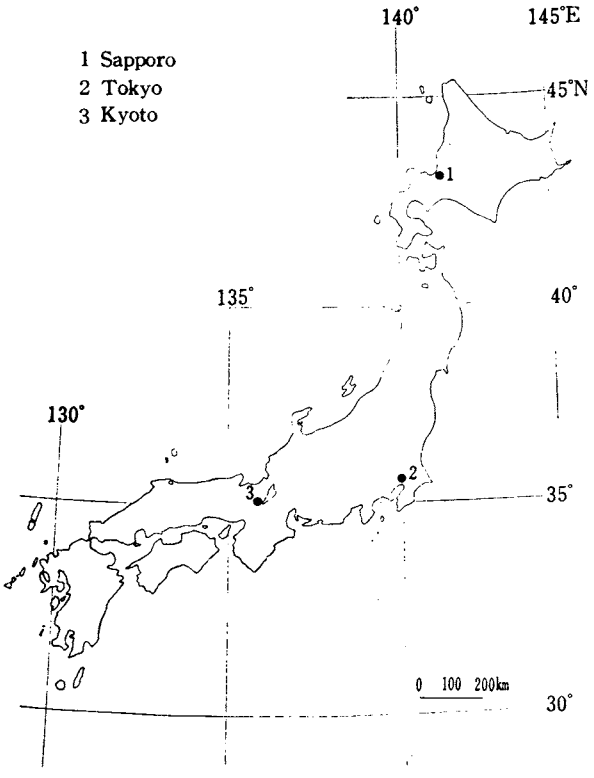
Measurement of Radium-226 in Bone of Japanese people

(*National Institute of Radiological Sciences*)

The Radium-226 concentration in bone of Japanese people collected in three cities is reported. The bone samples were collected in Sapporo, Tokyo and Kyoto being located geographically far from each other and in the areas of densely populated respectively. Sampling locations are indicated in Figure 5. The samples were taken from subjects that had lived for long time in each cities. In most cases the samples used were ribs, and the ages at death of them ranged from 6 to 78 years old.

The radium emanation technique developed by G. L. Bate et al,* was used to determine the Radium-226 content. The Radon-222 generated from Radium-226 in a sample was accumulated for 7 days. Then it was separated from other gases and water vapour and transfered into an ionization chamber (1,500 m*l*). After the radon in the ionization chamber was kept for several hours to make equilibrium between radon and its daughters, their activity was counted for 15 to 20 hours by using a vibrating reed electrometer and a recorder system. The calibration of measuring instrument used showed that 5×10^{-14} Ci of Radon-222 separated from standard radium solution gave 12.0 counts per hour as its counting efficiency and it had 4.4 counts per hour as the background counts of the ionization chamber. Each sample was measured twice and the background count

Figure 5. Human Bone Sampling Location



was subtracted from the mean of the measured counts, then the Radium-226 content was calculated compared with the standard sample treated with the same method as it was above described.

The results measured are shown in Table 12.

* G. L. Bate, H. L. Volchok and J. L. Kulp, "A Low-Level Radon Counting System" Rev. Sci. Instr., 25 : 153~157, 1954.

Table 12. Radium-226 in Human Bone

By S. Ohno and H. Watanabe

(*National Institute of Radiological Sciences, Chiba, Japan*)

Location	Age	Sex	Ra-226 ($\times 10^{-14}$ Ci/g · ash)	Appendix
Sapporo	74 y	f	0.42	Rib
	72 〃	〃	0.75	〃
	28 〃	〃	0.39	〃
	6 〃	〃	0.55	Rib, Sternum
	49 〃	〃	0.29	Rib
	67 〃	〃	0.29	〃
	62 〃	m	0.30	〃
	50 〃	〃	0.49	〃
	40 〃	f	0.47	〃
	47 〃	〃	0.46	〃
	13 〃	m	0.80	Rib, Sternum
		Average	0.47	
Tokyo	16 y	m	0.98	Rib, Sternum
	25 〃	〃	0.81	〃 〃
	18 〃	f	0.64	〃 〃
	14 〃	m	0.79	〃 〃
	15 〃	〃	0.55	〃 〃
	67 〃	〃	0.79	Rib
	16 〃	f	0.39	Rib, Sternum
	58 〃	〃	1.80	Composite
	66 〃	〃	1.30	Vertebra
		Average	0.90	
Kyoto	65 y	m	1.1	Rib
	55 〃	〃	2.9	〃
	62 〃	f	1.2	〃
	60 〃	m	1.1	〃
	26 〃	f	1.7	〃
	34 〃	〃	4.8	〃
	48 〃	〃	3.2	〃
	33 〃	〃	2.7	〃
	52 〃	m	2.2	〃
	45 〃	f	2.2	〃
		Average	2.3	

Dietary Data

Strontium-90 and Cesium-137 in Milk

Part 1 (*National Institute of Animal Industry*)

The observation of the monthly variation in Strontium-90 and Cesium-137 content in milk was conducted at the National Institute of Animal Industry.

Samples were taken from the same cow, if possible, at the farm of the Institute and six other prefectural agricultural experimental stations, and analyzed by the method recommended by the Science and Technology Agency.

Sampling stations are indicated in Figure 6.

Results obtained during the period from March, 1966 to January, 1967 are shown in Table 13.

Figure 6. Milk Sampling Stations

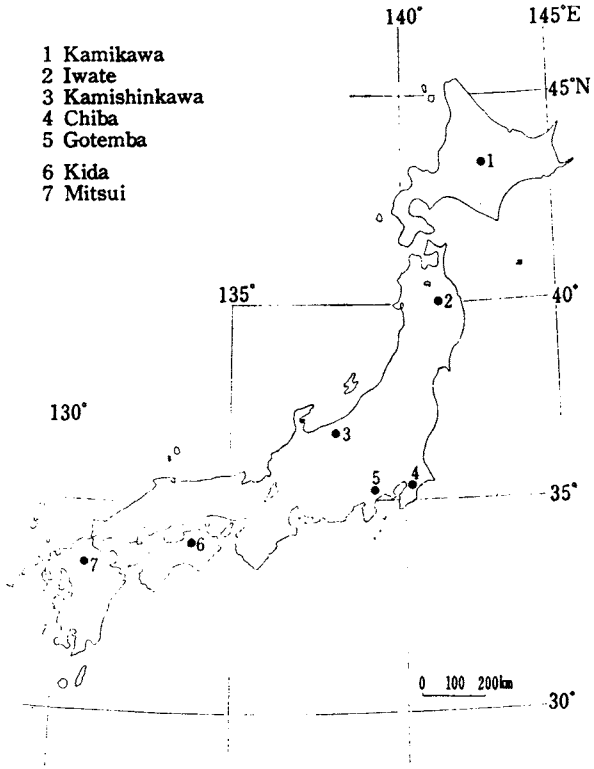


Table 13. ^{90}Sr and ^{137}Cs in Milk —Mar., 1966 to Jan., 1967—

By H. Danbara and T. Mitsuhashi

(*National Institute of Animal Industry*)

(Continued from Table 8, Issue No. 9~10 of this Pubication)

Location	Component		^{90}Sr		^{137}Cs	
	Ca (g/*l*)	K (g/*l*)	(pCi/*l*)	(pCi/gCa)	(pCi/*l*)	(pCi/gK)
Mar. 1966						
Kamikawa, HOKKAIDO	1.2	1.5	40.2	33.5	168.5	112.3
Iwate, IWATE	1.0	1.5	26.3	26.3	71.2	47.5
Kamishinkawa, TOYAMA	1.2	1.6	19.0	15.8	68.3	42.7
Chiba, CHIBA	1.1	1.6	15.9	14.5	39.6	24.8
Gotemba, SHIZUOKA	1.1	1.4	16.4	14.9	48.8	34.9
Kida, KAGAWA	1.1	1.5	7.4	6.7	52.7	35.1
Mitsui, FUKUOKA	—	—	—	—	—	—
Apr. 66						
Kamikawa, HOKKAIDO	1.2	1.5	39.7	33.1	314.1	209.4
Iwate, IWATE	1.2	1.3	21.3	17.8	128.3	98.7

Location	Component		^{90}Sr		^{137}Cs	
	Ca (g/*l*)	K (g/*l*)	(pCi/*l*)	(pCi/gCa)	(pCi/*l*)	(pCi/gK)
Kamishinkawa, TOYAMA	1.1	1.6	14.2	12.9	69.4	43.4
Chiba, CHIBA	1.1	1.6	10.4	9.5	49.7	31.1
Gotemba, SHIZUOKA	1.2	1.3	12.1	10.1	55.2	42.5
Kida, KAGAWA	1.1	1.5	3.6	3.3	38.2	25.5
Mitsui, FUKUOKA	1.1	1.4	14.7	13.4	62.8	44.9
May 66						
Kamikawa, HOKKAIDO	—	—	—	—	—	—
Iwate, IWATE	1.2	1.5	22.5	18.8	101.8	67.9
Kamishinkawa, TOYAMA	1.1	1.6	14.1	12.8	45.8	28.6
Chiba, CHIBA	0.9	1.3	6.0	6.7	38.0	29.2
Gotemba, SHIZUOKA	1.1	1.4	6.3	5.7	67.9	48.5
Kida, KAGAWA	1.2	1.6	15.5	12.9	22.2	13.9
Mitsui, FUKUOKA	1.0	1.6	8.2	8.2	25.7	16.1
Jun. 66						
Kamikawa, HOKKAIDO	1.1	1.5	23.5	21.4	118.6	79.1
Iwate, IWATE	1.0	1.7	19.4	19.4	77.8	45.8
Kamishinkawa, TOYAMA	1.1	1.6	14.9	13.5	56.6	35.4
Chiba, CHIBA	1.0	1.6	5.1	5.1	48.4	30.3
Gotemba, SHIZUOKA	1.2	1.5	22.7	18.9	164.6	109.7
Kida, KAGAWA	1.1	1.7	9.3	8.5	32.2	18.9
Mitsui, FUKUOKA	1.0	1.3	13.9	13.9	23.8	18.3
Jul. 66						
Kamikawa, HOKKAIDO	1.1	1.7	26.5	24.1	245.3	144.3
Iwate, IWATE	1.0	1.7	9.0	9.0	44.7	26.3
Kamishinkawa, TOYAMA	1.2	1.6	14.9	12.4	32.8	20.5
Chiba, CHIBA	1.2	1.6	11.4	9.5	43.7	27.3
Gotemba, SHIZUOKA	1.1	1.7	7.6	6.9	42.7	25.1
Kida, KAGAWA	1.0	1.6	6.1	6.1	29.4	18.4
Mitsui, FUKUOKA	1.0	1.5	10.4	10.4	25.5	17.0
Aug. 66						
Kamikawa, HOKKAIDO	1.1	1.7	16.8	15.3	239.3	140.8
Iwate, IWATE	1.0	1.7	16.1	16.1	54.8	32.2
Kamishinkawa, TOYAMA	1.1	1.6	14.2	12.9	30.2	18.9
Chiba, CHIBA	1.0	1.7	6.7	6.7	23.8	14.0
Gotemba, SHIZUOKA	1.1	1.7	13.1	11.9	39.6	23.3
Kida, KAGAWA	1.0	1.5	5.0	5.0	29.4	26.3
Mitsui, FUKUOKA	1.0	1.6	5.4	5.4	18.3	11.4
Sept. 66						
Kamikawa, HOKKAIDO	1.1	1.6	11.0	10.0	232.2	145.1
Iwate, IWATE	1.0	1.7	4.3	4.3	28.1	16.5
Kamishinkawa, TOYAMA	1.1	1.6	6.2	5.6	48.9	30.6
Chiba, CHIBA	0.9	1.4	3.5	3.9	49.3	35.2
Gotemba, SHIZUOKA	1.0	1.7	3.4	3.4	29.3	17.2
Kida, KAGAWA	1.1	1.5	3.2	2.9	29.3	19.5
Mitsui, FUKUOKA	0.9	1.7	4.0	4.4	19.3	11.4
Oct. 66						
Kamikawa, HOKKAIDO	1.0	1.7	20.0	20.0	144.9	85.2
Iwate, IWATE	1.0	1.7	12.6	12.6	66.9	39.4
Kamishinkawa, TOYAMA	1.1	1.7	6.3	5.7	31.8	18.7
Chiba, CHIBA	0.9	1.7	3.8	4.2	15.9	9.4
Gotemba, SHIZUOKA	1.1	1.7	7.9	7.2	41.5	24.4
Kida, KAGAWA	1.2	1.6	8.3	6.9	31.2	19.5
Mitsui, FUKUOKA	1.0	1.6	7.7	7.7	17.9	11.2
Nov. 66						
Kamikawa, HOKKAIDO	1.0	1.6	43.5	43.5	227.1	141.9
Iwate, IWATE	1.0	1.7	12.0	12.0	99.8	58.7
Kamishinkawa, TOYAMA	1.0	1.7	0.1	8.1	32.8	19.3
Chiba, CHIBA	1.1	1.7	5.3	4.8	25.9	15.2
Gotemba, SHIZUOKA	1.3	1.3	9.1	7.0	38.9	29.9
Kida, KAGAWA	1.1	1.4	5.5	5.9	22.8	16.3
Mitsui, FUKUOKA	0.9	1.7	6.6	7.3	17.8	10.5

Location	Component		^{90}Sr		^{137}Cr	
	Ca (g/*l*)	K (g/*l*)	(pCi/*l*)	(pCi/gCa)	(pCi/*l*)	(pCi/gK)
Dec. 66						
Kamikawa, HOKKAIDO	1.1	1.5	67.7	61.5	393.9	262.6
Iwate, IWATE	—	—	—	—	—	—
Kamishinkawa, TOYAMA	1.1	1.7	8.7	7.9	44.3	26.1
Chiba, CHIBA	1.0	1.7	6.8	6.3	7.0	4.1
Gotemba, SHIZUOKA	1.1	1.6	8.6	7.8	54.6	34.1
Kida, KAGAWA	1.2	1.3	3.9	3.3	34.1	26.2
Mitsui, FUKUOKA	0.9	1.5	5.9	6.6	21.5	14.3
Jan. 1967						
Kamikawa, HOKKAIDO	1.1	1.5	42.8	38.9	242.4	161.6
Iwate, IWATE	1.1	1.5	15.2	13.8	100.4	66.9
Kamishinkawa, TOYAMA	1.1	1.7	5.0	4.5	79.8	47.0
Chiba, CHIBA	1.0	1.3	5.4	5.4	6.0	4.6
Gotemba, SHIZUOKA	1.1	1.7	10.2	9.3	28.1	16.5
Kida, KAGAWA	1.0	1.6	5.9	5.9	25.0	15.6
Mitsui, FUKUOKA	1.0	1.6	6.8	6.8	19.5	12.2

Part 2 (*Japan Analytical Chemistry Research Institute*)

Since December 1961, milk samples from various parts of Japan have been collected by 24 prefectural public health laboratories and analyzed for Strontium-90 and Cesium-137 content at the Japan Analytical Chemistry Research Institute.

Sampling locations are indicated in Figure 7.

Three liters of fresh milk were purchased at a representative farm in each prefecture and carbonized by the public health laboratories. The carbonized samples were sent to the Japan Analytical Chemistry Research Institute and ashed, then analyzed using the method recommended by the Science and Technology Agency.

Results obtained during the period April to September, 1966 are shown in Table 14.

Figure 7. Milk Sampling Locations

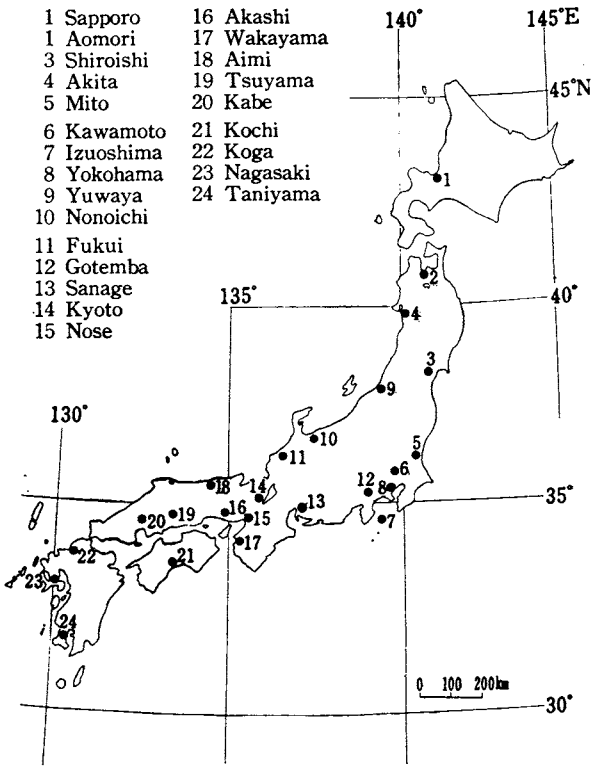


Table 14. ^{90}Sr and ^{137}Cs in Milk —Apr. to Sept., 1966—

By T. Asari, M. Chiba, and M. Kuroda
(*Japan Analytical Chemistry Research Institute*)

(Continued from Table 9, Issue No. 9~10, of This Publication)

Location	Component			^{90}Sr		^{137}Cs	
	Ash (g/*l*)	Ca (g/*l*)	K (g/*l*)	(pCi/*l*)	(pCi/gCa)	(pCi/*l*)	(pCi/gK)
Apr. 1966							
Aomori, AOMORI	7.17	1.34	1.46	21.4	16.0	54.1	37.1
Nonoichi, ISHIKAWA	6.70	1.06	0.99	6.9	6.5	36.9	37.2
Fukui, FUKUI	8.33	1.15	1.38	4.3	3.7	25.9	*18.8*
Sanage, AICHI	7.10	1.09	1.12	5.6	5.1	13.1	11.7
Tsuyama, OKAYAMA	6.87	1.09	0.98	7.7	7.1	24.6	25.1
Nagasaki, NAGASAKI	7.67	1.22	1.19	7.5	6.2	33.8	28.4
May 66							
Sapporo, HOKKAIDO	7.67	1.11	1.37	12.2	11.0	42.3	30.9
Shiroishi, MIYAGI	8.27	1.09	1.42	10.3	9.5	40.6	28.6
Mito, IBARAGI	8.63	1.34	1.44	4.7	3.5	17.0	11.8
Kawamoto, SAITAMA	7.03	1.04	0.94	12.0	11.5	17.6	18.4
Izuoshima, TOKYO	7.26	1.16	1.12	15.7	13.5	16.6	14.8
Yokohama, KANAGAWA	6.27	0.96	1.11	4.4	4.6	26.6	24.0
Yuwaya, NIIGATA	5.47	0.84	1.10	5.9	7.0	18.7	17.0
Gotemba, SHIZUOKA	6.00	0.91	1.11	8.5	9.5	11.8	46.7
Kyoto, KYOTO	8.16	1.15	0.93	5.1	4.4	20.1	21.6
Nose, OSAKA	6.47	1.08	1.23	5.1	4.7	19.9	16.2
Akashi, HYOGO	8.47	1.65	1.28	5.4	3.3	17.7	13.8
Wakayama, WAKAYAMA	5.32	0.89	0.97	3.8	4.3	12.5	12.9
Aimi, TOTTORI	7.58	1.10	1.29	7.5	6.8	31.4	24.3
Kabe, HIROSHIMA	8.47	1.35	1.13	6.1	4.5	28.2	25.0
Kochi, KOCHI	7.56	1.05	1.54	6.2	5.9	22.3	14.5
Koga, FUKUOKA	7.50	1.22	1.28	7.2	5.9	23.5	18.4
Taniyana, KAGOSHIMA	6.84	1.05	1.02	8.9	8.5	30.2	29.6
Jun. 66							
Aomori, AOMORI	6.87	0.99	1.30	24.8	25.0	59.4	45.6
Yuwaya, NIIGATA	7.17	1.17	1.53	12.6	10.8	22.1	14.4
Nonoichi, ISHIKAWA	6.70	1.01	1.26	11.3	11.2	35.8	28.4
Fukui, FUKUI	6.97	0.99	1.36	7.2	7.3	23.1	17.0
Sange, AICHI	7.23	1.05	1.13	6.0	5.7	21.0	18.6
Tsuyama, OKAYAMA	6.27	1.01	1.02	5.6	5.5	15.3	15.0
Koga, FUKUOKA	7.27	1.12	1.01	7.4	6.6	24.7	24.4
Nagasaki, NAGASAKI	7.77	1.14	1.55	8.8	7.6	41.7	26.9
Jul. 66							
Sapporo, HOKKAIDO	7.00	1.23	1.40	6.5	5.2	31.0	22.2
Shiroshi, MIYAGI	8.00	1.21	1.87	11.5	9.5	41.2	22.0
Akita, AKITA	7.27	1.14	1.18	19.3	16.9	48.4	41.0
Mito, IBARAGI	7.54	1.32	1.59	5.6	4.2	18.5	11.6
Kawamoto, SAITAMA	6.70	1.01	1.14	5.1	5.0	12.4	10.9
Izuoshima, TOKYO	9.53	1.36	1.89	13.5	9.9	170.9	90.4
Yokohama, KANAGAWA	6.33	0.96	0.92	4.5	4.7	23.8	25.9
Gotemba, SHIZUOKA	6.66	0.86	1.52	11.3	13.1	64.9	42.9
Kyoto, KYOTO	9.73	1.16	1.76	4.7	4.1	20.9	11.9
Nose, OSAKA	7.07	1.09	1.52	9.8	9.0	28.0	18.4
Akashi, HYOGO	8.00	1.49	1.51	5.4	3.6	31.3	20.8
Wakayama, WAKAYAMA	7.17	0.83	1.79	4.2	5.0	13.7	7.7
Aimi, TOTTORI	6.93	0.98	1.03	13.5	13.8	42.2	41.0
Kabe, HIROSHIMA	7.60	0.92	1.22	6.9	7.5	20.2	16.6
Kochi, KOCHI	7.33	0.92	1.16	5.7	6.2	16.8	14.5
Taniyama, KAGOSHIMA	6.80	1.09	1.47	16.0	14.7	26.0	17.7
Aug. 66							
Aomori, AOMORI	6.40	0.72	1.44	30.9	43.0	45.9	31.9
Yuwaya, NIIGATA	6.46	0.85	1.37	4.7	5.6	15.1	11.0
Nonoichi, ISHIKAWA	6.90	1.20	1.36	11.6	9.7	30.0	22.0
Tsuyama, OKAYAMA	6.70	0.09	1.36	8.5	7.8	20.6	15.2
Koga, FUKUOKA	7.83	1.15	1.70	6.4	5.6	19.1	11.2
Nagasaki, NAGASAKI	8.33	1.31	1.84	5.4	4.1	32.4	17.6
Sept. 66							
Akita, AKITA	7.30	1.15	1.46	14.3	12.4	32.7	22.5
Izuoshima, TOKYO	7.49	1.13	1.65	13.6	12.1	92.7	56.3
Kyoto, KYOTO	8.33	1.26	1.83	9.5	7.6	51.9	26.9
Aimi, TOTTORI	5.44	0.78	1.09	6.1	7.8	18.0	16.4
Kabe, HIROSHIMA	7.30	1.07	1.49	7.2	6.8	10.7	7.2
Kochi, KOCHI	7.33	1.16	1.74	5.8	5.0	22.2	12.8

Strontium-90 and Cesium-137 in Total Diet

(*Japan Analytical Chemistry Research Institute*)

Since June 1963, the Japan Analytical Chemistry Research Institute has conducted analyses of total diet samples from the 18 prefectures shown in Figure 8.

One city and one village in each prefecture as representative of urban and rural districts of these prefectures, respectively. Ten families from each location were chosen at random, and each family presented a normal portion of the regular diet consumed in one day by an adult or a child. Diet at special occasions was avoided.

Composite samples from the 10 families were ashed together and analyzed using the method recommended by the Science and Technology Agency.

Results obtained during the period from May to June, 1966 are shown in Table 15.

Figure 8. Total Diet Sampling Locations

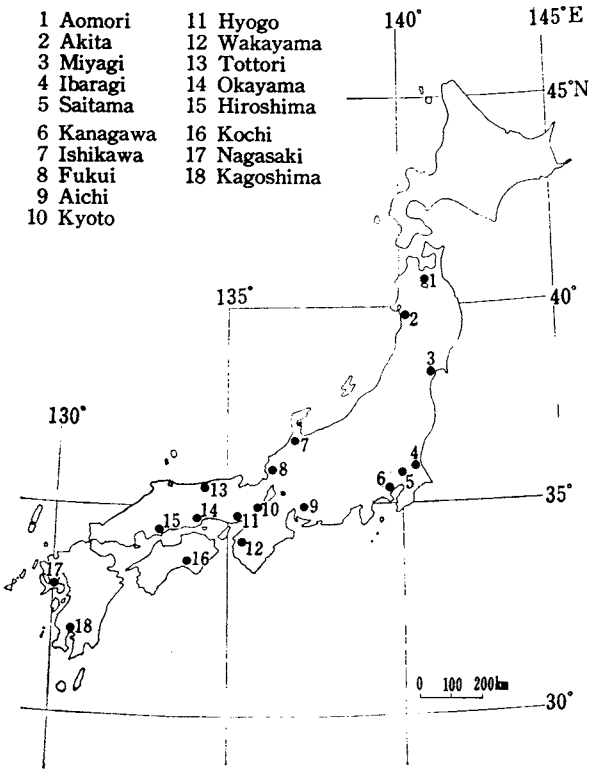


Table 15. ^{90}Sr and ^{137}Cs in Total Diet —May to Jun., 1966—

By T. Asari, M. Chiba and M. Kuroda
(*Japan Analytical Chemistry Research Institute*)

(Continud from Table 2. Issue No. 13, of this Pubication)

Location	Month	Daily Intake						
		Ash (g)	Ca (mg)	K (mg)	^{90}Sr (pCi)	^{137}Cs (pCi)	^{90}Sr (pCi/gCa)	^{137}Cs (pCi/gK)
(URBAN ADULT DIET)								
Aomori, AOMORI	Jun 1966	17.6	245	2.39	14.5	18.1	59.1	7.6
Akita, AKITA	〃 〃	17.2	655	1.63	24.6	23.6	37.6	14.5
Sendai, MIYAGI	〃 〃	21.8	887	3.43	10.3	9.8	11.6	2.9
Mito, IBARAGI	May 〃	20.0	554	2.84	7.8	24.1	14.1	8.5
Omiya, SAITAMA	〃 〃	15.1	242	1.34	7.3	9.6	30.2	7.2
Odawara, KANAGAWA	Jun 〃	18.7	781	1.84	11.2	35.2	14.3	19.1
Kanazawa, ISHIKAWA	〃 〃	20.5	439	1.48	18.9	19.2	42.1	13.0
Fukui, FUKUI	May 〃	18.0	684	1.94	17.5	7.9	25.6	4.1
Kariya, AICHI	Jun 〃	19.4	429	1.86	10.5	21.8	24.5	11.7
Kyoto, KYOTO	〃 〃	7.2	266	0.35	7.1	7.9	26.7	22.6
Kakogawa, HYOGO	〃 〃	17.5	706	2.31	7.1	16.8	10.0	7.3
Tottori, TOTTORI	May 〃	25.4	612	2.88	14.5	28.5	23.7	9.9
Okayama, OKAYAMA	〃 〃	15.6	362	1.44	5.9	12.5	16.3	8.7
Hiroshima, HIROSHIMA	Jun 〃	16.6	529	1.65	9.7	15.8	18.4	9.6
Kochi, KOCHI	May 〃	17.1	368	2.07	11.2	14.2	30.5	6.9
Nagasaki, NAGASAKI	Jun 〃	15.0	440	2.91	9.9	18.0	22.5	6.2
Kagoshima, KAGOSHIMA	〃 〃	9.5	448	1.79	7.1	14.7	15.9	8.2
(RURAL ADULT DIET)								
Aomori, AOMORI	Jun 〃	20.0	749	0.96	27.6	21.7	36.9	22.6
Yuwa, AKITA	〃 〃	25.1	578	2.79	27.4	16.9	64.9	6.1
Natori, MIYAGI	〃 〃	18.5	542	2.41	8.8	7.6	16.2	3.2
Tokai, IBARAGI	May 〃	19.1	519	1.83	9.7	24.1	18.7	13.2
Niiza, SAITAMA	〃 〃	21.6	588	1.75	13.6	19.0	23.1	10.9
Shiroyama, KANAGAWA	Jun 〃	15.7	456	1.57	6.3	22.8	13.8	14.5
Kashiwano, ISHIKAWA	〃 〃	15.0	732	1.10	25.5	28.4	34.8	25.8
Miyama, FUKUI	〃 〃	13.4	277	1.36	11.0	4.5	39.7	3.3
Nishio, AICHI	〃 〃	13.1	522	1.63	5.8	17.7	11.1	10.9
Yagi, KYOTO	〃 〃	20.3	710	2.14	12.3	21.8	17.3	10.2
Kakogawa, HYOGO	〃 〃	15.2	463	2.39	9.7	14.0	21.0	5.9
Shimotsu, WAKAYAMA	〃 〃	15.8	650	1.54	4.3	10.4	6.6	6.8
Fukube, TOTTORI	May 〃	20.7	891	2.14	25.0	8.4	28.1	3.9
Tsudaka, OKAYAMA	〃 〃	13.4	225	1.05	5.5	8.7	24.5	8.3
Shiwa, HIROSHIMA	Jun 〃	18.9	580	2.64	10.3	13.8	17.8	5.2
Haruno, KOCHI	May 〃	17.5	424	2.22	13.2	16.7	31.1	7.5
Tokitsu, NAGASAKI	Jun 〃	20.0	415	3.05	11.7	20.2	28.2	6.6
Miyanojo, KAGOSHIMA	〃 〃	14.2	327	2.27	8.8	16.5	26.8	7.3
(RURAL CHILD DIET)								
Aomori, AOMORI	Jun 〃	10.1	254	0.74	16.1	16.5	63.5	22.3
Yuwa, AKITA	〃 〃	9.9	192	1.09	6.9	7.5	36.0	6.9
Natori, MIYAGI	〃 〃	12.5	310	1.44	5.8	4.8	18.7	3.3
Tokai, IBARAGI	May 〃	11.9	427	1.65	7.4	6.4	17.3	3.9
Niiza, SAITAMA	〃 〃	11.6	432	1.50	7.4	13.5	17.1	9.0
Shiroyama, KANAGAWA	Jun 〃	12.7	364	1.07	6.1	16.4	16.8	15.3
Matsuto, ISHIKAWA	〃 〃	7.3	488	0.49	4.4	7.9	9.0	16.1
Miyama, FUKUI	〃 〃	6.6	158	0.70	3.4	2.7	21.5	3.9
Nishio, AICHI	〃 〃	9.0	307	1.15	4.3	13.9	14.0	12.1
Yagi, KYOTO	〃 〃	5.7	240	0.60	2.8	2.7	11.7	4.5
Kakogawa, HYOGO	〃 〃	10.5	334	1.85	4.0	10.8	12.0	5.8
Shimotsu, WAKAYAMA	〃 〃	5.9	153	0.56	1.6	4.2	10.5	7.5
Fukube, TOTTORI	May 〃	11.6	626	1.32	11.6	14.1	18.5	10.7
Tsudaka, OKAYAMA	〃 〃	6.8	246	0.76	2.5	5.5	10.2	7.2
Shiwa, HIROSHIMA	Jun 〃	14.4	527	1.17	9.4	16.3	17.9	14.9
Haruno, KOCHI	May 〃	10.5	550	1.31	12.8	30.7	23.3	23.4
Tokitsu, NAGASAKI	Jun 〃	12.4	288	1.60	6.8	10.9	24.7	6.8
Miyanojo, KAGOSHIMA	〃 〃	13.8	376	1.35	6.5	21.2	17.3	15.7

Fish Data

The Concentration of Strontium-90 and Cesium-137 in Various Kinds of Fishes collected from Japan during 1963 to 1966

(National Institute of Radiological Sciences)

Since 1963, radiochemical analysis of Strontium-90 and Cesium-137 in edible fish samples have been carried out at National. Institute of Radiological Sciences.

Fish samples used for analyses were sea water fish, brackish water fish and fresh water fish. Sea water fishes and brackish water fishes were caught at adjacent waters of Niigata, Hiroshima, Fukushima, Tokyo and Fukui Prefectures. Fresh water fishes were collected from the fresh water pools or lakes of Hokkaido, Akita, Kyoto, Niigata, Fukui, Fukushima, Ibaragi, Tokyo, Aichi, Hiroshima and Kagoshima Prefectures.

Sampling locations are shown in Figure 9.

These samples were dissected and separated into muscle, viceral organs and bone.

The radiochemical analyses were carried out on the ashed samples.

The results were summarized in Table 16 and 17.

The English and Japanese common names and scientific names of sample fishes are shown in Table 18.

Figure 9. Fish Sampling Locations

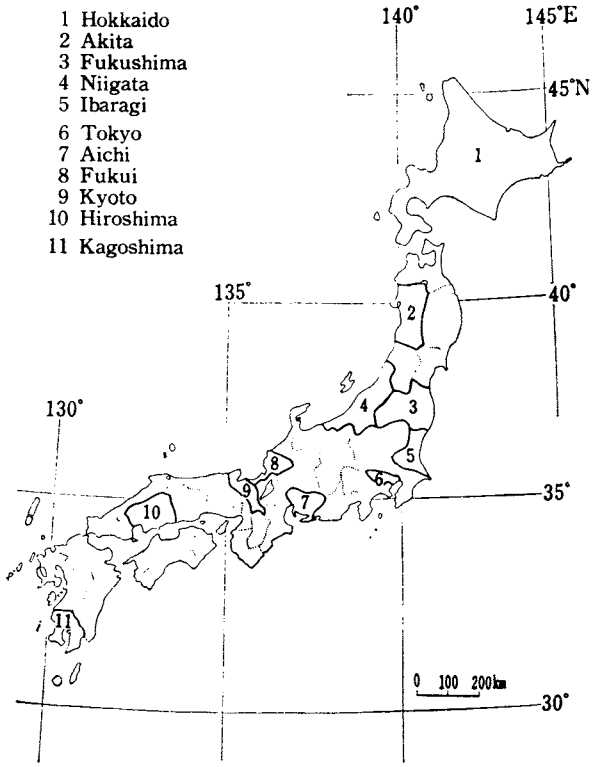


Table 16. The Concentration of ^{90}Sr in the Bone of Fishes (pCi/g of Ca) —Nov., 1963 to May, 1966—

By M. Saiki, T. Ueda, Y. Suzuki and E. Kase
(National Institute of Radiological Sciences)

Location	Classification by Inhabitancy	English Common name	1963 Nov.	1964 May	1964 Aug.	1964 Nov.	1965 Feb.	1965 May	1965 Nov.	1966 May
Niigata	A	Red barracuda	0.9	—	—	—	—	—	—	—
	〃	Japanese horse mackerel	0.2	—	—	—	—	—	0.8	0.6
	〃	Mackerel	0.7	0.7	3.0	0.2	0.5	—	0.5	0.6
	〃	Bastard halibut	—	1.1	—	—	—	0.5	—	—
	〃	Flat fish	—	—	4.7	—	0.9	—	0.6	—
	〃	Common Japanese Conger	—	—	—	—	—	—	—	—
	〃	Cod fiish	—	—	—	—	—	0.2	0.4	—
	〃	Sand smelt	—	—	—	—	—	—	—	—
	〃	Tile fish	—	—	—	—	—	0.3	—	—
	B	Gray mullet	32.8	16.9	32.5	—	18.3	42.6	38.2	4.0
	C	Carp	165.0	—	—	—	—	—	—	—
	〃	Gibel	108.3	56.4	—	—	—	69.3	46.8	26.6

Location	Classification by Inhabitancy	English Common name	1963 Nov.	1964 May	〃 Aug.	〃 Nov.	1965 Feb.	〃 May	〃 Nov.	1966 May
Hiroshima	A	Japanese sting ray	—	0.5	—	—	—	—	—	—
	〃	Black porgy	—	0.8	—	0.4	—	0.4	0.8	0.4
	〃	Sardine	—	0.5	0.5	0.5	—	—	—	—
	〃	Sea chub	—	—	0.7	0.4	0.6	0.3	0.9	—
	〃	Flat fish	—	—	—	—	0.5	0.6	—	*0.4
	〃	Gizzard shad	—	—	—	—	—	0.5	0.7	—
	B	Gray mullet	—	3.0	0.9	1.4	0.7	1.9	1.5	0.6
	C	Carp	—	28.6	25.9	13.5	13.0	29.0	22.9	18.7
Fukushima	A	Flat fish	—	—	—	—	—	0.6	0.4	—
	〃	Sea bass	—	—	—	—	—	2.4	0.8	1.5
	〃	Black porgy	—	—	—	—	—	0.1	0.5	0.3
	〃	"Kichigi"	—	—	—	—	—	0.5	0.5	—
	B	Gray mullet	—	—	—	—	—	6.5	1.9	2.9
	C	Carp	—	—	—	—	—	34.3	26.1	25.9
Tokyo	A	Flat fish	0.6	0.9	0.5	2.5	0.3	0.6	0.2	—
	〃	Mackerel	1.2	—	—	4.2	—	—	—	—
	B	Goby	1.3	—	—	—	—	—	—	—
	A	"Hata"	—	0.5	0.4	—	—	—	—	—
	C	Carp	29.5	62.5	—	—	—	18.6	7.3	—
Fukui	A	Flat fish	—	—	—	—	—	—	—	*0.3
	〃	Japanese horse mackerel	—	—	—	—	—	—	—	0.4
	B	Gray mullet	—	—	—	—	—	—	—	6.8
	C	Gibel	—	64.4	38.1	—	—	51.3	48.8	47.5
Hokkaido	〃	〃	—	—	—	—	—	46.8	—	39.5
Akita	〃	Carp	—	—	—	—	—	39.8	18.5	20.1
Ibaragi	〃	Gibel	—	—	—	—	—	57.5	38.2	47.6
Aichi	〃	〃	—	—	—	—	—	45.8	31.5	12.7
Kyoto	〃	Carp	—	—	—	—	—	*56.0	32.3	26.6
Kagoshima	〃	〃	—	—	—	—	—	40.0	36.8	25.3

Note : (A)-Sea Water Fish, (B)-Brackish Water Fish, (C)-Fresh Water Fish (*)-Whole Body

Table 17. The Concentration of ^{137}Cs in the Muscle and Viceral Organs of Fishes (pCi/kg•fresh)
—Nov., 1963 to May, 1966—
By M. Saiki, T. Ueda, Y. Suzuki and E. Kase
(*National Institute of Radiological Sciences*)

Location	Classification by Inhabitancy	English Common name	Nov. 1963		May 1964		Aug 〃		Nov 〃	
			M.	V.O.	M.	V.O.	M.	V.O.	M.	V.O.
Niigata	A	Red barracuda	188.1	88.3	—	—	—	—	—	—
	〃	Japanese horse mackerel	92.4	—	—	—	—	—	—	—
	〃	Mackerel	38.2	45.2	18.4	81.2	7.6	16.3	11.1	17.6
	〃	Bastard halibut	—	—	43.8	111.6	—	—	—	—
	〃	Flat fish	—	—	—	—	15.9	4.1	—	—
	〃	Common japanese conger	—	—	—	—	8.6	11.1	—	—
	〃	Cod fish	—	—	—	—	—	—	—	—
	〃	Sand smelt	—	—	—	—	—	—	—	—
	〃	Tile fish	—	—	—	—	—	—	—	—
	B	Gray mullet	158.9	132.9	28.2	83.5	45.3	109.6	—	—
	C	Carp	53.8	39.5	—	—	—	—	—	—
	〃	Gibel	146.9	—	—	—	—	—	—	—

Location	Classification by Inhabitancy	English Common name	Feb. 1965		May 〃		Nov. 〃		May 1966	
			M.	V.O.	M.	V.O.	M.	V.O.	M.	V.O.
Niigata	A	Red barracuda	—	—	—	—	—	—	—	—
	〃	Japanese horse mackerel	—	—	—	—	*12.3	—	21.2	16.5
	〃	Mackerel	10.6	12.9	—	—	11.5	12.5	19.4	20.1
	〃	Bastard halibut	—	—	22.8	19.9	—	—	—	—
	〃	Flat fish	20.8	19.3	—	—	25.0	20.5	—	—
	〃	Common japanese conger	—	—	—	—	—	—	—	—
	〃	Cod fish	—	—	44.9	40.8	23.3	21.3	—	—
	〃	Sand smelt	—	—	36.6	4.6	—	—	—	—
	〃	Tile fish	—	—	20.8	29.3	—	—	—	—
	B	Gray mullet	33.6	180.1	87.3	132.1	77.2	41.4	25.5	22.7
	C	Carp	—	—	—	—	—	—	—	—
	〃	Gibel	—	—	81.2	78.0	65.3	60.8	49.9	36.5

Location	Classification by Inhabitancy	English Common name	Nov. 1963		May 1964		Aug. 〃		Nov. 〃	
			M.	V.O.	M.	V.O.	M.	V.O.	M.	V.O.
Hiroshima	A	Japanese sting ray	—	—	17.6	—	—	—	—	—
	〃	Black porgy	—	—	3.4	5.1	—	—	18.2	23.5
	〃	Sardine	—	—	*32.0	—	*21.9	—	*26.5	—
	〃	Sea chub	—	—	—	—	32.5	5.7	28.6	15.3
	〃	Flat fish	—	—	—	—	—	—	—	—
	〃	Gizzard shad	—	—	—	—	—	—	—	—
	B	Gray mullet	—	—	3.9	7.4	20.3	27.2	23.6	49.8
	C	Carp	—	—	16.9	16.4	95.6	97.5	168.0	189.1

Location	Classification by Inhaditancy	English Common name	Feb. 1965		May 〃		Nov. 〃		May 1966	
			M.	V.O.	M.	V.O.	M.	V.O.	M.	V.O.
Hiroshima	A	Japanese sting ray	—	—	—	—	—	—	—	—
	〃	Black porgy	—	—	21.4	16.4	24.4	16.8	11.0	11.8
	〃	Sardine	—	—	—	—	—	—	—	—
	〃	Sea chub	26.3	14.6	38.4	13.8	42.5	86.0	—	—
	〃	Flat fiish	30.1	18.6	16.6	14.0	—	—	*12.3	—
	〃	Gizzard shad	—	—	15.1	15.0	23.8	19.2	—	—
	B	Gray mullet	29.2	32.5	11.4	23.5	37.7	104.7	13.6	25.6
	C	Carp	100.9	170.6	170.9	122.0	77.7	64.5	74.8	61.3

Location	Classification by Inhabitancy	English Common name	Nov. 1963		May 1964		Aug. 〃		Nov. 〃	
			M.	V.O.	M.	V.O.	M.	V.O.	M.	V.O.
Fukushima	A	Flat fish	—	—	—	—	—	—	—	—
	〃	Sea bass	—	—	—	—	—	—	—	—
	〃	Black porgy	—	—	—	—	—	—	—	—
	〃	"Kichigi"	—	—	—	—	—	—	—	—
	B	Gray mullet	—	—	—	—	—	—	—	—
	C	Carp	—	—	—	—	—	—	—	—

Location	Classification by Inhabitancy	English Common name	Feb. 1965		May 〃		Nov. 〃		May 1966	
			M.	V.O.	M.	V.O.	M.	V.O.	M.	V.O.
Fukushima	A	Flat fish	—	—	15.6	7.5	31.6	11.6	—	—
	〃	Sea bass	—	—	62.5	63.9	32.6	43.2	15.6	21.5
	〃	Black porgy	—	—	32.9	30.0	37.4	39.6	23.1	24.8
	〃	"Kichigi"	—	—	9.8	13.8	18.5	25.1	—	—
	B	Gray mullet	—	—	18.8	130.8	45.3	69.8	10.2	32.6
	C	Carp	—	—	28.8	31.0	37.0	42.0	28.6	21.5

Location	Classification by Inhaditancy	English Common name	Nov. 1963		May 1964		Aug. 〃		Nov. 〃	
			M.	V.O.	M.	V.O.	M.	V.O.	M.	V.O.
Tokyo	A	Flat fish	19.1	13.1	5.0	25.4	23.0	8.6	15.2	6.2
	〃	Mackerel	57.3	45.2	—	—	—	—	—	—
	〃	" Hata "	—	—	5.2	19.3	—	—	4.6	8.3
	B	Goby	14.1	9.7	—	—	—	—	—	—
	C	Carp	91.5	21.5	45.8	81.9	—	—	—	—

Location	Classification by Inhabitancy	English Common name	Feb. 1965		May 〃		Nov. 〃		May 1966	
			M.	V.O.	M.	V.O.	M.	V.O.	M.	V.O.
Tokyo	A	Flat fish	30.0	19.3	—	—	—	—	—	—
	〃	Mackerel	—	—	—	—	—	—	—	—
	〃	" Hata "	—	—	—	—	—	—	—	—
	B	Goby	—	—	—	—	—	—	—	—
	C	Carp	—	—	58.5	52.5	48.4	45.1	41.5	36.2

Location	Classification by Inhabitancy	English Common name	Nov. 1963		May 1964		Aug. 〃		Nov. 〃	
			M.	V.O.	M.	V.O.	M.	V.O.	M.	V.O.
Fukui	A	Flat fish	—	—	—	—	—	—	—	—
	〃	Japanese horse mackerel	—	—	—	—	—	—	—	—
	B	Gray mullet	—	—	—	—	—	—	—	—
	C	Gibel	—	—	83.3	83.1	46.5	128.8	—	—
Hokkaido	〃	Gibel	—	—	—	—	—	—	—	—
Akita	〃	Garp	—	—	—	—	—	—	—	—
Ibaragi	〃	Gibel	—	—	—	—	—	—	—	—
Aichi	〃	Gibel	—	—	—	—	—	—	—	—
Kyoto	〃	Carp	—	—	—	—	—	—	—	—
Kagoshima	〃	Carp	—	—	—	—	—	—	—	—

Location	Classification by Inhabitancy	English Common name	Feb. 1965		May 〃		Nov. 〃		May 1966	
			M.	V.O.	M.	V.O	M.	V.O.	M.	V.O.
Fukui	A	Flat fish	—	—	—	—	—	—	*20.0	—
	〃	Japanese horse mackeral	—	—	—	—	—	—	10.5	21.0
	B	Gray mullet	—	—	—	—	—	—	26.6	34.8
	C	Gibel	—	—	—	—	40.2	27.0	19.2	49.7
Hokkaido	〃	Gibel	—	—	**7.7	80.5	—	—	—	—
Akita	〃	Garp	—	—	68.5	59.1	51.0	45.5	—	—
Ibaragi	〃	Gibel	—	—	69.7	88.7	57.2	46.2	49.0	36.5
Aichi	〃	Gible	—	—	66.4	44.8	61.3	52.8	27.4	40.7
Kyoto	〃	Carp	—	—	58.6	57.5	*33.1	—	25.0	24.8
Kagoshima	〃	Carp	—	—	84.0	94.3	63.1	65.5	—	—

Note : (A)-Sea Water Fish, (B)-Brckish Water Fish, (C)-Fresh Water Fish, (M)-Muscle, (V.O.)-Viceral Organ
(*)-Whole body, (**)-Whole Body without Viceral Organs

Table 18. The Common and Scientific Names of Samgle Fishes

Classification by Inhabitancy	Japanese Common Name	English Common Name	Scientific Name
Sea water fish	Kamasu	Red barracuda	*Sphyraena pinguis* GÜNTHER
〃	Maaji	Japanese horse mackerel	*Trachurus japonicus* TEMMINCK et SCHLEGEL
〃	Saba	Mackerel	*Scomber japonicus* HOUTTUYN
〃	Hirame	Bastard halibut	*Paralichthys alivaceus* TEMMINCK et SCHLEGEL
〃	Karei	Flat fiish	*Limanda irrdorum* JORDAN et STARKS
〃	Mebachi	Common japanese conger	*Astroconger myriaster* BREVOORT
〃	Tara	Cod fish	*Gadus macrocephalus*
〃	Kisu	Sand smelt	*Sillago shiama* FORSKAL
〃	Amadai	Tile fish	*Branchiostegus japonicus* HOUTTUYN
〃	Ei	Japanese sting ray	*Raja Kenojei* MÜLLER et HENLE

Classification by Inhabitancy	Japanese Common Name	English Common Name	Scientific Name
Sea Water fish	Kurodai	Black porgy	*Mylio macrocephalus* BASILEWSKY
〃	Iwashi	Sardine	*Sardinia melanosticta* TEMMINCK et SCHLEGEL
〃	Tanago	Sea chub	*Acheilognathus lanceolata* JORDAN et THOMPSON
〃	Konoshiro	Gizzard shad	*Konosirus punctatus* TEMMINCK
〃	Suzuki	Sea bass	*Lateolobrax japonicus* CÜVIER
〃	Kichigi		*Sebastolabus macrochir* GÜNTHER
〃	Hata		*Epinephelus septomfasciatus* THUNBERG
Brackish water fiish	Bora	Gray mullet	*Mugli cephalus* LINNÉ
〃	Haze	Goby	*Acanthogobium flavimanus* TEMMINCK et SCHLEGEL
Fresh water fish	Koi	Carp	*Cyprinus carpio* LINNÉ
〃	Funa	Gibel	*Carraesium auratus* LINNÉ

Water Data

Strontium-90 and Cesium-137 in Source Water

(*Japan Analytical Chemistry Research Institute*)

Since May 1963, the Japan Analytical Chemistry Research Institute has analyzed the Strontium-90 and Cesium-137 content in source water from 21 locations in Japan.

Sampling locations are shown in Figure 10.

To concentrate the Strontium-90 and Cesium-137, the ion exchange method has been used. The column, filled with sodium cation exchange resin (Dowex 50W-X8, 50~80 mesh), and 100 ml of carrier solution containing both 100 mg of strontium and cesium, were sent in advance from the Japan Analytical Chemistry Research Institute to each prefectural pubic health laboratory.

At each prefectural public health laboratory, a 100 liter of water sample was passed through the column at the rate of 12 liters per hour, then the column was returned to the Japan Analytical Chemistry Research Institute.

At the Japan Analytical Chemistry Research Institute, after 2 liters of 5%-oxalic acid was passed through the column to remove other metals by complex ionization, strontium and cesium adsorbed on the resin were eluted by 3 liters of 3 N-hydrochloric acid. The hydrochloric acid fraction was analyzed using the method recommended by the Science and Technology Agency.

Results obtained during the period April 1966 to January, 1967 are shown in Table 19.

Figure 10. Source Water Sampling Locations

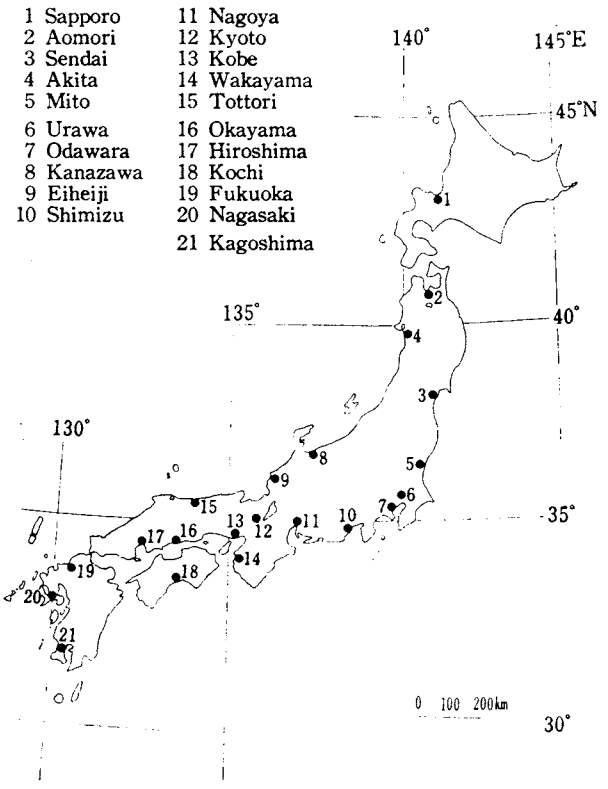


Table 19. ^{90}Sr and ^{137}Cs in Source Water —Apr., 1966 to Jan., 1967

By T. Asari, M. Chiba and M. Kuroda
(*Japan Analytical Chemistry Research Institute*)

(Continued from Table 2, Issue No. 14, of this Publication)

Location	Source	^{90}Sr (pCi/*l*)	^{137}Cs (pCi/*l*)	Nature of Water	
				pH	Appearance
Apr. 1966					
Sapporo, HOKKAIDO	Water Purification Station	0.32	0.08	7.0	slight muddy
Aomori, AOMORI	Reservoir	0.22	0.15	7.0	clear
Sendai, MIYAGI	Water Purification Station	0.28	0.16	6.8	slight muddy (white)
Akita, AKITA	〃 〃	0.34	0.07	6.6	clear
Urawa, SAITAMA	〃 〃	0.06	0.01	7.4	〃
Odawara, KANAGAWA	Station Intake	0.04	0.02	6.8	〃
Kanazawa, ISHIKAWA	Water Purification Station	0.45	0.08	7.1	〃
Eiheiji, FUKUI	〃 〃	0.12	0.08	7.2	〃
Shimizu, SHIZUOKA	Reservoir	0.10	0.02	7.2	〃
Nagoya, AICHI	Station Intake	0.14	0.04	7.0	〃
Kyoto, KYOTO	Water Purification Station	1.08	0.06	7.9	〃
Kobe, HYOGO	Reservoir	0.58	0.05	6.5	〃
Wakayama, WAKAYAMA,	Water Purification Station	0.17	0.04	7.0	slight muddy
Tottori, TOTTORI	Reservoir	0.26	0.15	7.1	〃
Okayama, OKAYAMA	〃	0.23	0.09	7.0	clear
Hiroshima, HIROSHIMA	Station Intake	0.22	0.05	7.1	〃
Kochi, KOCHI	〃	0.13	0.02	7.2	〃
Fukuoka, FUKUOKA	Reservoir	0.22	0.06	6.9	〃
May 66					
Kyoto, KYOTO	Station Intake	1.02	0.08	5.3	〃
Nagasaki, NAGASAKI	Reservoir	0.28	0.10	7.0	slight muddy
Kagoshima, KAGOSHIMA	〃	0.04	0.03	6.7	〃
Jun. 66					
Sapporo, HOKKAIDO	Water Purification Station	0.26	0.09	7.0	slight muddy (white)
Mito, IBARAGI	〃 〃	0.24	0.08	7.1	slight muddy
Odawara, KANAGAWA	Station Intake	0.07	0.02	6.8	clear
Nagoya, AICHI	〃	0.21	0.05	6.9	〃
Kyoto, KYOTO	〃	1.05	0.14	7.8	〃
Kobe, HYOGO	Reservoir	0.22	0.03	6.9	slight muddy (white)
Fukuoka, FUKUOKA	〃	0.27	0.05	6.7	clear
Jul. 66					
Sapporo, HOKKAIDO	Water Purification Station	1.06	0.19	6.8	slight muddy (brawn)
Aomori, AOMORI	Reservoir	0.15	0.09	7.0	clear
Sendai, MIYAGI	Water Purification Station	0.27	0.16	6.7	〃
Akita, AKITA	〃 〃	0.38	0.12	6.7	slight muddy (yellow)
Urawa, SAITAMA	〃 〃	0.06	0.09	7.4	clear
Eiheiji, FUKUI	〃 〃	0.14	0.04	7.3	〃
Shimizu, SHIZUOKA	Reservoir	0.12	0.03	7.1	〃
Wakayama, WAKAYAMA	Water Purification Station	0.11	0.06	6.9	slight muddy (yellow)
Tottori, TOTTORI	Reservoir	0.44	0.08	7.1	clear
Okayama, OKAYAMA	〃	0.28	0.05	6.8	〃
Hiroshima, HIROSHIMA	Station Intake	0.24	0.05	7.1	〃
Kochi, KOCHI	〃	0.15	0.03	7.1	〃
Nagasaki, NAGASAKI	Reservoir	0.22	0.08	8.0	slight muddy
Kagoshima, KAGOSHIMA	〃	0.02	0.03	6.8	clear
Aug. 66					
Sapporo, HOKKAIDO	Water Purification Station	0.33	0.07	7.1	〃
Odawara, KANAGAWA	Station Intake	0.05	0.02	6.8	〃
Kanazawa, ISHIKAWA	Water Purification Station	0.52	0.08	7.1	slight muddy (yellow)
Nagoya, AICHI	Station Intake	0.21	0.04	6.7	clear
Kyoto, KYOTO	〃	0.48	0.10	7.0	〃
Kobe, HYOGO	Reservoir	0.24	0.04	7.1	slight muddy (yellow)
Fukuoka, FUKUOKA	〃	0.23	0.05	6.8	clear
Sept. 1966					
Sapporo, HOKKAIDO	Water Purification Station	0.92	0.18	6.8	slight muddy (brawn)
Akita, AKITA	〃 〃	0.39	0.09	7.0	clear
Kyoto, KYOTO	Station Intake	0.96	0.06	8.1	〃
Oct. 66					
Sapporo, HOKKAIDO	Water Purification Station	0.29	0.06	7.1	〃
Aomori, AOMORI	Reservoir	0.12	0.07	7.0	〃
Sendai, MIYAGI	Water Purification Station	0.27	0.18	6.6	〃
Mito, IBARAGI	〃 〃	0.17	0.05	7.1	slight muddy

Location	Source	^{90}Sr (pCi/l)	^{137}Cs (pCi/l)	Nature of Water	
				pH	Appearance
Urawa, SAITAMA	Water Purification Station	0.05	0.01	7.4	clear
Odawara, KANAGAWA	Station Intake	0.06	0.01	6.8	〃
Eiheiji, FUKUI	Water Purification Station	0.13	0.03	7.6	〃
Shimizu, SHIZUOKA	Reservoir	0.17	0.03		〃
Nagoya, AICHI	Station Intake	0.15	0.04	6.8	〃
Kyoto, KYOTO	〃	0.86	0.30	8.6	〃
Kobe, HYOGO	Reservoir	0.18	0.04	7.4	slight muddy (yellow)
Wakayama, WAKAYAMA	Water Purification Station	0.13	0.03		clear
Tottori, TOTTORI	Reservoir	0.21	0.05	6.7	〃
Okayama, OKAYAMA	〃	0.17	0.02	7.0	〃
Hiroshima, HIROSHIMA	Station Intake	0.20	0.05	7.0	slight muddy
Kochi, KOCHI	〃	0.16	0.02	7.2	clear
Fukuoka, FUKUOKA	Water Purification Station	0.22	0.05	6.8	〃
Nagasaki, NAGASAKI	Reservoir	0.17	0.08	6.8	slight muddy (yellow)
Kagoshima, KAGOSHIMA	〃	0.03	0.04	6.7	clear
Nov. 66					
Sapporo, HOKKAIDO	Water Purification Station	0.98	0.25	7.2	slight muddy (yellow)
Akita, AKITA	〃 〃	0.34	0.07	6.8	clear
Dec. 66					
Sapporo, HOKKAIDO	Water Purification Station	0.24	0.06	7.1	clear
Odawara, KANAGAWA	Station Intake	0.02	0.02	6.8	〃
Kanazawa, ISHIKAWA	Water Purification Station	0.30	0.04		〃
Nagoya, AICHI	Station Intake	0.14	0.02	6.8	〃
Kyoto, KYOTO	〃	0.90	0.05	6.9	〃
Kobe, HYOGO	Reservoir	0.22	0.04	7.3	slight muddy (brawn)
Fukuoka, FUKUOKA	Water Purification Station	0.24	0.04	6.7	clear
Jan. 1967					
Aomori, AOMORI	Water Purification Station	0.13	0.08	6.8	〃
Urawa, SAITAMA	〃 〃	0.02	0.01	7.4	〃
Kyoto, KYOTO	Station Intake	0.89	0.07	6.5	〃
Wakayama, WAKAYAMA	Water Purification Station	0.10	0.04		〃
Tottori, TOTTORI	Reservoir	0.25	0.10	6.7	〃
Okayama, OKAYAMA	〃	0.15	0.02	7.0	〃
Hiroshima, HIROSHIMA	Station Intake	0.24	0.05	7.0	〃
Kochi, KOCHI	〃	0.11	0.03	7.2	〃
Nagasaki, NAGASAKI	Reservoir	0.02	0.09	7.0	slight muddy (yellow)
Kagoshima, KAGOSHIMA	〃	0.02	0.02	6.7	clear

Marine Data

The Concentrations of Radionuclides in Surface Sea Water Collected from Japanese Coast (1963~1966)

(National Institute of Radiological Sciences)

Since 1963, the concentrations of Strontium-90, Cesium-137 and Cerium-144 in surface sea water have been measured to know the artificial radioactivity level of coastal sea waters of Japan.

Sea water was collected seasonally from 3 points of 5 localities; Fukushima Coast, Niigata Coast, Tokyo Bay, Fukui Coast and Hiroshima Bay. These sampling localities are shown in Figure 11.

Each 20 liters of sample water was used for analysis by the method, suggested by Shiozaki, et al. [J. Oceanogr. Soc. Japan, 20 (2), 31 (1964)].

Data obtained are shown in Table 20.

Figure 11. Surface Sea Water Sampling Locations

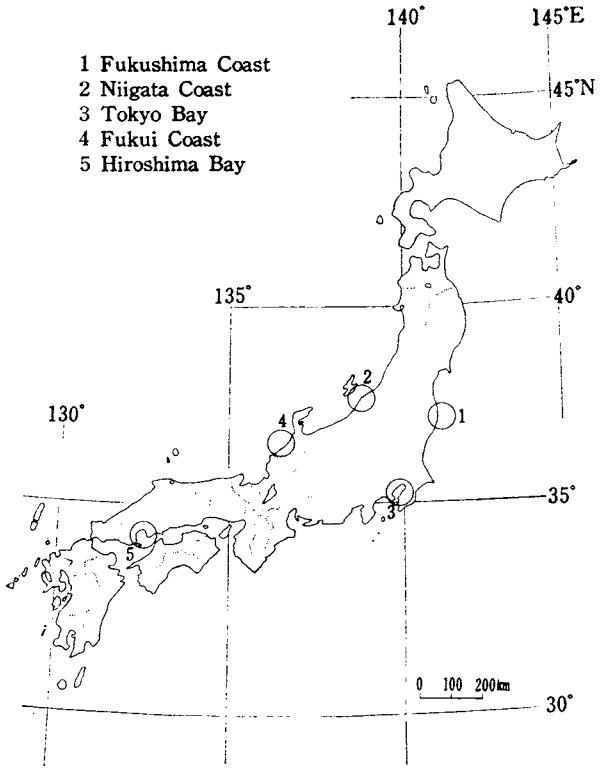


Table 20. Concentrations of Radionuclides in Surface Sea Water collected from Coastal Sea of Japan—1963 to 1966—

By M. Saiki, Y. Ohmomo and H. Yamaguchi

(*National Institute of Radiological Sciences*)

Location		Sampling Date	Concentration			Ratio of $^{137}Cs/^{90}Sr$
			^{90}Sr (pCi/*l*)	^{137}Cs (pCi/*l*)	^{144}Ce (pCi/*l*)	
Fukushima Coast	Matsukawa ura	26 May 1965	0.31	0.38	0	1.2
		16 Aug. 〃	0.47	0.56	0.14	1.2
		18 Nov. 〃	0.32	0.35	0.03	1.1
		10 Mar. 1966	0.38	0.30	0	0.8
		8 Jun. 〃	0.28			
		11 Aug. 〃	0.28	0.32	0.04	1.1
		7 Dec. 〃	0.13	0.23	0	1.8
	Onahama	7 Jun. 1965	0.44	0.70	0	1.6
		18 Aug. 〃	0.44	0.50	0.20	1.1
		17 Nov. 〃	0.27	0.36	0.07	1.3
		11 Mar. 1966	0.36	0.25	0	0.7
		7 Jun. 〃	0.30	0.41	0	1.1
		10 Aug. 〃	0.36			
		29 Nov. 〃		0.36	0	
	Okuma machi	10 Jun. 1965	0.53	0.48	0	0.9
		17 Aug. 〃	0.49	0.52		1.1
		17 Nov. 〃	0.32	0.34	0.11	1.1
		11 Mar. 1966	0.22	0.27	0	1.2
		7 Jun. 〃	0.28			
		12 Aug. 〃		0.42	0.11	
		28 Nov. 1967		0.65	0	
Niigata Coast	Kanaemachi beach	28 Apr. 1965	0.62	0.48	0.33	0.8
		3 Aug. 〃	0.53		0.04	
		26 Oct. 〃	0.40	0.45	0.02	1.1
		15 Mar. 1966	0.12	0.47	0	3.9
		27 May 〃		0.38	0	
		25 Aug. 〃		0.41		
		31 Mar. 1967	0.21			
	Off Hiwayama	28 Apr. 1965	0.69		0.38	
		3 Aug. 〃	0.52		0.27	
		26 Oct. 〃	0.22		0.04	
		15 Mar. 1966	0.19	0.38	0.08	2.0
		27 May 〃	0.46	0.51	0.04	1.1
		25 Aug. 〃		0.35		
		31 Mar. 1967	0.14			
	Niigata harbor	28 Apr. 1965	0.82		0.06	
		3 Aug. 〃	0.82		0.18	
		26 Oct. 〃	0.23	0.75	0.03	3.3
		15 Mar. 1966	0.12	0.47	0	3.9
		27 May 〃	0.24	0.43	0.08	1.8
		25 Aug. 〃		0.35		
		31 Mar. 1967	0.14			
Tokyo Bay	Chiba harbor	12 Jul. 1963	0.60		0.52	
		4 Nov. 〃	0.45		0.27	
		8 Jun. 1964	0.45		0.15	
		27 Aug. 〃	0.24		0.21	
		3 Dec. 〃	0.52		0.16	
		9 Mar. 1965	0.33	0.23		0.7
		2 Jun. 〃	0.28	0.39	0.06	1.4
		25 Aug. 〃	0.43		0.05	
		4 Nov. 〃	0.32	0.32	0.04	1.0
		15 Feb. 1966	0.28	0.35	0.05	1.3

Location		Sampling Date	Concentration			Ratio of $^{137}Cs/^{90}Sr$
			^{90}Sr(pCi/l)	^{137}Cs(pCi/l)	^{144}Ce(pCi/l)	
Tokyo Bay	Kisarazu	11 Jun. 1964	0.68	0.59		0.9
		3 Sept. 〃	0.57	0.38		0.7
		11 Nov. 〃	0.28		0.08	
		26 Feb. 1965	0.16	0.21	0.11	1.3
		25 May 〃	0.32	0.31	0.09	1.0
		27 Aug. 〃	0.25	0.53	0	2.1
		5 Nov. 〃	0.40		0.10	
		16 Feb. 1966	0.34	0.28	0.02	0.8
	Kazusaminato	17 Jun. 1964	0.42		0.90	
		31 Aug. 〃	0.32		0.08	
		27 Oct. 〃	0.20	0.50		2.5
		23 Feb. 1965	0.53	0.93	0.11	1.8
		18 May 〃	0.16	0.39	0.14	2.4
		30 Aug. 〃	0.30		0.04	
		10 Nov. 〃	0.16	0.23	0.02	1.4
		11 Feb. 1966	0.28	0.35	0.07	1.3
Fukui Coast	Nyu Bay	31 May 1966	0.52	0.41	0.07	0.8
		11 Aug. 〃	0.42	0.44	0	1.0
		8 Dec. 〃	0.77	0.34	0	0.4
	Off Shiraki	30 May 1966	0.51	0.35	0.04	0.7
		11 Aug. 〃	0.37	0.35	0.04	0.9
		8 Dec. 〃	0.82	0.35	0	0.4
	Urazoko Bay	30 May 1966	0.54	0.28	0	0.5
		11 Aug. 〃	0.57	0.62	0.02	1.1
		7 Dec. 〃	0.53	0.26	0	0.5
Hiroshima Bay	Hiroshima Bay (A)	7 May 1965	0.51	0.29	0	0.6
		9 Aug. 〃	0.93	0.32	0.13	0.3
		4 Oct. 〃	0.26	0.40	0.06	1.5
		5 Aug. 1966	0.29			
		6 Dec. 〃	0.23	0.27	0	1.2
	Hiroshima Bay (B)	7 May 1965	0.51		0	
		9 Aug. 〃	0.58	0.31	0.05	0.5
		4 Oct. 〃	0.29	0.74	0.05	2.6
		28 Jan. 1966	0.35	0.36	0.02	1.0
		5 Aug. 〃	0.23	0.56	0	2.4
		6 Dec. 〃	0.40	0.45	0	1.1
	Hiroshima Bay (C)	7 May 1965	0.78	0.62	0.05	0.8
		9 Aug. 〃	0.21	0.38	0.07	1.8
		4 Oct. 〃	0.31	0.68	0.06	2.2
		5 Aug. 1966	0.10	0.35	0.03	3.5
		6 Dec. 〃	0.40	0.49	0	1.2