Berkeley RadWatch

Food Chain Sampling Results (grass, spinach, etc.)

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Radionuclides, once deposited by rainwater or air onto the ground, will find their way through the ecosystem. We are already tracking its path from rainwater to creek runoff to tap water, but we would also like to monitor how much these isotopes that make their way into our food. For example, how much gets taken up by the grass and eventually winds up in our milk?

We have been collecting produce that is as local as possible to test for the radioactive isotopes. We might expect different kinds of plants to take up different quantities of cesium and iodine, so we are trying to measure as many different plants and fruits as we are able to. So far, we have measured:

- Grass
- Wild mushrooms
- Spinach
- Strawberries
- Cilantro
- Kale
- Arugula
- Carrots
- Cherry Tomatoes
- Topsoil from the Bay Area
- Seaweed from the Northern California coast
- Hay from Nevada
- Topsoil from San Diego
- Topsoil and dried manure from Sacramento
- Topsoil from Sonoma County
- Topsoil from Oakland
- Sand from Palo Alto
- Soy Sauce
- Salmon from the Pacific Northwest

The Bay Area topsoil, grass, and wild mushroom samples collected all come from the same location, so comparing grass samples to each other is a fair "apples to apples" comparison. For most of the produce, different samples came from different markets and different farms, so there will be many factors influencing the results. This variety of produce helps provide a picture of the food chain as a whole. But for understanding the time-dependence of the food chain results, the grass and soil is what to look at.

In the tables below, we are providing two numbers for each of the isotopes. The first is a standard concentration unit of Becquerel per kilogram (Bq/kg) which is the number of particles decaying per second in each kilogram of the sample. The number in parentheses after the activity is the number of kilograms that one would need to consume to equal the radiation exposure of a single round trip flight from San Francisco to Washington D.C. (0.05 mSv). For more information on how this equivalent dose is calculated, the details are here: How Effective Dose is Calculated

The experimental setup used for the food testing is the same setup used for the Rainwater Collection Experiment.

Topsoil

source: Alameda, CA

Collection Date	Sample Mass	I131	I132	Cs134	Cs137	Te132	Be7*	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
04/06/2011 10:15	1.04	12.42±1.24 [MDA=0.25] (89)	< MDA [MDA=0.38]	0.99±0.10 [MDA=0.25] (2.6E+03)	1.53±0.15 [MDA=0.33] (2.4E+03)	< MDA [MDA=0.17]	14.74±1.47 [MDA=2.23] (1.0e+05)	data
04/08/2011 08:00	0.91	7.55±0.76 [MDA=0.31] (1.5E+02)	< MDA [MDA=0.51]	0.41±0.08 [MDA=0.31] (6.3E+03)	0.90±0.12 [MDA=0.39] (4.1E+03)	< MDA [MDA=0.19]	5.21±0.67 [MDA=2.20] (2.8E+05)	data
04/13/2011 08:00	1.30	3.79±0.38 [MDA=0.18] (2.9E+02)	< MDA [MDA=0.25]	1.04±0.10 [MDA=0.21] (2.5E+03)	1.16±0.12 [MDA=0.26] (3.2E+03)	< MDA [MDA=0.13]	10.06±1.00 [MDA=1.74] (1.5e+05)	data
04/21/2011 08:00	1.49	1.41±0.14 [MDA=0.15] (7.9E+02)	< MDA [MDA=0.24]	0.99±0.10 [MDA=0.17] (2.6E+03)	1.21±0.12 [MDA=0.20] (3.1E+03)	< MDA [MDA=0.10]	10.92±1.10 [MDA=1.34] (1.4e+05)	data

Collection Date	Sample Mass	I131	I132	Cs134	Cs137	Te132	Be7*	Data
05/02/2011 18:00	1.26	0.60±0.06 [MDA=0.08] (1.9e+03)	< MDA [MDA=0.13]	0.76±0.08 [MDA=0.09] (3.4e+03)	1.11±0.11 [MDA=0.10] (3.3e+03)	< MDA [MDA=0.06]	7.05±0.71 [MDA=0.71] (2.1e+05)	data
05/18/2011 08:00	1.48	0.14±0.02 [MDA=0.10] (7.7e+03)	< MDA [MDA=0.38]	0.43±0.04 [MDA=0.07] (6.0e+03)	0.73±0.07 [MDA=0.08] (5.1e+03)	< MDA [MDA=0.17]	3.59±0.36 [MDA=0.56] (4.1e+05)	data
06/03/2011 08:00	0.9	< MDA [MDA=0.09]	< MDA [MDA=0.17]	0.58±0.06 [MDA=0.09] (4.5e+03)	1.17±0.12 [MDA=0.11] (3.2e+03)	< MDA [MDA=0.07]	6.79±0.68 [MDA=0.76] (2.2e+05)	data

Grass

source: Alameda, CA

Collection Date	Sample Mass	I131	I132	Cs134	Cs137	Te132	Be7*	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
04/03/2011 10:00	0.4	9.93±0.99 [MDA=0.31] (1.1E+02)	< MDA [MDA=0.61]	6.99±0.70 [MDA=0.37] (3.7E+02)	7.04±0.70 [MDA=0.42] (5.3E+02)	< MDA [MDA=0.26]	68.3±6.8 [MDA=2.8] (2.2e+04)	data
04/05/2011 08:30	0.36	6.82±0.68 [MDA=0.54] (1.6E+02)	< MDA [MDA=1.07]	4.39±0.44 [MDA=0.72] (5.9E+02)	3.80±0.38 [MDA=0.79] (9.7E+02)	< MDA [MDA=0.34]	48.2±4.8 [MDA=5.3] (3.1e+04)	data
04/06/2011 20:00	0.26	6.02±0.60 [MDA=0.65] (1.8E+02)	< MDA [MDA=1.09]	4.61±0.46 [MDA=0.85] (5.6E+02)	5.26±0.53 [MDA=0.93] (7E+02)	< MDA [MDA=0.40]	35.2±3.5 [MDA=6.2] (4.2e+04)	data
04/11/2011 07:30	0.51	1.55±0.15 [MDA=0.29] (7.2E+02)	< MDA [MDA=0.38]	1.63±0.16 [MDA=0.30] (1.6E+03)	2.20±0.22 [MDA=0.39] (1.7E+03)	< MDA [MDA=0.16]	16.8±1.7 [MDA=2.6] (8.8E+04)	data
04/14/2011 08:00	0.45	1.03±0.12 [MDA=0.39] (1.1E+03)	< MDA [MDA=1.19]	1.38±0.15 [MDA=0.48] (1.9E+03)	1.24±0.18 [MDA=0.61] (3E+03)	< MDA [MDA=0.31]	7.1±1.0 [MDA=3.3] (2.1e+05)	data
05/02/2011 18:00	0.18	< MDA [MDA=0.64]	< MDA [MDA=1.56]	0.92±0.21 [MDA=0.84] (2.8e+03)	1.68±0.30 [MDA=1.16] (2.2e+03)	< MDA [MDA=0.47]	9.9±2.0 [MDA=7.9] (1.5e+05)	data
06/03/2011 08:00	0.575	< MDA [MDA=0.17]	< MDA [MDA=0.52]	< MDA [MDA=0.14]	< MDA [MDA=0.19]	< MDA [MDA=0.23]	5.6±0.6 [MDA=1.3] (2.6e+05)	data

Wild Mushrooms

source: Alameda, CA

Collection Date	Sample Mass	I131	I132	Cs134	Cs137	Te132	Be7*	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
04/02/2011 10:00	0.39	7.35±0.73 [MDA=0.37] (1.5E+02)	< MDA [MDA=1.15]	< MDA [MDA=0.33]	< MDA [MDA=0.40]	< MDA [MDA=0.22]	11.3±1.1 [MDA=3.5] (1.3e+05)	data
05/02/2011 18:00	0.49	< MDA [MDA=0.11]	< MDA [MDA=0.26]	< MDA [MDA=0.24]	< MDA [MDA=0.15]	< MDA [MDA=0.11]	< MDA [MDA=0.87]	data

Seaweed

source: coastal areas of Northern California

Collection Date	Sample Mass	Species	I131	I132	Cs134	Cs137	Te132	Be7*	Data
	kg		Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)		
04/19/2011	0.55 (wet)	Porphyra	< MDA [MDA=0.15]	< MDA [MDA=0.57]	< MDA [MDA=0.30]	< MDA [MDA=0.28]	< MDA [MDA=0.12]	3.16±0.61 [MDA=2.59] (4.7e+05)	data
05/18/2011	1.87 (wet)	Porphyra	< MDA [MDA=0.17]	< MDA [MDA=2.23]	< MDA [MDA=0.11]	< MDA [MDA=0.09]	< MDA [MDA=1.01]	0.80±0.16 [MDA=0.66] (1.9e+06)	data
05/04/2011	0.50 (dry)	Wakame	< MDA [MDA=0.57]	< MDA [MDA=4.00]	< MDA [MDA=0.41]	< MDA [MDA=0.41]	< MDA [MDA=1.79]	< MDA [MDA=2.33]	data

05/05/2011	0.11 (dry)	Nori	< MDA [MDA=1400]	N/A	< MDA [MDA=0.62]	< MDA [MDA=0.62]	N/A	< MDA [MDA=13.7]	data
05/05/2011	0.14 (dry)	Kombu	< MDA [MDA=2800]	N/A	< MDA [MDA=1.33]	< MDA [MDA=1.11]	N/A	< MDA [MDA=20.5]	data
06/01/2011	0.15 (dry)	Kombu	< MDA [MDA=230]	N/A	< MDA [MDA=0.92]	< MDA [MDA=0.79]	N/A	< MDA [MDA=12.5]	data
06/08/2012	0.36 (dry)	Wakame	< MDA [MDA=0.70]	< MDA [MDA=4.9]	< MDA [MDA=0.12]	< MDA [MDA=0.15]	< MDA [MDA=4.2]	< MDA [MDA=1.8]	data
05/21/2012	0.34 (dry)	Kombu	< MDA [MDA=57]	N/A	< MDA [MDA=0.10]	< MDA [MDA=0.16]	N/A	< MDA [MDA=2.1]	data
05/24/2012	0.08 (dry)	Nori	< MDA [MDA=660]	N/A	< MDA [MDA=0.30]	< MDA [MDA=0.33]	N/A	< MDA [MDA=5.1]	data

Spinach

source: various local organic farms

Collection Date	Food Mass	I131	I132	Cs134	Cs137	Te132	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
04/08/2011 (Best By Date)	0.284	1.47±0.15 [MDA=0.50] (7.5E+02)	< MDA [MDA=0.88]	< MDA [MDA=0.43]	< MDA [MDA=0.62]	< MDA [MDA=0.29]	data
04/06/2011 (Purchase Date)	0.30	1.44±0.15 [MDA=0.54] (7.7E+02)	< MDA [MDA=1.66]	< MDA [MDA=0.89]	< MDA [MDA=0.60]	< MDA [MDA=0.28]	data
04/07/2011 (Purchase Date)	0.25	2.50±0.25 [MDA=0.63] (4.4E+02)	< MDA [MDA=0.97]	0.89±0.19 [MDA=0.73] (2.9E+03)	1.14±0.25 [MDA=0.96] (3.3E+03)	< MDA [MDA=0.38]	data
04/20/2011 (Purchase Date)	0.56	< MDA [MDA=0.28]	< MDA [MDA=0.39]	< MDA [MDA=0.23]	< MDA [MDA=0.32]	< MDA [MDA=0.16]	data
04/28/2011 (Purchase Date)	0.44	< MDA [MDA=0.27]	< MDA [MDA=0.46]	< MDA [MDA=0.34]	< MDA [MDA=0.37]	< MDA [MDA=0.20]	data
04/28/2011 (Purchase Date)	0.42	< MDA [MDA=0.20]	< MDA [MDA=0.36]	< MDA [MDA=0.22]	< MDA [MDA=0.38]	< MDA [MDA=0.15]	data

Strawberries

source: various local organic farms

Purchase Date	Food Mass	I131	I132	Cs134	Cs137	Te132	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
04/01/2011	1.23	0.21±0.03 [MDA=0.10] (5.3E+03)	0.35±0.07 [MDA=0.29] (4.3E+05)	0.71±0.07 [MDA=0.13] (3.6E+03)	0.72±0.07 [MDA=0.15] (5.1E+03)	< MDA [MDA=0.07]	data
04/07/2011	1.06	0.32±0.04 [MDA=0.15] (3.5E+03)	< MDA [MDA=0.41]	0.50±0.06 [MDA=0.19] (5.2E+03)	0.48±0.07 [MDA=0.23] (7.7E+03)	< MDA [MDA=0.10]	data
04/20/2011	1.08	< MDA [MDA=0.11]	< MDA [MDA=0.40]	0.49±0.05 [MDA=0.15] (5.3E+03)	0.64±0.06 [MDA=0.21] (5.8E+03)	< MDA [MDA=0.077]	data
04/20/2011	1.20	< MDA [MDA=0.073]	< MDA [MDA=0.13]	0.27±0.03 [MDA=0.10] (9.5E+03)	0.26±0.03 [MDA=0.10] (1.4E+04)	< MDA [MDA=0.060]	data
04/28/2011	1.08	< MDA [MDA=0.09]	< MDA [MDA=0.21]	0.23±0.03 [MDA=0.11] (1.1e+04)	0.42±0.05 [MDA=0.18] (8.7e+03)	< MDA [MDA=0.06]	data

04/28/2011	1.02	< MDA [MDA=0.08]	< MDA [MDA=0.14]	0.29±0.03 [MDA=0.12] (8.9e+03)	0.44±0.04 [MDA=0.15] (8.4e+03)	< MDA [MDA=0.06]	data
05/19/2011	0.905	< MDA [MDA=0.10]	< MDA [MDA=0.32]	0.15±0.03 [MDA=0.11] (1.7e+04)	0.15±0.03 [MDA=0.13] (2.4e+04)	< MDA [MDA=0.14]	data
06/09/2011	0.80	< MDA [MDA=0.38]	< MDA [MDA=4.60]	< MDA [MDA=0.09]	< MDA [MDA=0.20]	< MDA [MDA=0.79]	data
06/30/2011	0.99	< MDA [MDA=0.08]	< MDA [MDA=0.16]	< MDA [MDA=0.19]	< MDA [MDA=0.11]	< MDA [MDA=0.07]	data

Cilantro

source: various local organic farms

Purchase Date	Food Mass	I131	I132	Cs134	Cs137	Te132	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
04/04/2011	0.50	< MDA [MDA=0.34]	< MDA [MDA=0.41]	< MDA [MDA=0.34]	< MDA [MDA=0.56]	< MDA [MDA=0.15]	data

Kale

source: various local organic farms

Purchase Date	Food Mass	I131	I132	Cs134	Cs137	Te132	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
04/06/2011	0.34	< MDA [MDA=0.64]	< MDA [MDA=0.81]	< MDA [MDA=0.87]	0.65±0.17 [MDA=0.62] (5.7E+03)	< MDA [MDA=0.34]	data
04/07/2011	0.38	0.93±0.13 [MDA=0.47] (1.2E+03)	< MDA [MDA=0.64]	1.14±0.20 [MDA=0.80] (2.3E+03)	0.59±0.15 [MDA=0.57] (6.2E+03)	< MDA [MDA=0.28]	data
04/20/2011	0.50	< MDA [MDA=0.28]	< MDA [MDA=0.44]	< MDA [MDA=0.30]	< MDA [MDA=0.49]	< MDA [MDA=0.20]	data
04/20/2011	0.34	< MDA [MDA=0.35]	< MDA [MDA=0.64]	< MDA [MDA=0.47]	< MDA [MDA=0.56]	< MDA [MDA=0.25]	data
04/28/2011	0.60	< MDA [MDA=0.23]	< MDA [MDA=0.55]	< MDA [MDA=0.26]	< MDA [MDA=0.30]	< MDA [MDA=0.18]	data
04/28/2011	0.41	< MDA [MDA=0.19]	< MDA [MDA=0.39]	0.39±0.07 [MDA=0.26] (6.6e+03)	0.52±0.09 [MDA=0.34] (7.1e+03)	< MDA [MDA=0.15]	data
05/19/2011	0.555	< MDA [MDA=0.19]	< MDA [MDA=1.70]	< MDA [MDA=0.25]	< MDA [MDA=0.19]	< MDA [MDA=0.50]	data

Arugula

source: various local organic farms

Purchase Date	Food Mass	I131	I132	Cs134	Cs137	Te132	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
04/07/2011	0.38	0.41±0.07 [MDA=0.24] (2.7E+03)	< MDA [MDA=1.11]	< MDA [MDA=0.35]	0.66±0.12 [MDA=0.45] (5.6E+03)	< MDA [MDA=0.19]	data
04/20/2011	0.36	< MDA [MDA=0.32]	< MDA [MDA=0.90]	< MDA [MDA=0.49]	< MDA [MDA=0.51]	< MDA [MDA=0.25]	data
04/28/2011	0.313	< MDA [MDA=0.31]	< MDA [MDA=0.57]	< MDA [MDA=0.37]	< MDA [MDA=0.41]	< MDA [MDA=0.25]	data

Carrots

Source: a local organic farm

Collection Date	Sample Mass	I131	I132	Cs134	Cs137	Te132	Be7*	Data

	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
08/11/2011	0.63	< MDA [MDA=0.17]	< MDA [MDA=0.90]	< MDA [MDA=0.21]	< MDA [MDA=0.15]	< MDA [MDA=0.28]	< MDA [MDA=1.20]	data

Cherry Tomatoes

Source: a local organic farm

Collection Date	Sample Mass	I131	I132	Cs134	Cs137	Te132	Be7*	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
08/11/2011	0.83	< MDA [MDA=0.072]	< MDA [MDA=0.28]	< MDA [MDA=0.082]	< MDA [MDA=0.079]	< MDA [MDA=0.109]	< MDA [MDA=0.55]	data

Hay

Source: Northwest Nevada, irrigated with reservoir water

Collection Date	Sample Mass	I131	I132	Cs134	Cs137	Te132	Be7*	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
07/15/2011	0.16	< MDA [MDA=0.61]	< MDA [MDA=2.48]	< MDA [MDA=0.42]	< MDA [MDA=0.72]	< MDA [MDA=1.46]	41.7±4.2 [MDA=5.1] (3.5e+04)	data

Topsoil from San Diego

source: San Diego, CA

Top layer of soil (top 3–4 inches)

Collection Date	Sample Mass	I131	I132	Cs134	Cs137	Te132	Be7*	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
Never placed outside	0.54	< MDA [MDA=2.33]	< MDA [MDA=226]	< MDA [MDA=0.33]	< MDA [MDA=0.26]	< MDA [MDA=87]	< MDA [MDA=2.43]	data
06/29/2011	0.52	< MDA [MDA=2.36]	< MDA [MDA=157]	0.96±0.10 [MDA=0.32] (2.7e+03)	1.55±0.16 [MDA=0.37] (2.4e+03)	< MDA [MDA=77]	9.81±0.98 [MDA=3.63] (1.5e+05)	data

Next lower layer of soil (under 3–4 inches)

Collection Date	Sample Mass	I131	I132	Cs134	Cs137	Te132	Be7*	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
Never placed outside	0.55	< MDA [MDA=4.22]	< MDA [MDA=850]	< MDA [MDA=0.33]	< MDA [MDA=0.24]	< MDA [MDA=380]	< MDA [MDA=2.54]	data
06/29/2011	0.60	< MDA [MDA=3.51]	< MDA [MDA=1040]	< MDA [MDA=0.21]	< MDA [MDA=0.31]	< MDA [MDA=280]	< MDA [MDA=2.34]	data

Soil and Manure from Sacramento

Source: Farm in the Sacramento Area

Topsoil sample

Collection Date	Sample Mass	I131	I132	Cs134	Cs137	Te132	Be7*	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
08/16/2011	0.93	< MDA [MDA=0.138]	< MDA [MDA=0.845]	0.147±0.015 [MDA=0.055] (1.8e+04)	2.590±0.259 [MDA=0.072] (1.4e+03)	< MDA [MDA=0.567]	0.974±0.121 [MDA=0.532] (1.5e+06)	data

Dried manure sample — was produced about one year ago, left outside exposed to rain after Fukushima

Collection Date	Sample Mass	I131	I132	Cs134	Cs137	Te132	Be7*	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	

| 08/16/2011 | 0.56 | < MDA [MDA=0.53] | < MDA [MDA=6.41] | 5.18±0.52 [MDA=0.14] (5.0e+02) | 7.93±0.79 [MDA=0.17] (4.7e+02) | < MDA [MDA=3.37] | 16.6±1.7 [MDA=1.5] (8.9e+04) | data |

Soil from Sonoma County

Source: Farm in Sonoma County

Collection Date	Sample Mass	I131	I132	Cs134	Cs137	Te132	Be7*	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
04/27/2011	2.21	N/A	N/A	0.347±0.035 [MDA=0.056] (7.5e+03)	1.905±0.190 [MDA=0.057] (1.9e+03)	N/A	3.436±0.493 [MDA=2.138] (4.3e+05)	data

Soil from Oakland

Source: a grassless, treeless front yard

Collection Date	Sample Mass	Sample depth	Sample dimensions	I131	I132	Cs134	Cs137	Te132	Be7*	Da
	kg	cm	cm × cm	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
09/08/2011	2.03	0–2	25 × 38	< MDA [MDA=0.037]	< MDA [MDA=0.105]	0.087±0.010 [MDA=0.046] (3.0e+04)	2.46±0.25 [MDA=0.05] (1.5e+03)	< MDA [MDA=0.057]	0.441±0.088 [MDA=0.402] (3.4e+06)	da
09/08/2011	1.25	2–4	16.5 × 33	< MDA [MDA=0.095]	< MDA [MDA=0.47]	< MDA [MDA=0.083]	4.91±0.49 [MDA=0.09] (7.5e+02)	< MDA [MDA=0.264]	< MDA [MDA=0.474]	da
09/08/2011	1.08	4–6	15 × 28	< MDA [MDA=0.173]	< MDA [MDA=1.31]	< MDA [MDA=0.119]	3.62±0.36 [MDA=0.13] (1.0e+03)	< MDA [MDA=0.694]	< MDA [MDA=0.769]	da
09/08/2011	1.23	6–9	14 × 22	< MDA [MDA=0.372]	< MDA [MDA=16.7]	< MDA [MDA=0.075]	2.74±0.27 [MDA=0.08] (1.4e+03)	< MDA [MDA=9.18]	< MDA [MDA=0.55]	da
09/08/2011	1.37	9–14	13 × 15	< MDA [MDA=1.147]	< MDA [MDA=79.5]	< MDA [MDA=0.051]	3.06±0.31 [MDA=0.09] (1.2e+03)	< MDA [MDA=62.8]	< MDA [MDA=0.91]	da

Sand from Palo Alto

Source: Yard

For comparison, the activity concentration of Potassium-40 (K-40) in this sample was 730±73 Bq/kg.

Collection Date	Sample Mass	I131	I132	Cs134	Cs137	Te132	Be7*	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
05/29/2012	2.6	< MDA [MDA=0.26]	< MDA [MDA=5.1]	0.129±0.013 [MDA=0.030] (2.0e+04)	0.181±0.018 [MDA=0.032] (2.0e+04)	< MDA [MDA=4.0]	1.29±0.13 [MDA=0.31] (1.2e+06)	data

Soy Sauce

Source: Product of Japan, purchased in local grocery store

For comparison, the activity concentration of Potassium-40 (K-40) in this sample was approximately 100 Bq/L.

Collection Date	Sample Volume	I-131	I-132	Cs-134	Cs-137	Te-132	Data
	L	Bq/L (L**)	Bq/L (L**)	Bq/L (L**)	Bq/L (L**)	Bq/L (L**)	
08/21/2012	1.08	< MDA [MDA=0.027]	< MDA [MDA=0.044]	< MDA [MDA=0.029]	< MDA [MDA=0.032]	< MDA [MDA=0.065]	data

Salmon

Source: Pacific Northwest, purchased in local grocery store

Collection Date	Sample Mass	I-131	I-132	Cs-134	Cs-137	Te-132	Data
	kg	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	Bq/kg (kg**)	
01/31/2013	1.36	< MDA [MDA=0.085]	< MDA [MDA=0.25]	< MDA [MDA=0.049]	< MDA [MDA=0.056]	< MDA [MDA=0.39]	data

* Be-7 is observed normally due to its being produced by cosmic rays interacting with the atmosphere.

** The number in parentheses is the number of kilograms of the item that one would need to consume to equal the radiation exposure of a single round trip flight from San Francisco to Washington D.C. (0.05 mSv). To see how we

calculate these numbers, please visit our explanation of the equivalent dose calculation.

Note: "MDA" is the estimated minimum detectable activity for a given isotope in the detector.