Ensuring Food Safety

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Food Industry Affairs Bureau
Ministry of Agriculture, Forestry and Fisheries
(MAFF) JAPAN
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1. Basic Knowledge of Radioactive Substances
The Standard Limits for Radionuclides in Foods.

- Codex establishes the standard limits as not more than 1,000 Bq/kg for radioactive caesium (cesium) in food as the international standards.
- Japan establishes 100 Bq/kg (general foods) as the standard limit based on the international standard to ensure food safety strictly.
- Food safety is ensured through a thorough inspection of radioactive substances based on the standard limits as set in scientific basis.

<table>
<thead>
<tr>
<th>Nuclear species</th>
<th>CODEX</th>
<th>EU</th>
<th>US</th>
<th>Japan</th>
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</thead>
<tbody>
<tr>
<td>Radio caesium</td>
<td>Infant foods 1,000</td>
<td>drinking water 1,000</td>
<td></td>
<td>drinking water 10</td>
</tr>
<tr>
<td>(134Cs, 137Cs)</td>
<td>general foods 1,000</td>
<td>dairy products 1,000</td>
<td>Infant foods 400</td>
<td>milk 50</td>
</tr>
<tr>
<td></td>
<td>general foods 1,250</td>
<td>all foods 1,200</td>
<td></td>
<td>Infant foods 50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>general foods 100</td>
</tr>
</tbody>
</table>

【Note】
Codex: establishing the standard limit based on the Operational Intervention Level 1 mSv/Year, and assume 10% of all foods was harvested in radioactive contaminated area.

EU: establishing the standard limit based on personal additional exposed dose as not more than 1 mSv/Year, and assumed that 10% of all foods for human consumption in lifetime was harvested in the radioactive contaminated area.

USA: establishing the standard limit based on the collective effective dose 5 mSv/Year, and assume 30% of all foods intake is radioactive contaminated.
Daily Life and Radiation Dose

- We are exposed to radiation in our daily lives (world average = 2.4 mSv / year).
- We receive 0.2mSv of radiation through a round trip flight between Japan and New York.

Reference

Daily life and radiation (Unit: mSv [ millisievert])

- Naturally occurring radiation dose
- In an area of high radiation dose in the world (Guarapari in Brazil) (annual dose):
- Dose of natural radiation (1 - 13 mSv/year)
- Naturally occurring radiation per person (annual, the world average)
- The radiation dose limit for the general public (annual) (except for medical purposes)
- Flight from Tokyo to New York (one-way)

Source: Prepared by the Consumer Affairs Agency on the basis of "Daily life and radiation" from the Ministry of Education, Culture, Sports, Science and Technology, and the website of the National Institute of Radiological Sciences.
“Natural radiation” is defined as radiation which is originally present in nature. There are various radiation. We are exposed to natural radiation from both external and internal radioactive materials.

- We receive a dose of 2.4 mSv per year from natural radiation in our daily life.

Source: “Radiation and Life” from the Agency for Natural Resources and Energy
Decrease in Dose Rate of Radioactive Cesium (Cs134 & Cs137)

- There are two types of radioactive cesium (Cs-137: half-life of about 30 years, Cs-134: half-life of about 2 years).
- On the assumption that the ratio of caesium 137 and cesium 134 immediately after the Great East Japan Earthquake was about 1:1 and that the dose was not later decreased by movement of the radioactive substances, the dose rate of cesium was calculated taking only attenuation in the half-life into consideration. It is estimated that the cesium dose rate will decrease to a half in 3 years, four ninths in 4 years, three eighths in 5 years, one fourths in 9 years, and one sevenths in 30 years.
- However, it is expected to decrease slightly faster than that due to the influences of rainfall, etc. (weathering effect).

Variation of dose rate of Caesium

Dose Rate: The amount of radioactivity per unit time

*Estimated amount based on the assumption that the rate of radioactivity between caesium 134 and caesium 137 was one-to-one in April, 2011.
2. Measures to Ensure Safety of Food
Food monitoring inspection has been conducted based on standard limits in accordance with the international standard as set in basis.

Foods exceeding standard limits are restricted from being shipped and prevented from entering into the market.

<<Japan’s standard limits of radioactive cesium>>

<table>
<thead>
<tr>
<th>Food</th>
<th>standard limits* (Bq/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking water</td>
<td>10</td>
</tr>
<tr>
<td>Milk</td>
<td>50</td>
</tr>
<tr>
<td>Infant Foods</td>
<td>50</td>
</tr>
<tr>
<td>General Foods</td>
<td>100</td>
</tr>
</tbody>
</table>

(*) Enforced in April 2012 based on the index of annual dose of 1 mSv adopted by CODEX committee

- So far, About 1.6 million monitoring tests were implemented. About 53 million tests of all rice bags were also implemented in Fukushima prefecture. (as of Nov. 2016)

- Percentage of samples that exceed the limits are constantly decreasing to 0.13% (Dec. 2015 to Nov. 2016) (Most of the excesses were wild mushrooms and meats of wild birds and animals. The number of excesses in farm-grown products is extremely small.)

- Distribution of food exceeding the limits will be immediately prohibited, denying them entry into the markets.

Source: Created by MAFF
Restriction of Distribution and/or Consumption of Foods

- Restriction of distribution and consumption are taken place appropriately in order to prevent radioactive contaminated foods from entering the food supply chain.

Order by Act on Special Measures Concerning Nuclear Emergency Preparedness

"Restriction of Distribution"
When areas producing the items exceeding the limits have been spread out, relevant areas and items become subject to restriction.

"Restriction of Consumption"
When significantly high level of concentration is detected in items, the restriction of consumption is immediately established.

- The requirements for establishing items and areas of restriction
  - When it is considered that areas producing the items exceeding the limits have been spread out, relevant areas and items become to restriction.
  - Unit of Restriction is prefecture basis. Prefectures can be divided into multiple number of areas if they can be administered by prefectures and municipalities.

- The requirements for cancellation of restriction
  - Based on the application of the relevant prefecture.
  - Prefectures can be divided into a multiple zones, in the light of the actual situations of the shipments of the items.
  - As a general rule, the results of radioactive cesium inspections conducted at 3 or more locations per municipality within the last month must all fall below the limits.

Monitoring ➔ Exceed the limits ➔ Restriction of Distribution ➔ Restriction of Consumption

※ Monitoring of radioactive materials in food are mainly carried out before shipment. Most of the food items exceeding the limits are derived from areas where restrictions of distribution have been instructed.

Source: Ministry of Health, Labour and Welfare
The IAEA positively evaluated Japan in the assessments on a report provided by the Japanese government (Oct. 2016), and it says that “the measures taken (by Japan) to monitor and respond to issues regarding radionuclide contamination of food are appropriate, and that the food supply chain is controlled effectively.”

“Measurements of caesium radionuclide levels in foodstuffs, together with appropriate regulatory action and the publication of monitoring results, are helping to maintain confidence in the safety of the food supply.”

“Food restrictions continue to be revised and updated as necessary in line with the results of food sampling and monitoring. This indicates the continued vigilance of the authorities in Japan and their commitment to protecting consumers and trade.”

“Based on the information that has been made available, the Joint FAO/IAEA Division understands that the measures taken to monitor and respond to issues regarding radionuclide contamination of food are appropriate, and that the food supply chain is controlled effectively by the relevant authorities.”

Source: IAEA report
Agriculture Ministers from G7 countries gathered in Niigata on April 23 to 24, 2016 and declared that import restrictions should be based on science.

“We take note Japan’s five-year-long efforts to recover from the Great East Japan Earthquake which occurred in 2011, applauding the support from all over the world for accelerating the reconstruction.

We confirm that import restrictions should be consistent with WTO rules including the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) based on scientific knowledge and evidence.

We commit to respect these rules and that agreement. We hope that the reconstruction in the affected areas will be achieved at the earliest time possible.”
The Efforts by Fukushima Prefecture (Rice)

- Fukushima prefecture measures the radioactive caesium level of all bags of rice. Over 42 million bags have been tested every year since 2012.
- Only rice confirmed not exceeding standard limit can be shipped and distributed to the market.

Source: Fukushima Prefectural Government
71 items (0.0007%) were found to be exceeding the standard limit from 2012 year’s rice, and 28 items (0.0003%) from 2013 year’s rice, and also 2 samples (0.00002%) from 2014 year’s rice.

Those samples have been isolated from the market appropriately so that they could not be distributed on the market at all.

As of December 30, 2016, all tested items of 2015 and 2016 year’s rice have been confirmed below the standard limit.

- These graphs combine the result of Screening Inspection and Detailed Inspection. When detailed inspection is done, the result is updated accordingly.

- The results are the sum of caesium134 and caesium 137.

- Regarding the ratio, rounded total value of screening inspection and detailed inspection to 2 decimal places and 4 decimal places.

Source: Fukushima Association for Securing Safety of Agricultural Products.
Fukushima Prefecture checks the safety of locally produced vegetables and fruit through emergency environmental radiation monitoring before shipping them. Samples of these agricultural products are also tested at individual production areas (using equipment such as NaI scintillation spectrometers) to ensure that safe vegetables and fruit are shipped and distributed.

*The test is conducted by following the Testing Methods for Radioactive Cesium in foods prescribed by the Ministry of Health, Labour and Welfare.

**Testing Process**

The samples are cut into small pieces and packed into a container for measurement.

- Samples cut into small pieces
- Packed into a container
- Container is set on the analyzer and the sample is measured

Source: Fukushima Prefectural Government
Measures Toward Ensuring Food Safety in Fukushima (Beef)

Only farmers confirmed of upholding appropriate management can ship cows.

All cows are screened before shipment.

Only meat from cows that has passed the screening is distributed in the market.

Process for testing of all beef

Shipment → Cattle farmers in Fukushima

Submission of specimen (to testing institution, etc.) → Preparation → Measurement

Test result
- Above 100 Bq: Disposal
- 100 Bq or below: Distribution

Survey of feeding conditions

Officials from the Fukushima Prefectural Government undertake onsite inspections of cattle farms to check if cows are fed appropriately.

A radiographic test certificate is issued for beef that is confirmed as safe under the criteria of the Food Sanitation Act.

Source: Fukushima Prefectural Government