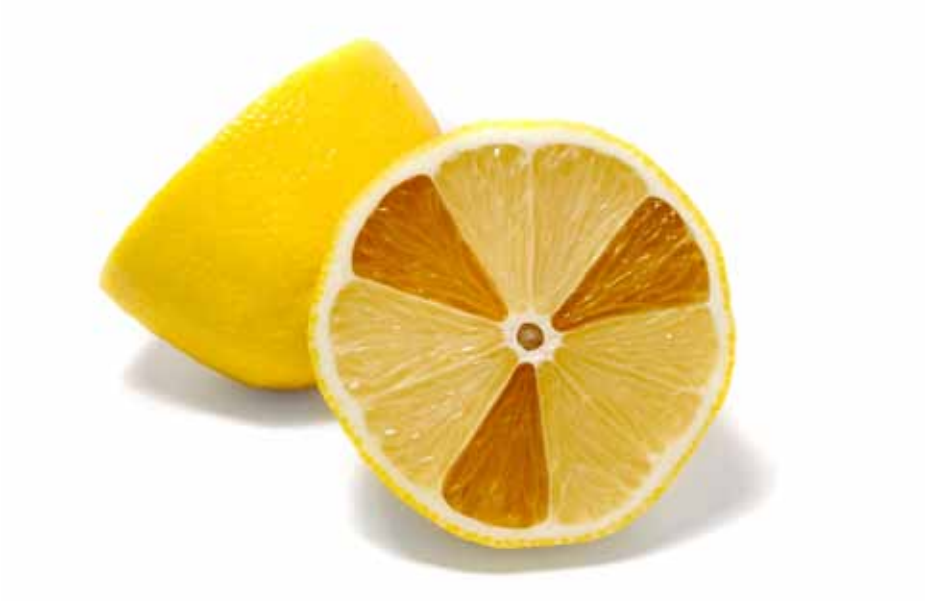

# RADIOACTIVITY TESTING SERVICES

Following the natural disaster in Japan and the damage it caused to the Fukushima nuclear power plant, a lot of public attention has been focused on the potential radiation contamination to the environment, especially in food and drinking water. Consequently, many questions have been raised about radiation exposure and detection. We've compiled a list of answers to some of the most frequently asked questions.

### WHICH ITEMS ARE CRUCIAL IN RADIATION EXPOSURE?

Radiation by cosmic and terrestrial radiation comprises the vast majority of radiation exposure. However, there is currently more concern about the artificial radionuclides released from the nuclear power plant in Fukushima. At the site of the Chernobyl disaster in 1986, explosions destroyed the core of a nuclear reactor while it was still active. Lighter volatile elements such as iodine and cesium isotopes were released into the environment and carried by wind over considerable distances. Due to the core meltdown heavier and less volatile elements such as strontium, uranium and plutonium were emitted as aerosols or dust particles and deposited closer to the plant. In comparison, at Fukashima the magnitude nine earthquake and tsunami damaged the plant's cooling system and lead to exposure of the fuel rods with iodine and cesium emitted into the environment. However, the highly radioactive cores of the affected nuclear reactors at the Fukushima plant remained largely intact by containment vessels.

### WHAT RADIOACTIVE ELEMENTS CAN BE MEASURED?

Basically, all radioactive elements are measurable. However depending on the length of their half-lives, the elements may take some time to disintegrate. For example the isotopes of iodine 131 and 133 have a half-life of up to 8 days, the half-life of cesium-137 is 30 years and plutonium-239 has a half-life of 24,000 years. The half-life is the time that it takes until the half of an element is decayed. During this period of decay, radioactive radiation is released. The radioactive radiation itself may be measured with an instrument such as a Geiger counter or gamma spectrometer. Iodine-131 and Cesium-137 are the main fission by-products that were released at Fukushima.

### HOW DO RADIOACTIVE ISOTOPES ENTER THE FOOD CHAIN?

There are basically two ways: when the particles of radioactive fallout contaminate the surfaces of food exposed to radioactive particles in the environment, for example Iodine-131 can settle on crops that humans or animals consume. Alternatively, plants and crops may metabolize contaminated ground and soil water. There are significant differences with regard to the bio-availability of radioactive elements depending on soil type. Elements such as Cesium-137 may quickly penetrate deeper layers in sandy soils making it more available to plants and crops which may be consumed by humans and animals. However in the case of mineral soils, Cesium-137 binds to clay particles reducing bio-availability to plants and crops. Iodine isotopes may also concentrate in marine and freshwater seafood, which people then consume.

# LEGAL RULES APPLICABLE

Every country has regulations in place for radionuclide limits in food. An SGS representative will inform you about the respective limits for your food products in the destined country of sale.

**JAPAN: MINISTRY OF HEALTH, LABOR AND WELFARE NOTICE NO. 0317 ARTICLE 3**

| NUCLIDE | INDEX VALUES RELATING TO INGESTION LIMITS IN GUIDELINES FOR COPING WITH DISTASTERS AT NUCLEAR FACILITIES ETC. (Bq/Kg) | |
|---|---|---|
| Radioactive Iodine (Representative radio-nuclides among mixed radio-nuclides: $I^{131}$) | Drinking Water | 300 |
| | Milk, dairy products | |
| | Vegetables (Except root vegetables and tubers) | |
| Radioactive cesium | Drinking Water | 200 |
| | Milk, dairy products | |
| | Vegetables | 500 |
| | Grain | |
| | Meat, eggs, fish etc. | |

**USA: DERIVED INTERVENTION LEVELS (DILS) FOR EACH RADIONUCLIDE GROUP FOR FOOD IN DOMESTIC COMMERCE AND FOOD OFFERED FOR IMPORT.**

| RADIONUCLIDE GROUP | DIL (Bq/Kg) |
|---|---|
| Iodine-131 | 170 |
| Cesium-134 + Cesium-137 | 1200 |

**EU: THE ACCUMULATED MAXIMUM RADIOACTIVE LEVEL IN FOOD ACCORDING TO COUNCIL REGULATION 351/2011.**

| RADIONUCLIDE GROUP | FOOD | THE ACCUMULATED MAXIMUM RADIOACTIVE LEVEL (Bq/Kg) |
|---|---|---|
| Cesium-134 + Cesium-137 | Milk | 200 |
| | Milk products | 200 |
| | Foodstuffs intended for special feeding of infants during the first four to six months of life | 200 |
| | Other food products | 500 |
| Iodine-131 | Milk | 300 |
| | Milk products | 300 |
| | Foodstuffs intended for special feeding of infants during the first four to six months of life | 100 |
| | Other food products | 2000 |

# THE SGS GROUP OFFER

SGS's state-of-the-art radionuclide testing laboratories are ISO 17025 accredited and can help you detect and measure radioactive contamination in your food products.

### SGS FRANCE CAPABILITY

| ANALYSES TO CERTIFY NO RADIOACTIVE CONTAMINATION | LD=LQ (Bq/Kg) |
|---|---|
| Gamma Spectrometry (determination of all gamma-ray radio nuclides, especially $Cs^{134}$, $Cs^{137}$, $I^{131}$, $Co^{60}$) | 2-3 Bq/Kg |
| Activity alpha global | 7-8 Bq/Kg |
| Activity beta global | 25-30 Bq/Kg |

### SGS GERMANY CAPABILITY

| ANALYSES TO CERTIFY NO RADIOACTIVE CONTAMINATION | LD=LQ (Bq/Kg) |
|---|---|
| Gamma Spectrometry (determination of all gamma-ray radio nuclides, especially $Cs^{134}$, $Cs^{137}$, $I^{131}$, $Co^{60}$) | 3 – 50 Bq/kg |

### SGS RUSSIA CAPABILITY

| ANALYSES TO CERTIFY NO RADIOACTIVE CONTAMINATION | LD=LQ (Bq/Kg) |
|---|---|
| Gamma Spectrometry (determination of all gamma-ray radio nuclides, especially $Cs^{134}$, $Cs^{137}$, $Ra^{226}$, $K^{40}$) | 5 Bq/Kg |
| Activity alpha global | 0.18 Bq/g – 50,000 Bq/g |
| Activity beta global | 50 Bq/Kg |

### SGS JAPAN CAPABILITY

| ANALYSES TO CERTIFY NO RADIOACTIVE CONTAMINATION | LD=LQ (Bq/Kg) |
|---|---|
| Gamma Spectrometry (determination of all gamma-ray radio nuclides, especially $Cs^{134}$, $Cs^{137}$, $I^{131}$) | 20 Bq/Kg |

SGS can also provide radiation testing services in many other locations through our large network of laboratories.
Please contact us for more information.

### WHO IS THE SGS GROUP?

SGS is the world's leading inspection, verification, testing and certification company. Recognized as the global benchmark for quality and integrity, we employ over 64,000 people and operate a network of more than 1,250 offices and laboratories around the world.

Contact us at: foodservices@sgs.com

WWW.SGS.COM



WHEN YOU NEED TO BE SURE

SGS