

## **Radiation Contamination in Food and Water: What's the Risk?**

As Japanese emergency workers continue to pump out thousands of gallons of contaminated water from the damaged reactors of the Fukushima Power Plant, radiation contamination in food and water has emerged as a new focus of the international media.

Before explaining the risks of food and water contamination, it's important to understand the difference between radiation exposure and radiation contamination. The United States Center for Disease Control (CDC) defines exposure and contamination with the following:

A person exposed to radiation is not necessarily contaminated with radioactive material. A person who has been exposed to radiation has had radioactive waves or particles penetrate the body, like having an x-ray. For a person to be contaminated, radioactive material must be on or inside of his or her body. A contaminated person is exposed to radiation released by the radioactive material on or inside the body. An uncontaminated person can be exposed by being too close to radioactive material or a contaminated person, place, or thing.”

As the CDC implies, there are many ways that radiation can enter the body for contamination to occur. Radioactive materials that enter into digestive tract can do damage while they reside in the body, but most of these materials pass through quickly. Radiation that gets trapped in other areas of the body, such as radioactive dust being breathed in and lodged in the lungs, can cause serious threats because the longer the radiation resides in the body, the more harm it can do.

So what are levels of radiation we actually need to worry about in food or water? The unit of measurement used for quantifying radiation in food and water is the Becquerel (Bq) and defined as the activity of a radioactive material in which one nucleus decays per second. More dangerous sources of radiation give off higher readings, and amounts decrease as radioactive isotopes decay. The Becquerel is a very small quantity of radiation; the human body itself produces over 4000 Bq per second. The standards set by the United States Food and Drug Administration (FDA) for food and water is about 375 Bq/lb (170 Bq/kg).

Recently Japan reported a reading of 463 Bq/lb (210 Bq/kg) in Tokyo's tap water, leading to widespread fear and a government advisory against giving tap water to children (who are more susceptible to radiation and have lower exposure limits). Since this incident, the radiation in Tokyo's tap water has returned to safe limits. Radiation in food has also been a problem, especially since much of the Fukushima Prefecture near the crippled nuclear plant is dedicated farmland. Widespread bans have gone into place on the sale and consumption of crops from affected areas, as well as seafood caught in the ocean near the plant. Much of the radiation present in the contaminated food and water is Iodine-131, which has a half-life (meaning that half of a quantity of the material has broken down and is not longer radioactive) of only 8 days. This means that this type of radiation won't be around for long, but the fear of radiation is more likely to hurt the Japanese economy as buyers shy away from food that they think might still have some contamination.

Although the fear that Japanese radiation in dangerous amounts will end up in other countries is often unfounded, we can't let down our guard just yet. Japan provides 4% of US food imports, including many seafood products that can have concentrated levels of radiation, such as shellfish and seaweed.



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So how can we assure that our food and water is contamination free? Finding trace amounts of radiation in food and water is often difficult because products are usually shipped in large containers that shield radiation. Common radiation detectors such as Geiger Counters just aren't sensitive enough to detect radiation at these levels. The FDA works to safeguard our food supply by using the MiniRad-D, a hand-held radiation detector, to search for radiation. The MiniRad-D uses a scintillation detector, which is over 100 times more sensitive than a Geiger counter, and because it can pick up radiation from tens of meters away, it can be used to scan whole containers of food at once.

The procedure of scanning food is becoming increasingly popular as Japan increases its exports. According to a recent New York Times article, even some fish markets and high-end restaurants have begun radiation detection procedures to ensure the safety of their customers. Knowing for sure that food and water is clean is a big draw for these businesses as Japan's nuclear clean-up continues to make headlines.

So, although the direct danger of radiation contamination in food and water is very low, the effects of the nuclear crisis are sure to be felt for years to come. And as many companies involved with food imports are discovering, peace of mind is not only attainable, but extremely valuable. With the right equipment, good information, and correct procedures, this peace of mind is truly available to everyone.

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