Radioisotopes That May Impact Food Resources

This table describes the radioisotopes (radioactive elements) that may be released in an accident at a nuclear power plant that are most likely to affect food resources. The potential human health risk posed by each of these radioisotopes depends on several factors:

- The form (e.g., a gas, a solid particle, or an element dissolved in water) of the radioisotope when it is released to the environment. This affects where it might be found in the environment and how far it might travel.
- The *radiological* half-life of the radioisotope. With each half-life that passes, one half of the radioactivity will be gone.
- The *biological* half-life of the radioisotope. With each half-life that passes, one half of the radioactivity will be removed from the living animal's body.
- The dose (amount) of radiation a person receives, and whether the dose is external (to the outside skin) or internal (inside the body after inhalation or ingestion).
- The target organ where the radioisotope may accumulate if it enters the body.

Radioisotope	Radiological half-life[1]	Biological half-life in mallard duck[2]	Exposure type[4]	Target area in body[5]	Food consumption issues
Iodine-131	8 days	10 days	Internal	Thyroid	Radiological half-life is short, and thyroid not commonly consumed.
Cesium-137	30 years	11 days	External, Internal	Whole Body	Can accumulate in the food web and in animal muscle tissue.
Cesium-134	2 years	10 days	External, Internal	Whole Body	Can accumulate in the food web and in animal muscle tissue. It is usually a smaller component of accident fallout[6] than Cesium-137.
Strontium-90	28 years	18 years in humans[3]	Internal	Bone	Bone not commonly consumed.

1) Radiological half-life is the time it takes for the radioisotope to lose half its prior radioactivity.
2) Biological half-life indicates how long it takes a living animal to eliminate a radioisotope from its body after it has been internally exposed. With each biological half-life, half of the prior radioactivity will have been eliminated from the body through metabolism and excretion. This value varies by animal species, and is different for each radioisotope. The biological half-life for many radioisotopes is much shorter than the radiological half-life. Duck data are from *Halford DE, Markham OD. 1983. Biological elimination rates of radioisotopes by mallards contaminated at a liquid radioactive waste disposal area. Health Physics 45:745-756*.
3) Defined as the "effective" half-life in *Agency for Toxic Substances and Disease Registry (ATSDR), September 1999. Toxicological Profile for Ionizing Radiation. U.S. Dept. of Health and Human Services, Atlanta Georgia*.
4) Radiation exposure can be external (to the outside skin) or internal (inside the body after inhalation or ingestion), depending on the radioisotope and the exposure scenario.
5) Location in the body where the radioisotope may accumulate. If an animal has been exposed to radiation, this affects which parts of the animal might be less safe to eat.
6) "Fallout" means the landing of radioisotopes on the Earth after they have been released into the air following a nuclear accident or explosion.