



# Radionuclides in Food and Feed

Levels of radionuclides in food are mainly monitored in relation to the consequences of nuclear accidents and nuclear weapons testing. Sr-90 and Cs-137 are products of nuclear fission of uranium and plutonium - they are present, for example, in the spent fuel of nuclear reactors. Radionuclides are contained in all forms of life. Their resources in the environment are natural (e.g. formation of the Earth and cosmic radiation), but also consequences of human activity (nuclear weapons tests, accidents at nuclear reactors, waste from nuclear facilities, industry, and healthcare).

During the decay of radionuclides (atoms with an unstable nucleus - radioisotopes), radioactive radiation (alpha  $\alpha$ , beta  $\beta$ , gamma  $\gamma$ ) is emitted. These radiations have different penetrations and different degrees of biological effects. The dose obtained from the diet represents only a small part of the total dose, the larger part coming from radon in buildings, the bedrock and building materials. Under normal conditions, the largest share of radioactivity in food is caused by natural radionuclides (K-40 and C-14) without negative effects on human health.

## Caesium 137

Cs-137 is a short-lifetime fission product which is easily soluble in water and thus freely moves and spreads in nature. Together with Cs-134, I-131 and Sr-90, Cs-137 belongs among the isotopes released during a nuclear explosion or a nuclear reactor accident. These isotopes pose the greatest risk to human health.

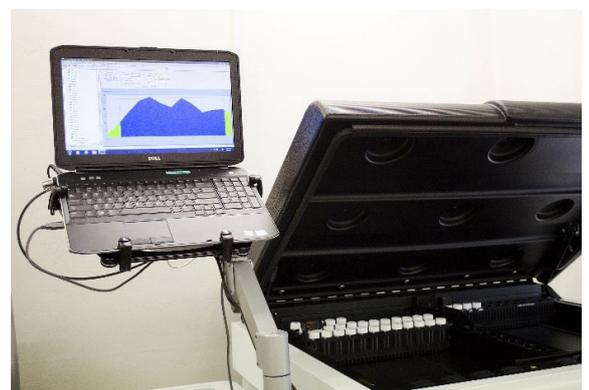
## Potassium 40

is a biogenic element and the largest source of natural radioactivity for humans. It makes up 0.012% (120 ppm) of the total amount of potassium found in nature. It is not considered dangerous.

## Actinides

Actinide radionuclides are used as fuel in nuclear facilities or form as by-products of fission reactions. They can also be released during accidents at nuclear facilities or nuclear explosions. In addition to the radiation risk, they are all highly toxic. The most frequently determined isotopes are Plutonium (Pu-239, Pu-240) and Americium (Am-241).

The main risk of artificial radionuclides or natural radionuclides not commonly found in the biosphere is that, due to properties similar to those of common biogenic elements, they may enter and accumulate in certain tissues (e.g. I-131 in the thyroid or Sr-90 in bones and teeth). In the long-term, they damage surrounding cells, which can lead to tumour growth.



**Council Regulation No. 3954/87 (EURATOM), as amended, lays down maximum permitted levels of radioactive contamination of foodstuffs and feeding stuffs following a nuclear accident or any other case of radiological emergency.**

According to European legislation, the radioactivity of wild mushrooms and their products, which are imported into the EU from third countries, is closely monitored. An updated list of approved foods and radiation doses in each country is published in the EU Official Journal.



**ALS also provides testing relating to the Technical Regulation of the Russia-Kazakhstan-Belarus Customs Union (CU) TR TS 021/2011 on Food Safety, which includes requirements for radionuclides Cs-137 and Sr-90 in specific foodstuffs, and holds the authorisation from the Greek Atomic Energy Commission for the determination of radioactive substances in drinking water.**

ALS code	Parameter	Methodology	LOQ (Bq/kg)	TAT	Accreditation
B-RAD	Cs-134, Cs-137, K-40, I-131	Non-destructive high-resolution gamma-ray spectrometry	Cs = 5; K = 10, I=1	7 days	YES
B-SR90-PRO	Sr-90	Low-background beta radiation detection after separation	5	10 weeks	YES

### ALS Radiology laboratory

- State-of-the-art laboratory equipment
- HRGRS (high-resolution gamma-ray spectrometry) and radiochemical methods
- Validated and accredited methods performed by highly experienced staff
- Maximum permissible limits checked in food, feed and drinking water
- Analyses and evaluation of results performed in accordance with the European EURATOM regulation and the Technical Regulation of the Russian Federation TR TS 021/2011, which stipulates the permissible amounts of radionuclides Cs-137 and Sr-90 for specific foods

**For more details, please contact our client service at +420 226 226 998 or [czsupport.food@alsglobal.com](mailto:czsupport.food@alsglobal.com).**