



Analysis of Radioactivity in Food

Natural sources of radiation – a combination of cosmic and terrestrial radiation – represent the major part of radioactivity in the food chain.

The radionuclides potassium-40, uranium-235 and -238 as well as products from these decay series such as radon-222, radium-226 and thorium-232 can be dated back to the origin of the earth. Radionuclides such as tritium and carbon-14 are continuously formed in the atmosphere. Main sources for man-made radioactivity dispersed in the environment have been the nuclear weapons tests performed in the 1960s as well as the reactor accidents in Chernobyl in 1986 and Fukushima in 2011.

Eurofins offers the analysis of the most important marker nuclides for food, caesium-134 and -137 as well as iodine-131.

Relevant Nuclides

Severe damage and containment breaches within nuclear power plants lead to the harmful release of volatile isotopes such as iodine and caesium. Less volatile radionuclides such as strontium, antimony, uranium and plutonium can be part of aerosol or dust particle releases. The extent and severity of their release is highly dependent on the process taking place in failing reactors.

Usually, caesium-134 and -137 are considered good indicator nuclides due to their distribution in the environment and the long half-life of caesium-137 of 30 years. Additionally, in case of Fukushima also iodine-131 (half-life 8 days) has initially been used as a marker nuclide for the assessment of food and feed.

Radionuclides in the Food Chain

Following a radioactive fallout the presence and bioavailability of caesium-137 depends on properties and characteristics of the soil. Acidic soils and soils rich in humus, such as bog and forest soils, are in a high risk category as caesium-137 maintains a high bioavailability. Up to today these facts result in considerable contaminations of mushrooms, forest fruits and venison with caesium-137, which nowadays are still measurable e.g. in Bavaria, originated from the Chernobyl reactor accident.

Regulatory Provisions

EU Regulation 733/2008 lays down maximum levels of caesium-134 and -137 for third country imports affected by the Chernobyl reactor accident.

The import for food and feed originating from Japan is governed by EU-Implementing Regulation 322/2014 with maximum levels for caesium-134 and -137. Analysis of both nuclides is mandatory for certain matrices depending on the prefecture of origin.

Additionally the EU Regulation 52/2016 lays down levels for strontium-90, iodine-131, plutonium-239, americium-241 and caesium-134 and -137 in food and feed.

Contrary to previous Implementing Regulations maximum levels for further radionuclides such as iodine, strontium or (trans-) plutonium are not considered necessary anymore.

Analysis

The analytical expertise of Eurofins in the field of radioactivity is based on more than 20 years of experience. Our offering includes the analysis of caesium-134, caesium-137 and iodine-131 by means of γ -spectrometry using either germanium- or sodium iodide-detection.

