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Diagnostics techniques and dosimetric evaluations for radioactivity investigations in food and environment

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The investigation of the natural/anthropogenic radioactivity in various food (drinking water, bovine and sheep meat, fish, milk and derivatives, etc.) and environmental samples (treated wastewater, lake water, coastal marine sediment, river sediment, etc.) is performed in laboratory by using different diagnostics techniques:

- NaI(Tl) and high resolution HpGe gamma spectrometry, in order to quantify the activity concentration of radionuclides that emit gamma photons;
- alpha spectrometry, for the determination of the specific activity of α -emitters radioisotopes;
- liquid scintillation, to measure the activity concentration of tritium, radon and gross alpha/beta in liquid samples;
- alpha spectrometry through the emanometric setup, in order to estimate the gas radon specific activity;
- total alpha/beta counter, for the activity concentration quantification of radionuclides, in solid samples, emitting alpha/beta particles. Regarding to radiometric measurements in field, ion chambers, proportional and Geiger counters, contamination meters, electret dosimeters and gamma spectrometers are usually employed, taking into account the specific operational activity to be performed.

From the dosimetric point of view, the knowledge of the radioactivity level in food and environmental matrices allows to evaluate any possible radiological hazard for the population, through the calculation of the appropriate indices of radioprotection and their comparison with the safety limits reported by the legislation.

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