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The extended source efficiency correction to measure norm concentrations using a HPGe detector

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The objective of the experiment is to measure NORM (Naturally Occurring Radioactive Material) in natural samples and calculate their concentrations. For this purpose, experiments detecting the radiation of several gamma-ray calibration sources located at different positions around an HPGe detector were conducted. The efficiency calibration curve for each position was obtained, a piece of information useful to determine the concentration of radionuclides within an extended source. To perform the validation of the results an IAEA reference standard (40K) was placed in different geometries within the volume of a lead shield together with the HPGE detector and the efficiency correction was considered to determine the concentration of radioactive material. The measurement of the 40K concentration was compared with the activity concentration values reported in the calibration certificate of the reference standard. The usefulness of this work is to measure NORM in natural samples to calculate their activity concentration without using the comparison with a reference standard.

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