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Preparation of spiked grass for use as environmental radioactivity calibration standard

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The monitoring of environmental radioactivity is important for public health protection. It is all the more important as the radionuclides can enter the food chain. Environmental nuclear analysis is usually carried out using γ-ray spectrometry on homogenized raw or treated materials (i.e. dried, sieved or ashed samples). The composition and density of environmental monitoring samples are very different from a sample to another.
The Laboratoire National Henri Becquerel (LNE-LNHB), as the French primary laboratory in the field of ionizing radiation, is working on the production of suitable calibration standards to improve the traceability chain of environmental radioactivity measurements. To address this issue, LNE-LNHB intends to produce mixed γ-ray calibration standards with certified mass activity and composition as representative of real environmental samples as possible. The use of such standards, suitable in radionuclide composition and density, will also improve the measurement system calibration due to a more accurate correction of self-attenuation by measuring a known sample whose composition is close to the real ones.
The paper describes the preparation and characterization of a low density matrix made of treated real grass spiked with mixed γ-ray emitters. The composition of the spiking cocktail includes low energy γ-ray emitters to account for self-attenuation in the matrix and high energy γ-ray emitters to cover a wide energy range. Multi- γ emitters have also been included to test the ability to estimate coincidence corrections. The spiking yield of the matrix is assessed and the homogeneity of the batch is verified by variance analysis on subsamples.
A proficiency test is being organized with the resulting matrix. The samples are to be shipped on mid-September so; unfortunately the results of the intercomparison will not be known by the time of the conference.

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