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SELF-ATTENUATION FACTORS IN GAMMA-RAY SPECTROMETRY OF SELECT SAND SAMPLES FROM CAMBURI BEACH-VITÓRIA, ESPÍRITO SANTO, BRAZIL.

L. F. Barros[1]*, B. R. S. Pecequilo[2]

Instituto de Pesquisas Energéticas e Nucleares, IPEN-CNEN/SP, Gerência de Metrologia das Radiações; Av. Professor Lineu Prestes 2242, Cidade Universitária, 05508-00, São Paulo,SP;
[1]lfbarros@ipen.br; [2]brigitte@ipen.br

High resolution gamma-ray spectrometry is an effective method to analyze natural radionuclides activities in soils, in order to assess potential environmental impact. Meanwhile, lower energy gamma rays have less penetrating ability and tend to interact more readily with matter, so, when the efficiency calibration curve is obtained with an aqueous standard multi-radionuclides solution, a self- attenuation correction is required. Sand samples from eleven selected locations along the 6 km extension of Camburi Beach, ES, Brazil, well-known for its high levels of natural radioactivity, were collected, dried and sealed in 100-mL HDPE flat-bottom cylindrical flasks. The self-attenuation factors were determined by the transmission technique, measuring the transmission of gamma rays through both the sand sample and an ultrapure water sample in the same geometry, using punctual sources, with gamma transitions in the range of interest. In this work, IAEA punctual sources of ^{152}Eu, ^{137}Cs and ^{60}Co were used, with gamma transitions covering an energy range from 122 keV to 1408 keV. Both the sand samples and the ultrapure water sample were measured in the same geometry with a 15% HPGe ORTEC EG&G detector with conventional electronics and a 919 ORTEC EG&G Spectrum Master 4k multichannel analyzer and the spectra analyzed with the InterWinner software. Attenuation factors were determined for each different sand sample density and curves were fitted, relating the self-attenuation factors with the gamma transition energies. These values will be used to correct the ^{226}Ra, ^{232}Th and ^{40}K sand concentrations activities. For the sample with the lowest density, 1.36 g.cm^{-3}, the self-attenuation factors varied from 1.04 for the 1408 keV to 1.24 for the 122 keV. For the sample with the highest density, 1.81 g.cm^{-3}, the self-attenuation factors varied from 1.12 for the 1408 keV to 1.62 for the 122 keV.