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Invited Talk: Application of an electronic spreadsheet package and a dedicated spectral analysis software for the calibration of a gamma-ray spectrometer

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The first step in a series of actions after installing new software and hardware in a Neutron Activation Analysis (NAA) laboratory is the calibration of the spectrometer besides the characterization of the reactor's irradiation channels. This must be done before any routine spectral analysis could be done using the k0-NAA Standardization Method. For the Nigeria Research Reactor-1 (NIRR-1) laboratories, this calibration of the spectrometer was carried out using two different tools. An electronic spreadsheet and a dedicated spectral analysis software (k0-IAEA) were employed for the same detector and the results obtained from both methods were compared in this study. The efficiency curves were established for the two optimum source-detector distances for the GEM 30195 detector from the measurement and interpretation of several spectra from nine standard gamma-ray calibration sources (Na-22, Mn-54, Co-57, Co-60, Y-88, Cs-137, Eu-152, Ra-226, Am-241) whose activities are known to better than ±3%. The performance of the electronic spreadsheet was compared with the proprietary software. The sets of values obtained for the full-energy peak detection efficiency from the two approaches are close at higher geometries with less than 10% variation.

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