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## Are LaBr<sub>3</sub>:Ce detectors the optimum instruments for naturally occurring radioactive materials (NORM) activity measurements?

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LaBr<sub>3</sub>:Ce (2" x 2") detectors were used to measure soil samples placed in Marinelli beakers in singles and coincidence modes. Time-stamped data were acquired and background removed offline by using photon time-of-flight in addition to measurement of the two photon energies in coincidence. Coincident gamma-ray pairs from <sup>238</sup>U (<sup>214</sup>Bi) and <sup>232</sup>Th (<sup>208</sup>Tl) series were identified in measured samples. The activity concentrations of <sup>238</sup>U and <sup>232</sup>Th series radionuclides inside the samples were determined in both singles and coincidence modes. The internal activity of the LaBr<sub>3</sub>:Ce detector increases the MDA at 1460.8 keV and 2614.5 keV, which limits the measurement of <sup>40</sup>K radionuclide with low activity concentration in singles mode. The measured internal activity of <sup>138</sup>La in the LaBr<sub>3</sub>:Ce detector crystal is  $263.8 \pm 26.8$  Bq kg<sup>-1</sup> which is comparable to the calculated activity of 293.3 Bq kg<sup>-1</sup>. The suitability of the use of these detectors for NORM measurements was evaluated.

**Primary authors:** BASHIR, Munirat ( Ibrahim Badamasi Babangida University ); Prof. NEWMAN, R.T (Srel-lenvosch University); Dr JONES, P.

**Presenter:** BASHIR, Munirat ( Ibrahim Badamasi Babangida University )

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