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## Baseline data of radioactivity and radon mass exhalation rate in soils and phosphate rocks of a prospective phosphate mining area in Hinda district, Republic of Congo

The present study aims to establish a baseline data of natural and artificial radioactivity in soil and phosphate rock samples collected in a prospective phosphate mine of Hinda district. Samples were measured using an HPGe gamma spectrometer. The mean activity concentrations (Bq kg<sup>-1</sup>) for <sup>238</sup>U, <sup>235</sup>U, <sup>226</sup>Ra, <sup>232</sup>Th, <sup>40</sup>K, and <sup>137</sup>Cs in soil are 94.87, 12.29, 47, 17, 43, 1 and 1370.23, 40.16, 922, 70, 103, 7 for phosphate rock samples, respectively. The obtained mean values were found to be lower than the world mean values for soil samples excepted for <sup>226</sup>Ra, and higher for phosphate rock samples. <sup>222</sup>Rn activity concentration (Bq kg<sup>-1</sup>) and <sup>222</sup>Rn mass exhalation rate were determined in soil and phosphate rock samples. The radiation hazard indices associated to natural radioactivity were also calculated and found to be lower than the world mean values for soil samples and higher for phosphate rock samples. Strong correlations were found between <sup>226</sup>Ra, <sup>222</sup>Rn activity concentrations and <sup>222</sup>Rn mass exhalation rates. Based on these findings, soils from prospective phosphate mine are not recommended for construction purposes. Also, phosphate rocks highly contribute to the contamination of the study area. Therefore, in order to protect the population, the recommendations were drawn to strengthen the environmental protection in this mining area during the operation phase of the mine. Precautionary measures such as continuous verification of dose level in the study area are necessary.

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