Radiological Assessment of Soil Used for Agriculture in Southern Nigeria
A case study of Federal Polytechnic Ile-Oluji Research Farm

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1. Introduction

The earth is radioactive due to natural sources and activities of man in the environment. There is a Continuous bombardment of man and his environment by these (radioactivity) ionizing radiations (UNSCEAR, 2000). Hence, the issue of environmental degradation and pollution in the 21st century is of global concern, because of its health impact and implications. The quest for agricultural development and the Southern States of Nigeria has led to various forms of activities that tend to perturb the fragile ecological, biophysical systems and the socio-economic structures of the area. Federal Polytechnic Ile-Oluji research farms are a case in point.

Natural occurring radioactive materials are present everywhere in our environment. One body contains some natural occurring radioactive decay elements such as carbon-14, potassium-40 and Plutonium-239 (IAEA, 2000). Radioactive disintegration arises in the natural radioactive series due to recent fractionation events (continues or instantaneous processes) which lead to the loss or gain of radionuclides that are mobile in the environment environment. This has on the other hand been found that radiation constitute a source of health hazard as in the short-term development are capable of causing hormonal effects (UNSEAR, 2000; IAEA, 2007).

Human health status is a function of his immediate environment. The level of contamination of our environment therefore has a great effect on the quality of human health. Importantly, human activities have led to an advanced level of art, soil and water pollution in our environment. As has been observed that air pollution and water pollution can have intrinsic effect to soil, thereby altering its elemental composition also, the activities of the universe has direct or indirect effect to the soil Olatunji 2016. Hence, it is important to study the radioactivity concentration and the radiological health impact of soil used for agriculture in Federal Polytechnic Research farm Ile-Oluji and environs.

2. Materials and Method

Metallurgy:
Geochron Process System (GPS) of IVE was used for this study in the geotechnical location of each sampling point. 100mg to 500mg of each agricultural purpose was sampled at the vicinity of the site with 3 replicates of each sample. All samples were collected in the form of composite samples. Each soil sample was packed in a specially designed double container, labelled and appropriately. Soil samples were evenly mixed and weighted. The samples were packed in a container, numbered for 30-40 days.

The sample was re-sieved as a checked sample container of the same dimension and geometry as the standardized size for the Faculty (Iyanu-Agbon). After sealing the soil, each sample was weighed on an electronic balance placed on the shield. The (7) detector (detector and counting of 18,000 seconds). The empty container of the same geometry and dimension was sealed for the same time as the background was recorded.

Gambro 300 gamma ray acquisition software was used for the gamma counting process after which the external disintegration was calculated using the corresponding method. The data analysis software subtracted a linear background from the corresponding sample to obtain a radionuclide of the sample. The plot of samples were identified in the natural radioactive decay series headed 238U and 232Th, and these soils contain radioactive nuclides. Other radionuclides may be present except below the detection limit of the detector used. The specific activity of C, the weight and the corresponding specific radionuclide in the standard are listed by

Where \( A \) is the area of the sample
\( M \) is the mass of the sample
\( n \) is the net peak area of the sample

3. Study area

The study area covered a situation in the Osogbo district of Osun State, Nigeria where the sampled soil was collected. The sampling points were located within the Osogbo district, Ogun State, Nigeria (latitude N 06°36'12", longitude E 04°42'23")

4. Results

<table>
<thead>
<tr>
<th>Sample</th>
<th>CN</th>
<th>238U</th>
<th>232Th</th>
<th>40K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample 1</td>
<td>123</td>
<td>59.32</td>
<td>34.68</td>
<td>8.72</td>
</tr>
<tr>
<td>Sample 2</td>
<td>124</td>
<td>58.12</td>
<td>33.68</td>
<td>8.72</td>
</tr>
<tr>
<td>Sample 3</td>
<td>125</td>
<td>59.32</td>
<td>34.68</td>
<td>8.72</td>
</tr>
</tbody>
</table>

5. Discussion on radionuclides

The results of the activity concentrations of these radionuclides were used to estimate the corresponding radiation impact parameters. The soil samples were used to determine the radioactive index of each sample. The soil samples were used to estimate the radioactive index of each sample. The results were used to determine the radioactive index of the soil samples. The results are presented in Table 1 below.

<table>
<thead>
<tr>
<th>Sample</th>
<th>D</th>
<th>E</th>
<th>Fmax</th>
<th>Fmin</th>
<th>W</th>
<th>D/D0</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample 1</td>
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</tr>
</tbody>
</table>

6. Conclusion

Many of the result obtained for the radiological impact parameters have been compared with the international reference levels given by the International Commission of Radiation Protection (ICRP). The results obtained were found to be within the acceptable limits for the protection of the public. This study will therefore recommend regular environmental monitoring in the area to determine the radiological impact parameters.