

Research

(a) Completed

- (i) Baseline studies of outdoor radiation exposure levels in Nigeria using in-situ and laboratory gamma-ray spectrometry
- (ii) Assessment of Ingestion effective dose equivalent due to radionuclide intake in soil and food crop samples from elevated radiation areas in old tin mining area in Jos and Abeokuta Nigeria.
- (iii) Radioactivity measurement of industrial minerals, by-product and industrial wastes and discharges in Nigeria.
- (iv) Radiation Exposure dose assessment to general public and occupationally exposed persons due to ionizing radiation use in medicine and the industry in Nigeria.
- (v) Growth and performance characterization of some tropical vegetable seeds due to gamma-ray irradiation.
- (vi) Effects of high background radiations on natal birth defects and deaths.
- (vii) Elemental and radioactivity characterization of Nigeria chemical fertilizers and its radiological implication on food crop consumption by the population.
- (viii) Determination natural radionuclide contents in farm soil for cigarette production and Polonium-210 in brands of cigarettes smoked in Nigeria.
- (ix) Radiation dose levels in bone, blood, faeces of cattles slaughtered at three Abattoirs in Southwestern Nigeria.
- (x) Effects of food diet preparation techniques on radionuclide intake and implications for individual ingestion effective dose in Abeokuta
- (xi) Physiochemical and radiological assessment of different water sources in southwestern Nigeria
- (xii) Radionuclide contents and evaluation of radiological hazards in the River sediments of Ogun River Southwestern Nigeria.
- (xiii) Radiation exposure and optimization assessment due to different x-ray diagnostic procedures in some Nigerian hospitals.
- (xiv) Radiological assessment in and around the environment of petroleum refining and petrochemical company and soil wastes streams from oil producing wells in Niger Delta area of Nigeria

(b) In Progress

- (i) Activity concentration levels of natural radioactive elements and cancer incidence in Oil producing areas in Imo State, Nigeria.
Oil and gas production activities result in the generation of soil and drill spoil products in the environment that may contain elevated radionuclide concentration levels. This study is designed to determine the concentration levels of radioactive elements in drill spoil products from different oil wells located in the oil producing areas in Imo State and seek for a relationship between radiation and the high prevalence of cancer incidence in the communities around the areas.

- (ii) Glandular dose evaluation and associated cancer risk to female patients undergoing Mammographic screening procedures at two major Teaching hospitals in Nigeria.
The use of x-ray in mammographic screening procedures on women for determination of calcifications in the breast may present some risk to the glandular tissues. With the level of awareness of breast cancer and prevention, mammographic screening has increased in the last decade. There is therefore the need to determine doses incurred by the glandular tissues in the process with the imperative to assessing the possible risk of cancer induction. The assessment of optimization of procedures in the screening process is also being investigated.
- (iii) Radiation dose audit of common x-ray diagnostic procedures and the establishment of local dose reference levels in Southwestern Nigeria.
Several millions of radiographic examinations are carried out annually in Nigeria hospitals for various diagnostic purposes. Emphasis by the imaging medical personnel is the quality of the radiographic image. Almost all the hospitals carrying out the examinations do not have the record of the dose delivered to the patients and the selected exposure parameters used during the examinations. Moreover, to date there are little published data on patient dose (dose-area product) compared with the large number of radiographic examinations carried out annually in Nigeria. This study is designed to investigate the current levels of patient radiation dose for the frequent radiological examinations carried out in the southwestern, and to establish the regional diagnostic reference levels.
- (iv) Radiological assessment of the environmental matrices in old coal mining areas of Enugu, southeastern Nigeria.
Radioactivity mapping in the country showed that Enugu has the highest environmental gamma dose rate amongst all the cities from the Southeastern Nigeria. The coal rich nature of the city appeared to be responsible for this level of gamma dose rate levels. Reports have also shown that higher incidences of cancer are reported for the population from the southeastern Nigeria; a trend that demands for reasons of the scourge in the region. The present study is therefore designed to determine the gamma, beta and alpha activity levels in the different environmental samples (soil, water, sediments, food crops, coal fly ash and coal ash) and consequently evaluate the radiological hazard parameters.
- (v) The study and modeling of transfer mechanisms of natural radionuclides in food crops and fish species from tin mining impacted environments in Jos, Plateau State.
The transfer of radionuclide from soil to food crops is function of the type of soil, crops, radionuclide and the competing influence in the environment. In essence the amount of radionuclide that is ingested by man is dependent on the above factors. The migration of the radionuclides in different parts of food

crops in non-mined impacted soil may not be same in mine-impacted soil and environment. This presents variations and different approaches to mitigation and control approaches in cases of radioactive contamination in the environment. This study will employ Neutron Activation techniques to study and develop a model for the transfer mechanism of radionuclides in different parts of common food crops and fish species in Jos area.

(c) Project, Dissertation and Thesis

- (i) In-situ gamma spectrometry in evaluation of natural radioactivity in Ibadan (M.Sc. project, Department of Physics, University of Ibadan, Ibadan, Nigeria, October, 1993).
- (ii) Application of In-situ Gamma ray spectrometry in baseline studies of outdoor radiation exposure dose rate levels in Nigeria (Ph.D.Thesis Department of Physics University of Ibadan, Nigeria, August, 2000).