

Assesment Of Radio Activity In Naturally High Radiation Area Of Middalam Village In Kanyakumari District

D. Abila Darling

Department of Physics,
Nanjil Catholic College of Arts and Science

Abstract: In this study, the Natural radioactivity concentrations of Beach sand at the surface and depths and Fruits from the study area of Naturally High Background Radiation area - Midalam of Kanyakumari District is measured. The Gross Alpha and Gross Beta radioactivity concentrations are measured by using an alpha counter (SP 647A) with Zns (Ag). The gross-alpha and gross-beta activity concentrations in soil samples varied from 10169.49 to 49789.03 Bq/ Kg and 21654.74 to 110035.62Bq/Kg are observed.

Keywords: Gross Alpha, Gross Beta, Beach sand and fruits.

I. INTRODUCTION

The determination of radionuclides in environmental samples is a crucial task in relation to the protections of human health [1] and their effects on humans are always depends on the regional geological and geographical behaviour. Presence of Radioactivity in surface soil is mainly due to the presence of radioactive elements in the Earth crust [2]. Radionuclides and their isotopes present in soil can be dissolved into the surrounding aquatic ecosystem [3] and produced an increased background level of natural radiation in a particular ecosystem [4]. Radiation contamination in environment occurs due to either naturally or artificially producing radioactive substance [5]. Radiation is part of the natural environment and approximately 80% of the human exposures are from naturally occurring radioactive materials [6]. Human activities have contributed to the increased concentrations of some of radionuclides in the environment [7]. The Earth crust contains small amounts of radionuclides and radioisotopes such as Uranium, Thorium, Radium and Potassium respectively. Natural contents of uranium (U) and thorium (Th) in igneous rocks are in the range 0.1-5 and 1-20 mg/kg respectively, depending on the type of rocks, Felsic rocks (Granite), usually contains more U and Th than Mafic rocks (Basalt) [8]. Enhanced levels of these naturally occurring radionuclides might be present in the soil and acts as

a source of transfer of radionuclides through the food chain depending on their chemical properties and the uptake process by the roots to plants and animals [9]. The Gross Alpha and Beta analyses are the simplest radio analytical procedures and used as the first step of a screening method. It is a very fast, safe and low cost method [10]. This present study will help to prepare baseline data for gross alpha and gross beta radioactivity in environmental sample, which will be used as fingerprint for the comparison of radioactivity level [11].

II. MATERIAL AND METHODS

A. STUDY AREA AND SAMPLE COLLECTION

The study area selected is Middalam village, Kanyakumari. District, Tamilnadu (India) I have collected the Beach sand at the surface and depths and Fruits from the study area.

B. SAMPLE PREPARATION

For the measurement of gross alpha and gross beta activity, the first step involved for measuring the activity of the sample is the sample preparation. The steps for preparing the samples are as follows. The beach soil samples are collected in a plastic container. For proper identification, the

sample collection location, sample description, fresh weight of the sample must be noted. Then remove the pebbles and other particles. The samples are dried at 150° C for one day. Then cool the sample. Mix thoroughly and take 5 gms of the sample with the help of a riffle splitter. Then powder the sample using pestle and agate mortar.

III. ESTIMATION OF GROSS ALPHA, BETA ACTIVITY OF THE SAMPLES

Alpha Activity	Beta Activity
Take approximately 0.02 gms of powdered sample in a previously cleaned aluminum planchet	Take approximately 0.03 gms of powdered sample in a previously cleaned silver planchet
The sample along with the planchet is in drawer assembly of the alpha counting system.	Beta Counting System
Counted for 1000 seconds	Counted for 600 seconds.
The background of the counting system was determined by using the empty planchet for 1000 seconds	600 seconds
The net count obtained is found out by subtracting the background counts from the sample counts.	The net count obtained is found out by subtracting the background counts from the sample counts.

Table 1

IV. RESULTS AND DISCUSSION

Sample	Alpha Activity (Bq/Kg)	Beta Activity(Bq/Kg)
Sand at the surface(S1)	49789.03	110035.62
Sand at the depth of 15 cm (S2)	32943.47	82196.81
Sand at the depth of 30 cm (S3)	10169.49	21654.74
Banana Fruit	66.91	123.57

Table 2

V. CONCLUSION

Natural radioactivity forms a significant part of the total activities in the environment whereas anthropogenic activities have introduced significant amounts and usually their influence is limited to the near locality of their introduction. As radiation is harmful to human life, it is advisable to take steps to reduce the radiation level. The ventilated houses

reduce the chance of radioactive elements entering into human body by dilution through respiration. Radiation exposure which exceeds a minor causative factor limit is harmful to human life. They cause cancer in living tissues. Therefore extensive and unnecessary exposure to radiation must be avoided.

The present study indicates that the fall out radioactivity in fruit is absolutely negligible and their dose to population is nil. The natural radioactivity in soils are higher and at global level concentration for most of the matrices. At present the ingestion dose is less.

REFERENCES

- [1] Selcuk ZO, Ceylan H, Dogru M. *Gross alpha and beta radioactivity concentration in water; soil and sediment of the Bendimahi River and Van Lake (Turkey)*. *Environ Monit Assess* 2009; 148:39-46.
- [2] Lide DR. *CRC handbook of chemistry and physics* (74th ed.). Boca Raton, USA: CRC, 1994.
- [3] BAL SS, Mohammed FK, Mahmut D. *The gross alpha and beta radioactivity concentration on the Sivrice (Elazig) fault Zone*. *Journal of science and Technology*. 2012; 2:49-51.
- [4] Canbazoglu C, Sahin S, Dogru M. *Determination of the gross alpha and the gross beta radioactivity concentrations in some medicinal plants*. *Balkan Physics Letters*, Special 2001, 59-63.
- [5] Patel B. *Management of environment*, New Delhi: Wiley Eastern 1980; 51(76):506-509.
- [6] Brijesh patak. *Estimation of gross alpha activity in soil and plant samples in Udaipur*. *International journal of scientific & Engineering Research*. 2012; 3.
- [7] Baxter MS. *Technologically enhanced radioactivity: an overview*. *Journal of Environmental Radioactivity*, 32, 3-17. Bradley, D. A., & Roberts, C. (1998). Foreword. *Applied Radiation and Isotopes* 1996; 49:147-148.
- [8] Brijesh patak. *Estimation of gross alpha activity in soil and plant samples in Udaipur*. *International journal of scientific & Engineering Research*. 2012; 3.
- [9] Jabbar A, Tufail M, Arshed W, Bhatti A, Ahmad SS, Akhter P, et al. *Transfer of radioactivity from soil to vegetation in Rechna Doab, Pakistan*. *Isotopes in Environment and Health Studies*, 2010; 46(495).
- [10] Canbazoglu C, Sahin S, Dogru M. *Determination of the gross alpha and the gross beta radioactivity concentrations in some medicinal plants*. *Balkan Physics Letters*, Special 2001, 59-63.
- [11] Periyasamy M, Christopher S, Syed Mohamed HE, Sadiq Bukhari A, Mohamed Shamsudin, *Gross Alpha and Beta radioactivity studies in Dindigul and Erode Districts, Tamilnadu*, *International Journal of Advanced Science and Research*, 2016, 22-26