Background Baseline of Radiation in Natural Environment: An Interface with Environmental Impact Assessment and Management

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Abstract- **Environmental Impact assessment and management have acquired a great significance today due to rapid industrialization and urbanization with regard to safeguarding the environment probably no other issue has drawn so much attention and raised so many controversies as the radioactive pollution. The study on baseline radiation background and distribution and radionuclide's of natural and artificial origin in the environment play an important role. The radiation exposure in excess on certain lower limits due to both natural and artificial radionuclides can produce unacceptable deleterious effect in human environment. This requires a precise knowledge of the environmental radiation levels and their variation due to natural sources and a thorough understanding of environmental processes and their dynamics which modify radiation levels. Environmental impact assessment and management act as a tool to predict impact due to radiation and helps to mitigate these impacts and provides a comprehensive management plan and strategies for the natural environment.**

Keywords- Environmental impact assessment, Radiation, Human Environment.

I. INTRODUCTION

The present article reveals with the objectives, to establish a reliable baseline data of background radiation level and concentration of prominent natural and artificial radionuclides in the environment for future environmental impact assessment and management by studying the origin, distribution,and transportation of radionuclides in the region.This article also emphasize the study of biological take up of radionuclides by plants and living organisms in the vicinity or to study the external and internal exposure to human beings from natural and artificial radionuclides through various means. Background radiation is the integral component for assessment and management plan for developmental activities directly and indirectly related to the radiation. The procedure includes first and foremost preliminary review, either project is influenced or not, secondly to select the environmental indicators to be used for evaluating radiation impact on environment, thirdly arrange field sampling program to complete description of environmental setting and finally make prediction of radiation effects naturally as well as artificial with mitigative measures and modification.

II. MATERIALS AND METHODS

The precise knowledge of environmental radiation levels, their variation due to natural sources and dynamics of modification requires laboratory studies as well as field survey. The measurement of radiation in environment and biological material based on separation of the radionuclides from bulky matrix. These methods requires sample preparation, concentration, chemical separation and counting methods.

III. DISCUSSION AND CONCLUSION

Present article emphasize on the considerations of the natural as well as artificial radionuclides by adopting following steps for assessment of imposed impacts..

A. Sample collection and processing; all living beings have evolved in an environment of natural background radiation originating from extraterrestrial sources such as cosmic rays. These particle consists of 87% protons,11%alpha particles and 1%nuclei of atomic number 4-26 and about 1%of electrons of very high energy.The other source is terrestrial origin radionuclides in the earth crust. The average annual dose due to all natural sources in normal vicinity is 2.4mSv**(UNSCEAR,1988).T**he samples collected such as soil, sand, sediments, plants and vegetation having primordial radionuclides given in the given table are component of the three series Uranium,Actinium and Thorium**(Eriksson,.,1987).**

Table showing the terrestrial and cosmic origin of natural radionuclides.

Radionuclides	Half life in year's
^{40}K	$1.26*10^{9}$
^{50}V	$6*10^{15}$
^{87}Rb	$4.8*10^{10}$
^{115}In	$6*10^{14}$
^{123}Te	$1.2*10^{13}$
^{138}La	$1.12*10^{11}$
^{142}Ce	$5*10^{16}$
^{144}Nd	$2.4*10^{15}$
^{147}Sm	$1.05*10^{11}$
^{156}Dy	$1*10^{18}$

^{174} Hf	$2*10^{15}$
^{176} Lu	$2.2*10^{10}$
^{180}Ta	$1*10^{22}$
^{187} Re	$4.3*10^{10}$
^{190} Pt	$6.9*10^{11}$
^{32}P	14 days
^{36}S	88 days
^{10}Be	$1.6*10^{6}$

B. Technologically enhanced natural radiation: The technological practices are also contribute to the prevailing natural background radiation level in environment from industries like phosphate, coal electric power plants nuclear power plants, and consumer products such as radio-luminous products, electronic and electric device, smoke detectors, ceramics glassware etc.(UNSCEAR1988).

C. Sources of artificial radionuclide's: The use of radioisotopes in medicines, nuclear weapons test . More than 200 different nuclides used in these artificial sources which significantly contribute the back ground radiation level in the environment.

D. Chemical separation: The process involves the removal of the radionuclides by anion and cation exchange, solvent extraction, extraction chromatography co-precipitation and distillation.

E. Counting phenomenon: It shall take by high resolution gamma spectrometry,alpha spectrometry beta counting system etc.

F. Impact of background radiation: It has primary as well as secondary effects like effects on food components,(carbohydrates, proteins and lipids)and(Eakins, 1984) by phenomenon of radappertization, radicidation and radurization besides with delay of senescence, maturation and ripening in fruits and vegetables and contamination with pollutant (Anon.,1987).

Environmental impact assessment interface with background radiation is need of hour so the comprehensive approach in this field is require grab and composite collection of samples over period of time, by refinement of techniques for measuring impacts, quantification of impacts and developed more application to achieve the goal of sustainable development.

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