APPLICATION OF RADIATIONS AND RADIOISOTOPES IN IMPROVING THE QUALITY OF HUMAN LIFE

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The discovery of radioactivity and the subsequent development of the nuclear reactors and accelerators have opened up the floodgate for production of varieties of artificial radioisotopes of different elements and as of today, more than 2500 artificially produced radioisotopes are available. Nuclear scientists and technologists have heralded the peaceful applications of radiations and radioisotopes as powerful tools in diverse fields like medical, industrial, agricultural, environmental and chemical research for the benefit of mankind. The choice of a particular radiation or a radioisotopic source for its beneficial application is always guided by its characteristic nuclear properties, intensity, availability and compatibility with the system under investigation. For example, in health care, high intensity radioactive sources are utilized in teletherapy unit, particularly, for treatment of cancer, and medium level sources are used in brachytherapy and diagnostic purposes. In industry, radiation sources from medium to high level activities are applied for radiation processing, non-destructive testing, nucleonic probes, etc. Utilization of high energy radioisotopic sources or accelerators in medical sterilization, food irradiation and decontamination of waste-waters and sewages are of great commercial importance. Radiation helps in conversion of the gaseous pollutants in fossil fuel emissions from power plants to agricultural fertilizers. Production of more and more artificial radioisotopes for peaceful applications in newer areas is an ongoing process and the present article primarily deals with the beneficial applications of radiations and radioisotopes in some important non-power fields in improving the quality of human life with minimum acceptable risks.