RADIOPROTECTION PROBLEMS FOUND IN NUCLEAR MEDICINE

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[**Introduction**] In nuclear medicine the main objective of the radioprotection controls is to protect three people groups from external and internal radiation. To obtain this goal, the dose limitation system has to be followed firmly and for that, basic procedures have to be introduced. These basic procedures are the result of several activities which have to be balanced one each other to be effective.

[**Materials and Methods**] The aims of radioprotection are to ensure that people are not exposed to doses large enough to cause acute radiation and to limit the doses of radiation. This is achieved by the use of shielding, containment, careful design and operating and administrative procedures.

[**Results**] This paper presents small list of general radioprotection problems found in nuclear medicine and it establishes some rules related to the job schedule and control measures to be followed in favor of safety. By considering the general radioprotection problems a number of factors of substantial relevance in the control of external and internal doses can be deduced and emphasis is put on for: work with radioactive materials should be concentrated on a limited number of works rooms; good radioactive materials inventory are essential because of the potentially large diversity of materials and users; storage of radioactive materials should be concentrated into limited shielded sites; access control is important to minimize staff doses and to ensure that the public is not unnecessary exposed; appropriate monitoring equipment should be available within each working site.

[**Conclusion**] Line management commitment with safety led to a heightened awareness of those control measures which encouraged individuals to review and improve their own work rules. Investment in training programme, plant modification and written procedures provides the necessary resource to support the dose reduction initiatives.

GAMMA SPECTROMETRIC ANALYSIS OF TOBACCO

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Introduction: The potential carcinogenesis and other biologically harmful effects of radiation exposure necessitate the measurement of radioactivity in substances humans are exposed to, particularly those which they internalize, such as tobacco.

Materials and Methods: A number of commercially available brands of cigarettes were arbitrarily picked for this study. Tobacco was taken from the cigarettes and each brand sample was placed in a plastic petri dish having a wall thickness of 2.0 mm. All tobacco samples were maintained in a hermetically sealed environment by securing the petri dishes with non-porous plastic tape. Gamma photon detection was performed using an Ortec EG & G HP Ge detector cooled to -196 °C (counting time = 44 hours). The counting efficiency of this instrument was calibrated against a mixed radionuclide Marinelli standard. Gamma spectrographic plots were obtained for all of the samples. One of these samples was selected to show changes in the radioactive contents of tobacco over time.

Results: Spectrographs of various tobacco brands indicated counts related to the same discrete energy peaks as those of ^{238}U, ^{214}Pb, ^{214}Bi and ^{40}K among others. Photons having an energy of 511 keV were also detected, suggesting the presence of a positron emitter. Variations in certain peak heights over time for one of the samples indicated radioactive processes in progress; the total activity of this sample (mass = 22.0 g) varied between 547 Bq (14.78 nCi) and 842 Bq (22.76 nCi) over a period of five months.

Conclusions: The presence of radioactive substances in tobacco raises questions related to their epidemiological significance in individuals who are chronic abusers of tobacco products. The age of tobacco may be a factor in determining the amount of radiation dose smokers receive, and may also indicate an optimal time window for minimizing radiation exposure through smoke inhalation.