

[02/09/03 - Poster]

**Study of neutron-DNA interaction at the BNCT Research facility at IPEN.**MARITZA RODRIGEZ GUAL, OSCAR RODRIGUEZ HOYOS, FERNANDO GUZMAN MARTINEZ, AIRTON DEPPMAN,  
J. D. T ARRUDA NETO, V. P. LIKHACHEV, PAULO R. PINTO ~~CELIA~~

Our group at the Laboratório do Acelerador Linear (IFUSP- USP) is currently developing several studies related to the interaction of different kinds of radiation with DNA. Initially, our plan is to study the interactions proton-DNA, gamma-DNA and neutron-DNA. In this work we describe the most important features of the neutron-DNA study, which we plan to perform by selecting thermic, epithermic and fast neutrons. To improve the information about radiation-DNA interaction is important in order to achieve more secure and efficient cancer treatments by using radiation therapy. Nowadays, one important technique is the boron neutrons capture therapy, where neutrons are used to initiate a nuclear reaction at the tumor site. The effects of the neutrons on the health tissue, however, must be better understood. The study of neutron-DNA interaction, in this scenario, is of great importance. The research facility for Boron Neutron Capture Therapy (BNCT) in the IEA-R1 Reactor of the IPEN-CNEN/SP will be used for studying the neutron-induced DNA damage. At present, we are evaluating the characteristics of the neutron flux at the biological sample, and we are carrying out simulations of the experimental procedure through Monte Carlo N- particle transport code system version 4C (MCNP-4C) to find the experimental conditions necessary to minimize such contamination, and also investigate possible experiments to verify the effects of those gamma's on the DNA molecule. The first step is the selection of filters and moderator configurations, which will allow us to irradiate the DNA sample with thermic, epithermic and fast neutrons. We present the results of our simulations, and describe the experimental setup show the best sets of materials necessary to obtain neutron spectra for different neutrons energies.

[02/09/03 - Poster]

**Development and testing of a Radon chamber for plastic detectors calibration**

ALMY A. R. DA SILVA, ELISABETH M. YOSHIMURA

A calibration system for radon and radon progeny concentration in the air was developed in Laboratório de Dosimetria (IFUSP). The aim is to make possible the assessment of the exposure of general public to these contaminants in the atmosphere of dwellings and workplaces. A radon chamber was mounted in order to provide the controlled irradiation of plastic detectors (LR115 and CR39 solid state nuclear track detectors). The factors affecting the calibration process for radon monitors or sources, such as a good sealing, low ventilation conditions, radon and radon progeny homogeneity or radon progeny plate-out were taken into account in the chamber design. The chamber has a cylindrical form with stainless steel walls and with approximately  $0.8 \text{ m}^3$  of internal volume to avoid the influence of the plate-out effect in the homogeneity of radon progeny in the center of the chamber. A small glass port of  $15 \times 15 \text{ cm}^2$  in the upper part of the chamber avoids critical losses of radon gas when monitors are placed inside or withdrawn from the chamber. A dry Ra-226 source (Model 2000A - Pylon Electronics) with an activity of 96.6 (3.9) kBq and a controlled aperture gives rise to a production of 12.6 Bq/min of Rn-222. Arrangements of opening and closing procedures of the radium source permit a variety of radon gas concentrations in the internal volume. The verification of radon and radon progeny homogeneity, gas leakage, gas activity calibration and absence of ventilation inside the chamber were evaluated giving good results.

[02/09/03 - Poster]

**High Dose Dosimetry on Radiation Processing at  $^{60}\text{Co}$  gamma field**

CELIA MARINA NAPOLITANO, ALAN ANATOLY DE SOUZA CORRÊA

The processes induced by ionizing radiation, such as food preservation and disinfestation, sterilization of health care products, tissues sterilization for surgical implants, gems inducing color, polymers modification, and others, at  $^{60}\text{Co}$  gamma ray irradiation facilities of the Center of Radiation Technology (CTR) at Institute for Energetic and Nuclear Research (IPEN), generate products and services for customers of the industry, agriculture, medicine, radiobiology and environmental.

In radiation processing, the essential quantity is *Radiation Absorbed Dose*, therefore, a well characterized reliable dosimetry system that is traceable to recognized national and international dosimetry standards is the key element of such activities. The dosimetry procedures for radiation processing in our Laboratory of High Dose Dosimetry are carried out in agreement with the ASTM (American Society Testing and Materials) standard guides and practices. To check on the entire dose measurement system, i.e., dosimeters, measurement equipment, procedures for the use of the system, data transfer procedure and to establish a reliable dosimetry system we have participated of the intercomparisons of gamma dose measures among International Dose Assurance Service (IDAS) offered by the IAEA (International Agency Energy Atomic).

This work shows the results of several materials used to measure the dose absorbed and the dose distribution, and to control the routine radiation process. Fricke solution as reference standard dosimetry system, Alanina