

## DOSIMETRY OF ELECTRON AND GAMMA RADIATION WITH DL-ALANINE

Zelia M. Costa and Leticia L. Campos (Instituto de Pesquisas Energeticas e Nucleares - CNEN/SP, Caixa Postal 11049 - CEP 05422 - 907 -Sao Paulo, SP - BRAZIL)

Alanine is a simple aminoacid, on irradiation at room temperature, predominantly free paramagnetic radicals of the type  $\text{CH}_3\text{-CH-COOH}$  are produced, which can be measured quantitatively using ESR. This paper reports the application of powder DL-alanine/ESR dosimeter for measurement of the absorbed dose of  $^{60}\text{Co}$  gamma rays and electron beams. The sample preparation details are described, as well as the analysis of the ESR signal to dose, the energy response, the influence of dose rate and effect of the ambient conditions on the fading of the ESR signal. The irradiations were performed using a panoramic  $^{60}\text{Co}$  gamma ray source and electrons emitted from an accelerator for industrial purposes. The ESR spectra was measured at room temperature using JES-ME-3X ESR spectrometer with cylindrical  $\text{TE}_{011}$  mode cavity (Jeol) operating at a frequency of 9400 MHz (X). The ESR spectra was recorded as the first derivative of the paramagnetic absorption spectra where the response of the alanine was expressed as the maximum peak to peak amplitude of the ESR spectra and measurements taken at different days were normalized using a  $\text{Mn}^{2+}$  reference sample. The same signal-dose relationship was obtained for both gamma rays (1.25 MeV) and electron beams (1.14MeV) and no dependence of the response on dose rate has been found in the range from 0.21 to 1.16 kGy/h. In the dose range of  $10^2$  to  $10^5$  Gy, the dose response showed a linear relationship and the precision was less than 2%. The obtained results give useful information on the care necessary to obtain the needed overall accuracy in the determination of absorbed does.

Work partially supported by CNPq - Conselho Nacional de Desenvolvimento Científico e Tecnológico, Brazil

*Abstract*