TRANSFER COEFFICIENTS OF ^{210}Po FROM LIVESTOCK FEED TO MEAT AND EGGS

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Rock phosphate is generally used as a source of phosphorus for livestock feed supplements. The occurrence of uranium and its daughters in rock phosphate is well known [1,2]. In Israel dicalcium phosphate (DCP) is added to chicken feed (1.5-2% by weight) and turkey feed (3-4%). Relative to phosphate rock DCP is depleted in ^{226}Ra and its daughters (e.g. ^{210}Pb, ^{210}Po) and enriched in uranium [1].

Some of the radioactivity in the DCP is expected to be retained in chicken meat and eggs. To assess the radiation dose to consumers due to the consumption of these foods, a study is being carried out to establish the transfer coefficients of ^{238}U, ^{226}Ra, ^{210}Pb and ^{210}Po from chicken feed to meat and eggs. The transfer coefficient (TC) is defined [3] as the ratio between the concentration of radioactivity (pCi/kg) in meat and eggs and the amount of activity fed to the chicken in one day (pCi/day) for prolonged feeding.

Samples of chicken and turkey feed preparations, as well as the meat and eggs of chickens fed with these feed preparations, were collected and analyzed for ^{210}Po. Preliminary results are 14.7 ± 5.0 pCi/kg ^{210}Po for feed preparations and 2.9 ± 1.4 pCi/kg for chicken meat.

Assuming a daily intake of 0.13 ± 0.03 kg feed per day in the 30 days before slaughter, then TC for Po as defined above is in the range of 1.5 ± 1.0 day/kg. ^{210}Po concentrations in beef in the range of 1.3-3.9 pCi/kg have been reported in Germany and Russia [4,5].

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DOSIMETRY OF PLANT TISSUES

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Dose distribution patterns in gamma irradiated plant materials (potato tuber, eggplant, wheat grains, and pollen) were measured with a TLD (thermoluminescence dosimeter) inserted at different intervals in the tissues. Calculated ($e^{-(\mu/\rho)\rho x}$) and measured (D/D_0) attenuation factors were dissimilar, the measured values being higher than the calculated values. Multiplication of the calculated attenuation factors by an estimated B, (dose build-up factor [1,2]), resulted in values which were similar to the measured ones especially at 4 to 6 cm thickness. Division of the measured attenuation factor by B, results in a tissue-specific attenuation factor free from the effect of B. From this factor, mass attenuation coefficients (μ/ρ) were extracted and found to be similar to those determined from the effective Z [3]. A good correlation was found between the tissue-specific attenuation factors and the density of the tissues.

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RADIATION INDUCED ORGANOGENESIS IN TOBACCO CALLUS: DETERMINATION TIME AND ENERGY IN LIGHT, DARKNESS AND UNDER THE EFFECT OF RADIATION [1]

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Organogenesis in tobacco callus in light, or in darkness combined with the effect of gamma radiation, differs in two main aspects: (a) the determination time, under the light-dark regime is about 14 days, and under the effect of radiation about 20 days; (b) in light, buds appear on the tobacco callus after about 4 weeks, and under gamma radiation after 5 to 6 weeks. The amount of applied gamma energy effective in organogenesis is apparently much smaller than the effective light energy. However, the penetrating gamma radiation interacts with many layers along its path, whereas light interacts only with a thin surface layer. Therefore, the total number of interactions per unit volume due to the two types of radiation is much closer than is apparent from dose calculations.

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