GEANT4 MONTE CARLO CALCULATED DOSIMETRY PARAMETERS FOR ^{169}Yb

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Monte Carlo simulation widespread also was included into practice of calculations of dosimetric characteristics of brachytherapy sources. Thus the problems connected with dosimetry in areas with high gradients of a dose, accuracy of positioning of dosimeters and accuracy of definition of their active volume act in film. The considerable quantity of various program codes was applied to tabulation of data according to formalism AAPM TG-43 in the scientific literature, including EGSnrc, GEANT4, PENELOPE, PTRAN and MCNP4C. The purpose of the present work is definition of dosimetric characteristics of a new source on a basis radionuclide ^{169}Yb, developed Open Company «Medical sterilising systems», by means of program code GEANT4.9.6. Verification of the given version of a program code performed by literary data for well-known sources BEBIG Co0.A86 and BEBIG Ir2.A85-2.

Value of a dose-rate constant for source BEBIG Co0.A86, received in the present work, makes 1.102±0.018 cGy/(hU), and for source Ir2.A85-2-1.114±0.019 cGy/(hU). Results of calculations by means of software package GEANT4.0 executed Granero [1, 2] for the same sources make values 1.087±0.011 cGy/(hU) and 1.109±0.013 cGy/(hU). Results coincide within an error, and divergences can be caused difference in spectra of radioisotopes and versions of a program code.

Values of radial dose functions of investigated sources fit a polynom of the third degree for a source ^{60}Co and polynoms of the fifth degree for other sources. Deviations of the points received by modelling, from the values received at calculations on fitting function in all cases do not exceed ±2 %. Angular distribution of studied sources rather similar, in a case ^{169}Yb more strongly pronounced dose recession under corners close to 0° and 180°.

Sources ^{169}Yb are preferable in the event that the basic part of a tumour settles down on removal from a capsule, dose loading thus decreases for fabrics located for a tumour.

1. D.Granero, J.Perez-Calatayud, F.Ballester // Med. Phys. 2007. V.34 (9). P.3485.
2. D.Granero, J.Perez-Calatayud, F.Ballester // Med. Phys. 2008. V.35. P.1280.