

STUDYING THE DOSE LOAD ON THE RESPIRATORY SYSTEM FROM HEAVY NATURAL RADIONUCLIDES DURING TOBACCO SMOKING

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According to the ICRP (publications No. 50 and No. 65), radon and its decay products (Rn-DP) contribute more than 50% to the total radiation background. In Kazakhstan, cancer incidence rates remain among the highest among the CIS countries [1-2] and 28831 new cases were detected in 2020 [3]. Currently, it has been proven that the main cause of lung cancer is smoking [4]. However, despite the fact that the first place as a cause of lung cancer is occupied by tobacco smoking, the second place is occupied by the inhalation of radon and Rn-DP. Toxic chemicals in tobacco smoke are one reason why cigarettes cause cancer, but radioactive heavy elements also play a significant role in them. They accumulate in tobacco leaves at the time of their vegetation due to absorption from the soil and air, and the rate of absorption depends on the pH of the soil. The decay product of radon, Pb-210, plays an important role in human radiation exposure, since it has a long residence time in the body [5]. This contributes to an increase in the dose of internal radiation and increases risk of lung cancer. For this reason, conducting studies on the quantitative assessment of the concentration of natural beta-radionuclides in the lungs due to smoking as one of the causes of the carcinogenic effect is an urgent task. In this work, the authors performed a quantitative assessment of the concentration of natural beta-radionuclides in six samples of the most popular tobacco products in the Kazakhstan. The beta activity concentrations of the samples were measured by beta spectrometry using a scintillation detector. The results of the preliminary analysis of this work show that the lower threshold for the activity of beta-radionuclides in the tobacco of one cigarette is 60 mBq. A person who smokes one pack a day (20 cigarettes) inhales an average of 120 mBq. The annual effective doses were calculated based on the intake of Pb-210, as having the greatest danger among other beta radionuclides, and amounted to 39 μ Sv/year for a person who smokes one pack per day. This research is funded by the Science Committee of the Ministry of Education and Science of the Republic of Kazakhstan (Grant No. AP09058404).

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The speaker is a student or young scientist

No

Section

1. Nuclear technology and methods in medicine, radioecology

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