



Contribution ID: 6

Type: poster preferred

ACCUMULATION OF RADIONUCLIDES IN VEGETABLE SOME CROPS IN ZONES OF THE ARMENIAN NPP

Wednesday, 17 October 2012 16:00 (1 minute)

Artificial radionuclides (RN, ^{90}Sr - $T_{1/2}=28.6$ years, ^{137}Cs - $T_{1/2}=30.1$ years) dangerous for health are released to ecosystems because of human influence in the field of nuclear energetics RN can penetrate into human organism through water-soil-plant chain. Armenian NPP (ANPP, opened in 1976, operated till 1989, reoperated in 1995) is in a densely populated area of the Ararat Valley with intensive agriculture. ANPP uses the water of the River Metsamor. Unbalance waters of the ANPP fall into the Metsamor River which is used for irrigation of the soils. Since 1996 we have carried out radiomonitoring researches in water- soil-plant ecosystems in zones of the ANPP with a radius of 2-15 km. The aim of the studies is to develop practical radioprotective activities for getting ecologically pure food.

The results of investigations have shown that the content of ^{90}Sr fluctuated between 2.2-8.8 Bq/kg and ^{137}Cs between 4.0-13.1 Bq/kg in vegetable crops (basil, celery, dill, parsley, lettuce, pepper, tomato, eggplant, marrow, cucumber, cabbage, potato, cauliflower) which were grown in gray soils and irrigated with the water of the Metsamor River. It is caused by joint influence of many factors, especially biological peculiarities of crops (vegetation duration, mineral nutrition, form of expansion of roots in the soil, watering regime, anatomical structure of leaves, their size etc.). We can conclude that RN penetrated into crops through irrigation water, soil as well as atmosphere. It also turned out that in soil-plant system the observed ratio ($OR=^{90}\text{Sr}/^{137}\text{Cs}$ in plant/ $^{90}\text{Sr}/^{137}\text{Cs}$ in soil) <1 for crops, that is, ^{137}Cs accumulated in the crops more than ^{90}Sr . The $OR>1$ and the absorption of ^{90}Sr exceeded ^{137}Cs for vegetable marrow and cucumber. Accumulation coefficient ($AC=\text{content of RN in the plant}/\text{content of RN in soil}$) $AC^{90}\text{Sr}>AC^{137}\text{Cs}$ 1,3 times for cucumber and $AC^{137}\text{Cs}>AC^{90}\text{Sr}$ 1.2 - 3.0 times for other crops. There is a positive strong comparative connection between OR and $AC^{90}\text{Sr}$ for vegetable crops (correlation coefficient is $r=0.81\pm 0.14$) and there is negative weak comparative connection between OR and $AC^{137}\text{Cs}$ ($r=-0.30\pm 0.23$). RN content in crops hasn't increased during 2002-2011 and doesn't exceed the MACL. We can conclude that, ANPP doesn't have any radioecological danger for people who live in the Ararat Valley, as well as residents of neighboring regions.

The researches have been implemented since 2011 in the context of project 11-1f262 of Ministry of Science of RA.

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Session Classification: Poster Session 2

Track Classification: Radioecology