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ASSESSMENT OF ^{137}CS RADIOACTIVE CONTAMINATION OF WILD MEDICINAL PLANTS IN FORESTS OF ZHYTOMYR REGION

Due to radioactive contamination after the Chernobyl accident there is still a big amount of 137Cs which is accumulated by plants. Forests absorbed large amount of radionuclides and they still remain critical landscapes in terms of radioactive contamination. Many wild herbs that grow in the forests are used by local people for medical application. Long-term studies indicate that plants species have inherent specificity to accumulate radionuclides. That is why, each plant species in the territory with high density of soil radiation contamination can accumulate radionuclides in different manner. The accumulation of radionuclides by tree species is determined by many factors: the type of site conditions, characteristics of silvicultural plantations, peculiarities of radioactive contamination, radionuclides migration in forest ecosystems, biological characteristics of tree species.

The aim of our study was to evaluate the ^{137}Cs radioactive contamination of certain species of wild woody herbs. Due to the fact that the population of Zhytomyr region uses wild woody herbs for medicinal purposes, such prevailing in the region species as oak (Quercusrobur L.), buckthorn fragile (Frangulaalnus Mill.) and pine (Pinussylvestris L.) were selected as research objects. Bark samples of every tree species, as well as pine needles, were selected in the 6-fold repetition. Sample site is located within SE "Ovruch LH" in the 31st block of Borutynske forestry. Studies were conducted in 2016 in fresh pine forests (B_2) at a density of soil radioactive contamination of 130 kBq / m^2 (3.5 Ci / km^2). Measuring ^{137}Cs specific activity in samples was carried out in modern ZSTU Radioecology Laboratory with Gamma spectrometer GDM-10 20 PLUS.

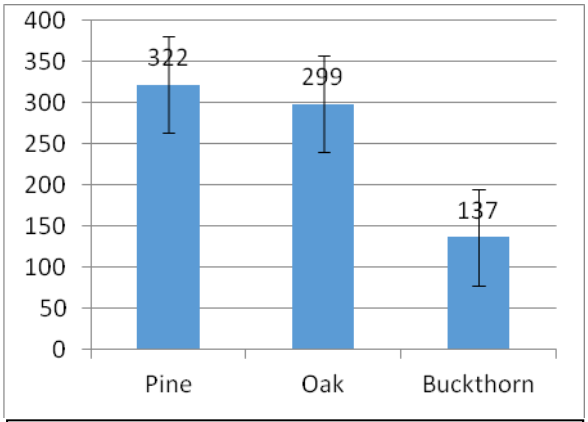

Figure 1 Concentration of ^{137}Cs in bark of various species of medicinal trees, Bk / kg/

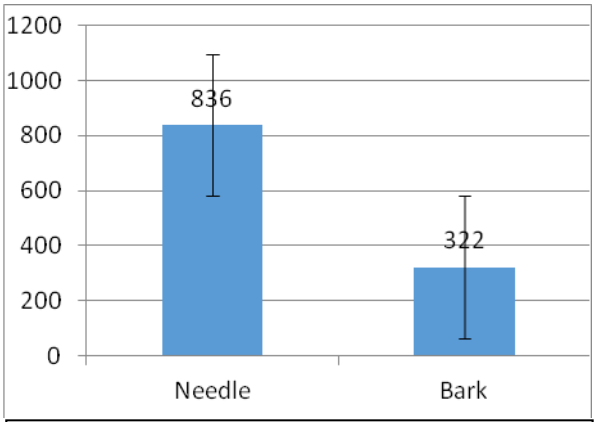

Figure 2 Concentrations of ^{137}Cs in bark and pine needles, Bk / kg.

Figure 1 shows the average ^{137}Cs specific activity in three selected species of wild medicinal trees. Pine bark is characterized by the largest quantities of 137Cs specific activity among investigated medicinal tree species - 137.4 ± 322 Bq / kg, which is not much more than 299 oak bark ± 51,8Bk / kg. Buckthorn bark was the least polluted -

137Cs137 ± 21,7Bk/kg, which is 2.5 times lower than the concentration of radionuclides in the bark of pine and 2 times less than in the bark of oak. Figure 2 shows a comparison of ^{137}Cs specific activity in the bark and needles of pine. Figure 2 shows the average ^{137}Cs specific activity in needles - 836 ± 262,1 Bq / kg, which is 2.6 times more than ^{137}Cs contamination in the bark - 137.4 ± 322 Bq / kg. Data analysis shows features of ^{137}Cs accumulation by different organs and tissues of woody plants. That maximum ^{137}Cs accumulation is observed in needles – photosynthetic organs of pine which are characterized by 2-3 times higher content of ^{137}Cs than in a bark pine.

Comparing obtaining ^{137}Cs specific activity with normative values, we can see that the excess of permissible levels of ^{137}Cs radioactive contamination is observed only in pine needles (^{137}Cs am not> 500Bk / kg). The average ^{137}Cs concentration in needles exceeds the standard value by 0.5 times; in some samples of pine needles ^{137}Cs concentration values exceed allowable standard value by 3 times. In general, the conclusion can be drawn that oak bark (^{137}Cs am not> 600 Bq / kg), buckthorn (^{137}Cs am not> 600 Bq / kg) and pine (^{137}Cs am not> 500Bk/kg) can be used as a medicinal plants. Storage and use of needles is advisable to prohibit or restrict with the obligatory radiological control. These recommendations should be used taking into account contamination density 3,5 Ci/km^2 and the type of forest vegetation conditions B_2.

REFERENCES

1. Краснов В. П., Орлов О. О., Бузин В. О., Ландін В. П., Шелест З. М. Прикладная радиоэкология леса. Монография / Под ред. д. с.-х. н., проф. В. П. Краснова. – Житомир: «Полисся», 2007.

2. Рекомендации по ведению лесного хозяйства в условиях радиоактивного загрязнения / Под ред. В. П. Краснова. – К.: Аграрна наука, 1995.