Table 1 General soil properties

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RADIOACTIVITY OF FUNGI IN SCHIST-TYPE SOIL IN THE STARA PLANINA MOUNTAIN ECOSYSTEM

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➢In the region of the Stara Planina were indentified four main soil types as fungi substrates. Here will be presented results for schist type soil.

Samples of various fungi species (stipes and cups) are collected in summer season 2019 and analyzed for ^{40}K, ^{226}Ra, ^{232}Th, ^{238}U, ^{235}U, ^{210}Pb and ^{137}Cs contents :

➢Wild edible fungi

Phallus impudicus, Cantharellus cibarius, Boletus edulis, Russula cyanoxantha , Leccinium carpini (griseum), Craterellus cornucopioides

➢Wild non-edible fungi

➢*Trametes versicolor, Trametes gibbosa,*
➢ *Russula solaris* , Russula mix ,
➢Lactarius mix,Boletus mix,
➢*Megacollybia plathyphylla, Cyathus striatus,*
➢ *Polyporus leptocephalus,*
➢ *Stereum insignitum, Stereum hirsutum,*
➢ *Diatrype sp., Polyporaceae mix,*
➢*Russula nigricans , Xylaria longipes,*
➢*Trametes multicolour, Agaricales mix.*

❑Primordial radioactivity of rock and soil material in mountain ecosystems migrate and fractionate in other environmental sections like waters, air and biota. Having a feature to accumulate different minerals and trace element fungi indicates processes and composition of their substrates.

❑The aim of this study is uptake of radionuclides by fungi in the schist soil of the Stara Planina, well known for biodiversity as well as for enhanced natural radioactivity areas.

❑Four main soil typed have been identified as fungi substrates in the investigated area of Stara Planina. Pedological characterisation of the schist type soil has shown the coarse fragments, sand, silt and clay with organic carbon content 3.10% and pH-values in the range 4.80-5.33.

❑The coarse grains and low pH values are not supportive for fungal growth, although the acidic medium make radionuclides more mobile in this soil type. Fungi species with good accumulation ability in this conditions can be very suitable for phyto-remediation of the contaminated arid environments.

❑Dried fungi samples were analysed by gamma spectrometry (HPGe,) showing following naturally occuring radionuclides (^{40}K, ^{226}Ra, ^{232}Th and ^{238}U and ^{210}Pb) contents in wide range of concentrations with maximum values (in Bq/kg): 1850, 46, 36, 42 and 160 respectively. The manmade ^{137}Cs content varied from 2-20 Bq/kg.

❑Radionuclides contents in fungi samples collected in the Stara Planina region are within average values for the forest systems, while the ^{210}Pb has concentration levels higher than can be expected from the uranium in investigated soil thus indicating another source existence.

❑Slight difference in radionuclide contents observed for species with mycorrhizal and saprobic types of nutrition indicates fungus specie physiology and structure as dominantly responsible for radionuclides uptake in compare with nutrition type significance.

❑The local population habits in use of edible fungi species would enable effective dose assessment for the representatives of the public in the Stara Planina mountain ecosystem.

Table 1 General properties of the schist type soil in the Stara Planina ecosystem

Schist soil (Stara Planina)								
Coarse	Sand			Silt	Clay	pH		Soil
frag-ments	2-0.2 mm	0.2-0.02 mm	2-0.02 mm	0.02-0.002 mm	<0.002 mm	H_2O	KCl	organic C
	%							
67.5	38.4	24.7	63.1	26.5	10.4	5.33	4.80	3.10

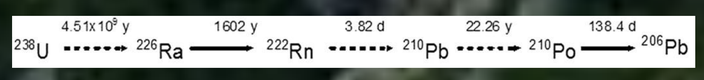
Table 2. Radionuclide content (Bq/kg) in the soil (S1) and typical fungi samples (F1, F2, F3)

	A(Bq/kg)			
Radio-nuclide	S1	F1	F2	F3
^{226}Ra	27+/-2	39+/-5	34+/-4	<5
^{232}Th	26+/-2	<4	<5	<3
^{238}U	32+/-4	<20	<2	38+/-13
^{210}Pb	63+/-6	<50	160+/-40	110+/-30
^{40}K	500+/-30	1150+/-80	830+/-60	1850+/-120
^{137}Cs	19+/-1	20+/-2	<30	17+/-2

Primordial ^{40}K in fungi is not correlated with soil contents due to its biological origin.

Artificial ^{137}Cs, coming from the Chernobil fallout, has relatively low levels in compare with other reported values for forest systems.

Obtained ^{238}U decay series radionuclides in studied species have not enhanced values except the ^{210}Pb contents. Production of the ^{210}Pb through the ^{238}U decay series is briefly presented, with dush lines for one or several intermediate radionuclides:



So, in addition to the ^{238}U series in soil, the ^{210}Pb may originate from the atmosphere as being the gasoues ^{222}Rn daughter, mostly attached to the aerosol particles and deposited on the leaves and other organisms by sedimentation processes.

Fungi species known as radiophite such as Cladosporium sphaerospermum, Wangiella dermatitidis and Cryptococcus neoformans, have not been observed and sampled in the studied region of the Stara Planina

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