Determination of several metals in the soil of Imereti region village Sviri as well as the Phytolacca americana plant roots grown in this soil with microwave plasma atomic emission spectrometry

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The presence of heavy metals in soil causes its subsequent decline in quality as well as the changes in the physical system, while simultaneously harming the living organisms. Heavy metals can be present in soil due to various reasons, and from there they can get accumulated in plants. The main goal of our study was to determine the concentration of several metals (Cd, Pb, Zn, Cu, Ni, Co, Mn, Ba, Al) in the soils alongside of river Kvirila in village Sviri of Imereti region. Particularly, the Sviri soils as well as Phytolacca Americana plant roots grown in this area were analyzed with the use of microwave plasma atomic emission spectrometry.

We compared our results to the maximal permissible concentration values. The content of Pb, Zn, Cu and Ba is within the permissible range in case of both Phytolacca Americana samples. However, concentration of Ni, Co, Cd and Al exceed the permissible range. These values are out of range in case of one Phytolacca Americana sample, №7 in particular. Concentration of Cd, Zn, Ba and Mn, except for sample №5, are higher than permitted concentrations. Co and Cu fall within the range. Ni is exceeding the permissible concentration in two samples only (2.4) and Pb is present in excess amount in the sample №5.

The upper green part of Phytolacca americana is considered to be a bio-accumulator of manganese and is recommended for bioremediation of soils contaminated with this metal. It is interesting that the content of manganese in the roots of this plant does not exceed its content in the soils where the plant was grown.

Content (mg/kg) of selected metals in the soils of village Sviri in Imereti region and in Phytolacca Americana plant roots grown on these soils by MP-AES

№	Soil, plant	Cd	Pb	Zn	Cu	Ni	Co	Ba	Mn	Al
1	Station sviri near the river Mkvirila (appproximately 30m)	**10.0**	-	**560**	20	**60**	490	**2330**	**23980**	26940
2	Station Sviri maximally dislocated from the river Mkvirila	**10.0**	-	**520**	30.0	120	460	**2480**	**39890**	26840
3	Station Sviri in the base of Pitolaca American	**10.0**	-	**730**	30.0	60.0	450	**1760**	**17380**	35620
4	Station Sviri approximately 15m away from Pitolaca American	**30.0**	20	**960**	30.0	**100**	500	**2910**	**24080**	33210
5	20 hectares in the area of the river Cholaburi	**20.0**	**50**	**870**	20.0	20.0	460	220	**1590**	31110
Maximal Permissible Concentration in Soils		**2**	**30**	**100**	**55**	**85**	**1000**	**1500**	**1500**	
6	Pitolaca root (surface, crust)	**1.0**	3.33	46.67	4.33	**3.0**	**12.0**	38.0	87.67	**96.69**
7	Pitolaca root (middle section)	**1.33**	1.67	**64**	9.66	**3.0**	**9.33**	76.0	**541.33**	**1635**
Maximal Permissible Concentration in Plants		**0.3**	**10**	**50**	**150**	**1.5**	**0.5**	**200**	**200**	**3**

References:

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