

# ACCUMULATION OF HEAVY METALS IN NATIVE PLANTS GROWING ON A CONTAMINATED OCNA DE FIER SITE (ROMANIA)

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MATERIALS AND METHODS



Plants and the associated soil samples were collected in vicinity of Danila Lake, in vicinity of Moravita river and from the refuse dump of Ursoanea mine from Ocna de Fier.. The six species of native plants (*Dactylis glomerata* L., *Dryopteris filix-mas* (L.) Schott., *Crepis* sp., *Equisetum arvense* L., *Tussilago farfara* L. *Cynodon dactylon* L..) were collected, as well as the soil below the plants (top 0-20 cm soil layer). Soil sample preparation was done in accordance with ISO 11464/98, whereas the determination of Cu, Pb Zn and Fe followed the ISO 11047/99 method. The plants sampling was done in accordance with the methodology described in STAS 9597/1-74. Plant and soil extracts analysis was done using a Varian Spectra AAS (atomic absorption spectrophotometer) at the National Institute of Research and Development for Industrial Ecology Timișoara laboratories. Concentration of metals in soil was correlated with their concentration in plant. One parameter named the Bioconcentration Factor (BCF) was calculated:  $BCF = \text{metal concentration ratio of plant (Leaves + steam) to soil}$ . This parameter is very important to estimate a plant's potential for phytoremediation purpose [4].



## RESULTS

The concentration of metal in the soils and plants of the mining area is significantly different from the concentrations of the same elements in the soils and plants of the control ones.

Table 1. Copper concentrations in topsoil and plant samples (mg kg<sup>-1</sup>) from the Ocna de Fier site, Romania

Site	Sampling points	Species	Leaves + steam	Topsoil	Bioconcentration factor (BCF)
Danila Lake (DL)	1 DL (control)	<i>Dactylis glomerata</i> L.	16.1	79,6	0.20
Moravita River (MR)	2 MR	<i>Dryopteris filix-mas</i> (L.) Schott.	15.0	33,0	0.45
Ursoanea Mare Stream (UMS) where is situate Waste Mining Dump	3 UMS	<i>Crepis</i> sp.	58.8	534.6	0.10
		<i>Equisetum arvense</i> L	82.29	741,1	0.11
		<i>Tussilago farfara</i> L.	82.89	66,5	1.23
	4 UMS	<i>Cynodon dactylon</i> (L.) Pers	222.7	385.5	0.57
		<i>Equisetum arvense</i> L.	12.62	375.1	0.03
		<i>Tussilago farfara</i> L.	50.67	388,5	0.13
5 UMS	<i>Equisetum arvense</i> L.	87.41	867.3	0.10	
	<i>Tussilago farfara</i> L.	27.78	845.4	0.03	

## CONCLUSIONS

The geochemical investigation has shown that the soil, in slopes of Ursoanea Mare Stream is contaminated by Pb, Cu, Zn and Fe, due to the location of mining wastes in this area and of wind. The analysis of plants has shown that the species collected in the vicinity of Waste Mining Dump are contaminated with Pb, Cu, Zn and Fe. Among the 36 plant samples of 6 plant species, no plant species were identified as metal hyperaccumulators. However, 2 plants had BCF greater than one. *Tussilago farfara* (site UMS) were most efficient in taking up Cu and *Dactylis glomerata* (site DL) in taking up Zn. The phytoremediation potential of these plant species, needs to be investigated.

## Acknowledgements

The authors would like to thank the students Carmen Secuianu and Dana Elena Mititelu for their contributions in the field. This paper was prepared within Romania-Republic of Serbia IPA Cross-border Cooperation Programme, within project MIS-ETC Code 464 and Subsidy contract from IPA No 8518.

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