

INFLUENCE OF INORGANIC AMENDMENTS ON TRACE METAL EXTRACTABLE CONTENTS IN URBAN SOILS

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Urban soils in medium size and big cities, have shown in many cases (Madrid et al. 2002) high contents of some trace metals, for example lead, copper, or zinc, due to traffic, industry, etc (Bullock and Gregory, 1991). The presence of these metals at high concentrations in the soils of green areas, mainly recreational areas, is a potential source of dangerous elements for human health. For that reason, the availability of these contaminant elements is an essential control parameter, because it is related to plant uptake, and to their transfer to humans via suspended dust or by direct contact, specially by small childrens. The addition of amendments to the soil is a reasonable technique to reduce the availability of trace metals. The relationship between trace metals and different inorganic amendments was studied.

Four urban soils of green areas of Sevilla (Table 1), with relatively high lead contents, were amended in the laboratory with four inorganic materials for each soil (acid zeolite (AZ), sodium zeolite (SZ), slovakite[®] (SL) and apatite (AP)), at two doses (1% and 5% w/w). A Control treatment for each soil with no amendment addition was prepared. Experiments were carried out in triplicate. The mixtures were homogenized carefully, and initial properties (pH, aqua regia and EDTA extractable metals) were measured. Water was added (48%), and the mixtures soil-amendment were incubated in 0.5 litre containers at room temperature. Moisture was checked every two weeks.

EDTA extractable metals and pH were determined periodically to study the effect of the amendments on the availability of the metals.

Table 1. pH and trace metal content of the 4 urban soils.

	SU-140		SU-141		SU-142		SU-143	
	EDTA	Aq. regia	EDTA	Aq. regia	EDTA	Aq. regia	EDTA	Aq. regia
Cu	34.6	168	40.5	138	30.5	143	26.7	78
Zn	41.2	184	58.1	245	37.2	209	15.8	130
Mn	32.1	344	46.0	482	22.8	364	45.2	368
Pb	98.1	332	123.7	665	74.3	411	108	340
Ni	1.6	26	1.4	27	1.4	27	1.5	26
Cr	2.1	34	1.8	32	1.7	32	1.9	32
pH	8.09		8.40		8.51		8.43	

An increase in pH was observed in the experiments with amendments SZ and SL, while AZ caused some acidification. The effect was more noticeable for the higher doses than the lower ones. AP did not show any effect on pH. Significant decreases in available metal contents were observed in some of the treatments. The effect of each amendment on metal availability was compared with the behaviour of the isolated minerals as adsorbent of metals from aqueous solutions of the latter.

REFERENCES

- Bullock P. and Gregory P.J.(Eds.) 1991. *Soils in the Urban Environment*. Blackwell, Oxford, UK.
- Madrid L., Díaz-Barrientos E. and Madrid F. 2002. Distribution of heavy metal contents of urban soils in parks of Seville. *Chemosphere* 49, 1301-1308.