RESEARCH ON LEAD CONTENT IN SENSITIVE SOIL USE IN THE TOWN OF BAIA MARE

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Abstract
The level of lead in soil and sediment is highly diversified, dependent on atmospheric deposition and accumulation of lead. Concentration usually fall, depending on the distance from the source of contamination, which can be represented by the combustion of leaded gasoline, factories, mines or industrial processing points Galen, lead-based paints, etc. Heavy metal atoms in the sample, withdraw the flame air - acetylene absorb specific wavelength radiation, the absorption is proportional to the concentration of metal ions. (Pb = 283.3 nm). Results of determining the minimum and maximum usage of lead in soil to use sensitive and less sensitive areas, and the frequency of exceeding the reference levels at the two sampling depths (AD1, AD2) are presented in the following material.

Key words: Sensitive soil-use, alert threshold, action threshold

INTRODUCTION

Among the contaminants in the soils of inhabited areas is the lead that the most significant health risks. In general, concentration of lead in contaminated soil is 32.200 ppm, while urban areas in 170 of 208 samples (82%) of lead content is over 500 ppm. Biocinetic model is recognized by the takeover and exposure that the ratio of soil and dust ingested is 45:55. From toxicological report of special importance in especially where animals can graze and ingest significant ground. Currently it is recommended to introduce a new evaluation methods children for lead exposure by analyzing dust on the hands children. Studies show that kindergartens and schools Lead exposure in children occurs most often by taking ground during the game. Soils containing more than 25 ppm (average resulted in slightly contaminated areas) are contaminated with lead from various sources (paint, leaded gasoline combustion, emissions from combustion waste) and is the source of exposure for humans and animals. A study in 1993 estimated daily taking the lead in all sources as 6 mg. For children under 6 years of this level health attributes on extreme-risk exposure. The study, conducted in 15 kindergartens by assessing the level of lead in dust on their hands 145 children shows that it increases to 1.73 mg lead before play in the yard to 3.75 mg after they have played in the yard. in cases where rocurile thwart party does not have lead to increasing soil is insignificant.

The level of lead in soil and sediment is highly diversified, dependent on atmospheric deposition and accumulation of lead. Concentration usually fall, depending on the distance from the source of contamination, which can be represented by the combustion of leaded gasoline, factories, mines or industrial processing points Galen, lead-based paints, etc. The sediment contains usually higher levels of lead than water surface. The average level of lead in river sediment is estimated at 20 000 mg / g and the sediment from the sea coast contains 100 000 mg / g. Studies show that lead levels in sediments is strictly influenced by submitting Atmospheric lead contamination that industrial sources. Lately, the focus is on induced Troubleshooting environmental contamination with heavy metals, given the consequences posed extreme. Conventional remediation methods are represented by solidification, soil washing and application of barrier membrane. Most of these procedures are extremely expensive especially affecting implementation environment, environment that is already affected by contamination. The new trend is the application of fitoremedierii, method of application is significantly lower price than traditional methods, being considered the "green revolution" in technology to eliminate the consequences of contamination environment. Phytoremediation is achieved by using plants pentm accumulation of metals from contaminated areas, as first described time in 1983. Currently is used to "cleanse" the 30 000 contaminated sites across the U.S.. Base is fitoremedierii represented by the structure of microbial contamination of the environment, taking into to the complex interactions of biological, physical and chemical environment contaminated target.

MATERIAL AND METHOD

Analysis of soil contamination with lead in Baia Mare depression consequence of mining and extraction, respectively processing of ferrous ores. Soils are from the Baia Mare predominantly acidic, strong debazeificate and a low phosphorus and potassium (ICPA-Lăcătuşu R. et al. - 1995).Results were obtained from measurements of concentrations of lead in soil samples in the laboratory of the Environmental Protection Agency Baia Mare, where after analysis of soil quality during the years 2004 - 2006, at a depth of: AD1. 0-5 cm; AD2. 20-30 cm, we obtained results that will be seen below.

Determination of lead in soil was done by spectrophotometry AAS atomic absorption using PLUS VARIAN 250.Field layout of sampling points is carried so as to allow obtaining information on soil quality an area as large, but this study provides information of minimum and maximum concentrations of points arranged in both areas Baia Mare basin adjacent to,

but mainly provides information 2 (two) of sampling points in the immediate vicinity of sources pollution and a high point in a residential area city at different depths, from 0-5 cm and 20-30 cm.The main sources of soil pollution from Baia Mare, me determined to establish points of soil sampling, they hovering close to their SC Romplumb SA (sectionharvest: St. IMAS - Ferneziu), S.C. Cuprom SA (pct.recoltare: Prison Area - Satu Nou de Sus) residential area (Park section Municipal - Baia Mare). The area with the highest values of lead concentrations in soil Baia Mare, including the perimeters surrounding the city, the coming out of this area near the SC Soil samples Romplumb SA S.C. Cuprom SA, which leads to the conclusion of influence, time, sources of pollution on soil quality.

• The principle of the method. Heavy metal atoms in the sample, withdraw the flame air - acetylene absorb specific wavelength radiation, the absorption is proportional to the concentration of metal ions. (Pb = 283.3 nm).

• Soil Sampling shall be in accordance with ISO / CD - 10 381. Representative from an area about 250 m^2 is harvested. 2 kg soil, which accounted for an average sample mix, the more points taken from a depth study (AD1 and AD2). During the five years 2004 to 2008 and - were taken to use ground 150 samples sensitive and less sensitive.

RESULTS AND DISCUSSION

Results of determining the minimum and maximum usage of lead in soil to use sensitive and less sensitive areas, and the frequency of exceeding the reference levels at the two sampling depths (AD1, AD2) are presented in the following material. After sampling, standards and - proceeded to carry out laboratory tests in physical - chemical properties of EPA Maramures, the year the situation is as follows: In 2004 lead concentrations over the 212.75 mg / kg and maximum of 1341.57 mg / kg, admitted to the reference concentration of 20 mg / kg, exceeding the value of 10.63 times, 67.08 times respectively at a depth of 0-5 cm. The AD2 depth (20-30 cm) and lead concentrations - at a minimum value of 340.76 mg / kg and maximum of 889.38 mg / kg, exceeding the allowable concentrations of Reference 17.03 times, respectively 44.47 times. Frequency threshold is exceeded (PA = 50 mg / kg) in sensitive soils to use at a depth of 0-5 cm, making average calculations, the result was 100%. Overruns frequency of intervention (PI = 100 mg / kg) at a depth of 0-5 cm was 100%. At a depth of 20-30 cm, often exceeding the PA in 2004 was 100% and the P.I. frequency was 100% overrun.

In 2005 lead concentrations over the 367.38 mg / kg and maximum of 1362.45 mg / kg, admitted to the reference concentration of 20 mg / kg, exceeding the value of 18.37 times, 68.12 times respectively at a depth of 0-

5 cm. At a depth of 20-30 cm minimum and maximum concentration of lead and - at the minimum value of 177.20 mg / kg and maximum of 1101.28 mg / kg, exceeding the allowable concentrations of 8.86 times the reference, or 55, 06 times. Frequency threshold is exceeded (PA = 50 mg / kg) in sensitive soils to use at a depth of 0-5 cm, by averaging the measurements, was 100%. Overruns frequency of intervention (PI = 100 mg / kg) at a depth of 0-10 cm, was 100%. At a depth of 20-30 cm, often exceeding the PA in 2005 was 100% and the P.I. frequency was 100% overrun. In 2006, lead in soil to use this sensitive, minimum concentrations of 308.45 mg / kg and maximum of 2024.13 mg / kg, compared to the reference concentration of 20 mg / kg, exceeding the value of 15.42 times respectively 101.20 or, at a depth of 0-5 cm. Exceeded the threshold frequency (PA) of 50 mg / kg in soil usage sensitive at a depth of 0-5 cm, by averaging the measurements, was 100%. Overruns frequency of intervention (PI) stood at 100 mg / kg at a depth of 0-5 cm, was de100%. In 2007, lead in soil to use this sensitive, minimum concentrations of 313.50 mg / kg and maximum of 1702.86 mg / kg, compared to the reference concentration of 20 mg / kg, exceeding the value of 15.67 times respectively 85.14 times at a depth of 0-5 cm. Exceeded the threshold frequency (PA) of 50 mg / kg in soil usage sensitive at a depth of 0-5 cm, by averaging the measurements, was 100%. Overruns frequency of intervention (PI) stood at 100 mg / kg at a depth of 0-5 cm was 100%.

In 2008, lead in soil to use this sensitive, minimum concentrations of 187.88 mg / kg and maximum of 1635.06 mg / kg, compared to the reference concentration of 20 mg / kg, exceeding the value of 9.4 times respectively 81.75 times at a depth of 0-5 cm. Exceeded the threshold frequency (PA) of 50 mg / kg in soil usage sensitive at a depth of 0-5 cm, by averaging the measurements, was 100%. Overruns frequency of intervention (PI) stood at 100 mg / kg at a depth of 0-5 cm was 90%.

Table 1

Minimum and maximum usage of lead in soils sensitive from the Baia Mare					
Area	Year	Sensitive soil-use			
		Depth			
		AD1 (0-5cm)		AD2 (20-30cm)	
		Concentrations(mg/kg)		Concentrations(mg/kg)	
		min.	max.	min.	max.
Baia Mare	2004	212.75	1341.57	340.76	889.38
	2005	367.38	1362.45	177.20	1101.28
	2006	308.45	2024.13	170.19	1712.47
	2007	313.50	1702.86	195.31	1373.98
	2008	187.88	1635.06	153.3	1237.27

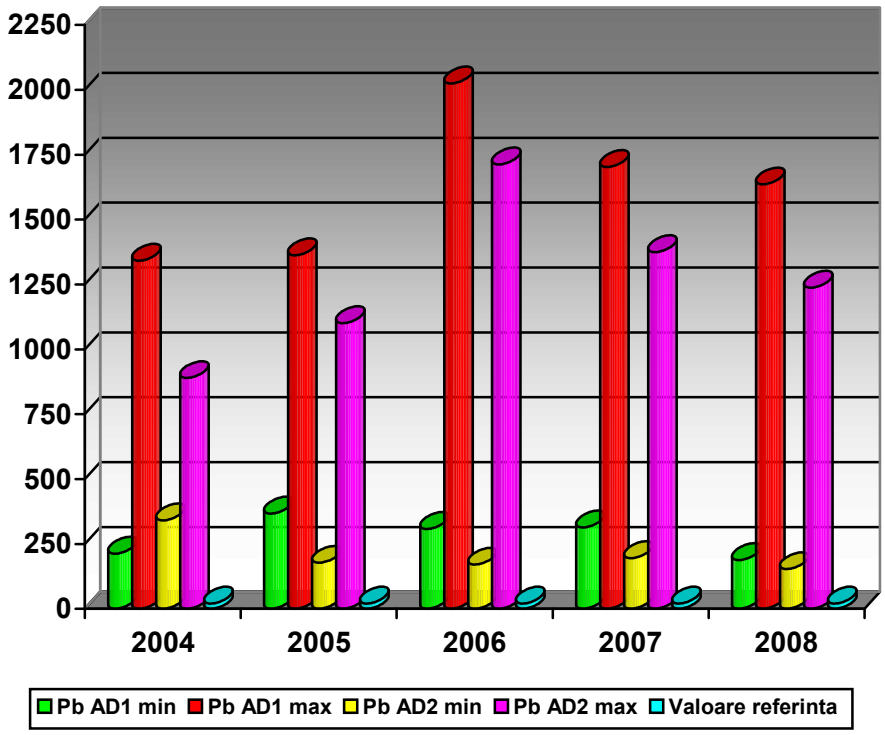

Fig. 1 Minimum and maximum values of lead concentration in soil at a depth AD1 and AD2, the years 2004 to 2008 Baia Mare

CONCLUSIONS

The analysis results the following conclusions:
1) Compared to the reference value of 20 mg / kg soil exceedances were recorded respectively with 93.15% 10020.65% usage in sensitive soils.
2) The alert threshold to use sensitive soils (50 mg / kg) reported maximum values recorded in the soil exceeded the sensible use of 0% - 3948.26%
3) Threshold to use intervention to soil sensitive to the values reported up to 100mg/kg revealed overruns due to 0% - 1924.13% to use sensitive soils.
4) Results from tests conducted in the years 2004-2008 have revealed significantly higher concentrations of lead in soil in areas directly affected by pollution sources. It further differentiates the areas under the influence of sources of pollution, where the frequency of exceedances recorded reference values higher than areas outside the influence of pollution sources. The area with the highest values of lead concentration in soil is Ferneziu area and perimeter including neighboring city of Baia Mare, in this area coming out of the soil samples in the vicinity of SC Cuprom SA S.C. Romplumb SA Baia Mare, with higher values, which leads to the conclusion of influence, over time, these sources of pollution on soil quality.

5) Soil quality is affected both for anthropogenic and natural causes. Main sources of soil pollution are the activities of non-ferrous metallurgy, mining and nonferrous ores.

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