RESEARCH ABOUT THE CONTAIN OF AGRICULTURAL SOILS IN LEAD, FROM METROPOLITAN AREA OF IASI

CERCETĂRI CU PRIVIRE LA CONŢINUTUL ÎN PLUMB AL SOLURILOR CU UTILIZARE AGRICOLĂ DIN ZONA METROPOLITANĂ A IAŞULUI

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Abstract *The average is subjected to somes various sources of contamination with lead, the most important as incidence have to remind the exploitation mining industry, mils and factories, poison gas from cars, using chemicals wich contain lead (paints, container, insecticides). Paper presents the variation of levels in adjacent of urban's soils, respective Iasi zone, known that the degree of some geography industrialization zone makes to grow up his concentration in soil.*
Key words: heavy metals, lead, contamination, admissibility

Abstract *Mediul este supus unor surse variate de contaminare cu plumb, dintre care cu incidenţă frecventă se amintesc exploatările miniere, uzinele, gazele de eşapament, utilizarea de produse ce conţin plumb (vopsele, recipienţi, insecticide etc.). Lucrarea prezintă variaţiile conţinutului de plumb din solurile adiacente unei zone urbane, respectiv zona Iaşiului, cunoscut fiind faptul că gradul de industrializare a unei zone geografice influenţează concentraţia acestuia în sol.*
Cuvinte cheie: metale grele, plumb, contaminare, admisibilitate.

INTRODUCTION

Enhancing complex interactions of biological and biochemical that occur between components of chemical fertilizers and elements from the culture of plants in various agroecosisteme, above the normally accepted, is the starting point in the study undertaken and also a warning for agrochemical research and agricultural practice. Causes of high content in soil, especially of heavy metal elements can be multi geogena some nature (Lacatusu,2001), especially the nature of anthropogenic. Intensity of the negative effect of heavy metal concentration is dependent on both the size of this concentration as well as a series of physical and chemical attributes of soil such as defining: content in organic matter, texture, reaction, redox potential, etc.

Spread of microelements restrictive environment, lead, who undertook the study, covered the small proportion recycle (Budoi,2001), only one third, rest contributing to the contamination of the environment. Toxicity levels of lead in soil for plants can not be measured easily but generally agreed that a concentration of lead in soil, ranging between 100 and 500 mg kg-1 is considered excessive (Kabata – Pendias si Pendias, 2001). Maximum allowable

limits (MRL) established by Kloke (1980) are used in different countries, including in our country and for lead is at value 150.0 mg/kg.

The work is part of a much larger study, which concerned the entire circuit elements in a trophic chain soil-plant-animal, close to the city of Iasi, study was undertaken over two years of research and which allowed the formulation of conclusions about the translocation of soil and feed on the animal organism, especially of trace elements with impact on food security. We consider appropriate to make public the study results for lead in soil, showing its variations and the existence of potential risk than normally acceptable limits.

MATERIAL AND METHOD

The research took place at the Research Station for Cattle Dancu that the administrative point of view is on land of the commune Holboca territory and on municipality of Iasi, in wich main soil types are chernozems, with typical subtypes, bills of exchange and argic, prevailing subtype classically cambic chernozem, mezocalcaric poorly degraded and into sheep farm Raducaneni, SC apartinad Daniela Ltd. Raducaneni-Iasi dominated by an aluviosol gleyic, salt pelic, proxicalcaric, clay loamy / clay lutoasa, evolved on a gleisol cenic.

Soil samples were collected from the upper horizon (0-20 cm) of agricultural land in two locations, Dancu (6) and Raducaneni (7). Samples were dried in oven for 3 hours at 105°C, then brought to a grain size ≤ 0.02 mm.

Disaggregation of soil samples for Pb determination was made by treating concentrated in two stages on sand bath at 400-450 ºC. Solutions were brought to 100 ml bottle flask with 2%. Each vial was added prior to the mark, 10 ml of 1% CsCl solution.

For each sample, each four determinations were made: two by Spectophotometric atomic absorption flame ionization, a determination by X-ray fluorescence Spectophotometric and a determination by molecular absorption Spectophotometric UV-VIS.

1. Determination by atomic absorption spectrometry with flame ionization (ASA-FL). Camera: ASA-FL spectrometer Vario 6.0 monoelement lamp. Flame: acetylene / air. Wavelength: 283.30 nm. The lamp current intensity: 3.00 mA. Acetylene flow: 65 L / hour. The stoichiometric C / O flame: 0.13. Flame height: 9 mm. Nebulizer: 1.3. Ionization buffer: 0.1% CsCl. Interference: Cu (216.5 nm), Fe (216.7 nm) We (216.6 nm), Sb (217.6 nm), Pt (216.5 nm).

2. Determination by X-ray fluorescence spectrometry Camera: X-ray fluorescence spectrometer Epsilon 5 model. Standard working conditions after the device's technical manual.

3. UV-VIS Spectrophotometric determination. Device: UV-VIS spectrophotometer model MPM 1500, quartz cuvettes with 1 cm thick. Dithizone method, extraction in chloroform. Spectro Dithizone method, extraction in chloroform. Spectro at 500 nm.

RESULTS AND DISCUSSIONS

In order to determine the relevance of analytical results, standard procedures were applied statistical calculation are presented in tables 1, 2, 3.

Table 1

Specifications

Type of sample	Agricultural soils
No. samples	13
Location test	Iasi Metropolitan Area (table 1)
Requirements	Heavy metals Pb

Table 2

Results analysis

No. harvest	Area	No. Laboratory test	Pb (µg/g)
1	Raducaneni (Corn of Beslega)	AV-1	33,0744±3,1728
2	Raducaneni (Ostrov 1)	AV-2	33,4352±1,8041
3	Raducaneni (Canal 2)	AV-3	30,8251±3,3422
4	Raducaneni(after Pompa)	AV-4	30,9937±2,7164
5	Raducaneni (after Pompa)	AV-5	33,8034±1,9165
6	Raducaneni (Ostrov 2)	AV-6	37,8575±1,6837
7	Raducaneni (Canal 2)	AV-7	30,7929±1,8769
1	Dancu-Alfaalfa-scyte III(Sole Aron Voda)	AV-8	33,4808±1,2410
2	Dancu-Sudan grass (sole Chirita)	AV-9	34,9525±2,0137
3	Dancu-Soy(sole Securitate)	AV-10	34,8581±1,3252
4	Dancu-Corn (sole Aron Voda)	AV-11	36,5498±1,4228
5	Dancu- Green grss(sole Bazin)	AV-12	35,0920±0,2774
6	Dancu-Green corn sillage (sole Securitate)	AV-13	37,8885±0,7308

Table 3

Specifications

Specifications	Pb
Average deviation	0,8717
Standard deviation (mean square error)	1,1380
Dispersion selection	1,5789
Mean squared error of the mean selection	0,5690

In the two microzone lead concentration in the studied soils ranged from 30.7929 mg/g to 33.8034 mg/g in micro Raducaneni; in micro Dancu, lead concentration in soils was between 33.4808 mg/g and 37.8885 g/g.

Comparing the contents of lead, the two microzone respectively Raducaneni and Dancu, finds a higher concentration of lead in soil from the area Dancu Raducaneni area. We believe that this is due to the industrial area of Iasi, much closer to Dancu.

Accepted normal value of concentration in Romania, according to Order 156/1997 is 20µg/g. Compared to this normal value, concentration of lead in soil is much higher because the two areas of industrial and heavy traffic, butbelow the alert level, which according to same order, is 50µg/g. (figure 1).

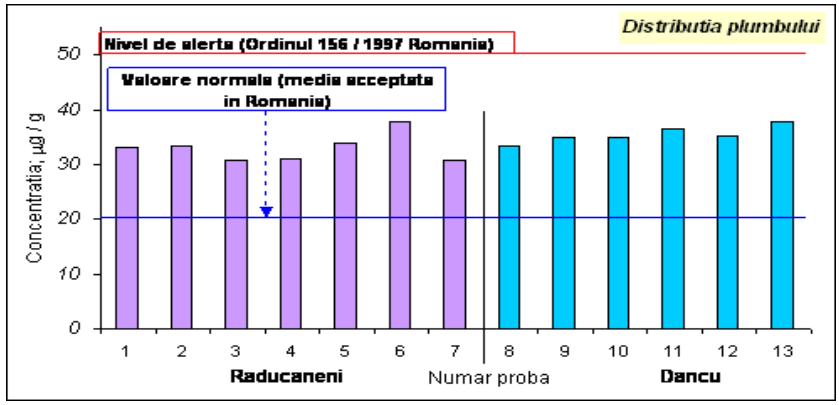

Fig. 1. Distribution of the sole lead for locations Raducaneni and Dancu

CONCLUSIONS

1. Dancu location area of study, recorded higher values of lead content in soil from the area Raducaneni, due to greater proximity of the industrial area of Iasi, Iasi's especially CET.

2. Values of lead in soils in both locations exceeding 20 mg/g, average value considered acceptable in Romania, that a maximum of 37.8885 mg/g for sample No. 6 location Dancu (sole corn silage) and 37,8575 mg/g for sample location No.6 Raducaneni (sole Ostrov).

3. The maximum values of lead in soil, for both locations, do not exceed the alert level of 50 mg/g (Order 156/1977 Romania).

4. Because salts are less soluble lead in soil, feed contamination with this element of risk is low, and if there is, it is caused by other sources.

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