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SOIL POLLUTION WITH HEAVY METALS

Maria VLAD[1], Gelu MOVILEANU[2]
[1]"Dunarea de Jos" University of Galati
[2]Environment Engineering and Biotechnology,
Faculty of "Valahia" University, Târgoviste
email: mvlad@ugal.ro

ABSTRACT

In this paper was studied soil pollution with heavy metals (copper, chrome, manganese, lead, zinc, cadmium, nickel) caused by the municipal waste from landfill. The level of soil pollution depends on rain regime which usually brings in soil the air pollutants but in the same time washes as the soil determining the pollutants transport through the emissary.

Mean value of the collected samples in four different points situated close to the landfill, were represented in the graphs and related to Maximum Admissible Concentration values. There were ascertained leads, zinc, nickel, cadmium, cation concentrations bigger than admissible values.

KEYWORDS: properties, soil, heavy metal, landfill

1. Introduction

The pollution of the soil produces a disorder of the balance of the constituent elements; it is difficult to fix the balance remake being very after elimination of the cause.

The depreciation factors of the soil could be the following:

-physical pollution;
-chemical pollution;
-radioactive or nuclear pollution;
-biological pollution.

The level of the soil contamination depends also on the pluvial regime which washes in generally the atmosphere, on the pollution agents which are deposited on the soil, but also in the same time wash the soil helping to circulate the pollution agents towards the emissaries.

The rains also favour deep contamination of the soil. The soil pollution depends also on its vegetation, as well as on the soil nature.

This is very important for the pursuing of the pesticides and artificial fertilisers persistency on the agricultural lands or in the areas where there is a big amount of wastes, e.g. storage ditches.

The contaminants resulted from the municipality wastes could be: organic substances, heavy metals and their compounds, fats and oils, organic and inorganic substances, oils and auto pills (accumulators), other industrial wastes, etc.

2. Results and discussions

The medium values of the pH and conductivity variation of the soil samples, in four points (P1, P2, P3, P4) are presented in Figure 1. The pH value represents one of the most important values which characterize the quality of the soil.

In general, conductivity increases with the concentration on the ions, because in the concentrated solutions there are many ions which conduct the electric current.

Over a certain limit of the concentration, the conductivity decreases, the phenomenon being caused by the ions interactions that occur.

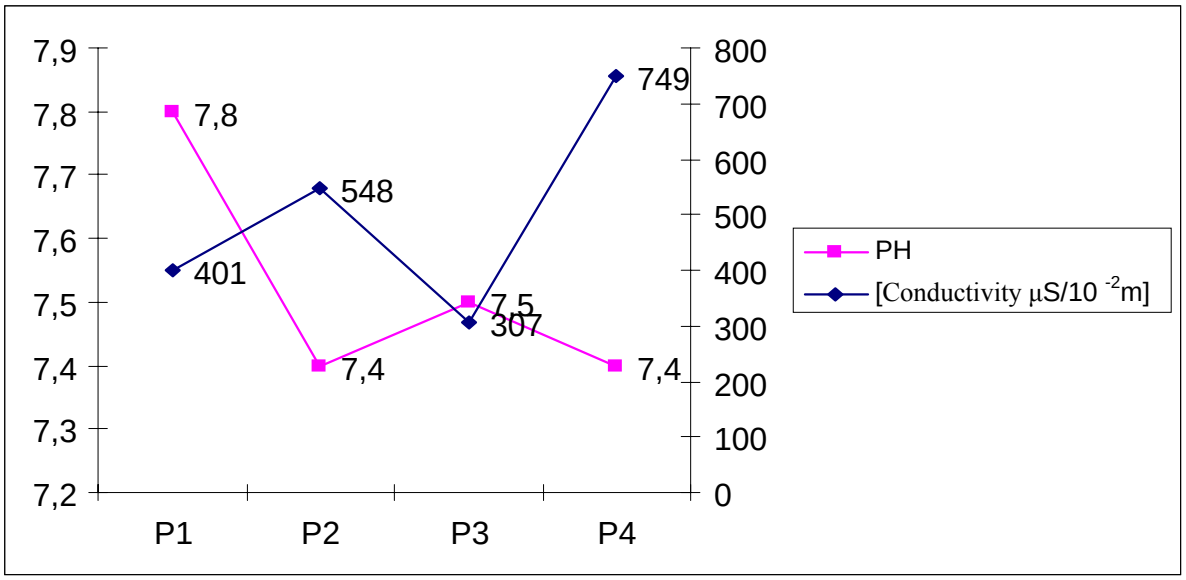

Fig.1. *The conductivity and pH variation of the soil, in the points P1, P2, P3, P4.*

It has been observed that the values of the pH vary between 7.4–7.8 but within the Maximum Admissible Concentration (MAC).

Conductivity varied between 307 µS/10^{-2}m, in P3 and 749 µS/10^{-2}m, in P4, so it was smaller than the MAC value (2500 µS/10^{-2}m).

Graphs from picture no 2 show that in soil the metals such us: Zn, Cr, Cu, are in amounts bigger than the nominal values, but they are nevertheless under the alert level which is 250 ppm for Cu, 300ppm for Cr and 700ppm for Zn.

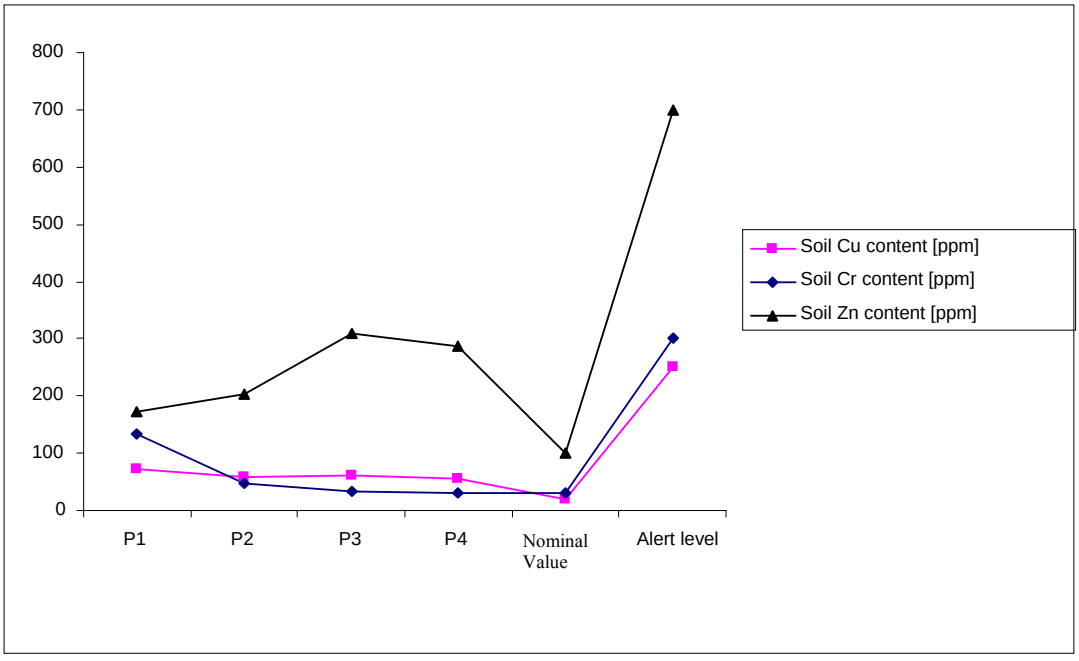

Fig.2. *Copper, chrome and zinc content variation of the soil in the four points where were the samples taken.*

The graph no 3 shows that in soil, the metals as Pb and Ni are found in amounts over the nominal value of 20ppm, but there are under the alert level which is 200ppm for Ni and 250 ppm for Pb. The content variation of the oil products in the analysed soil samples - Fig 4.

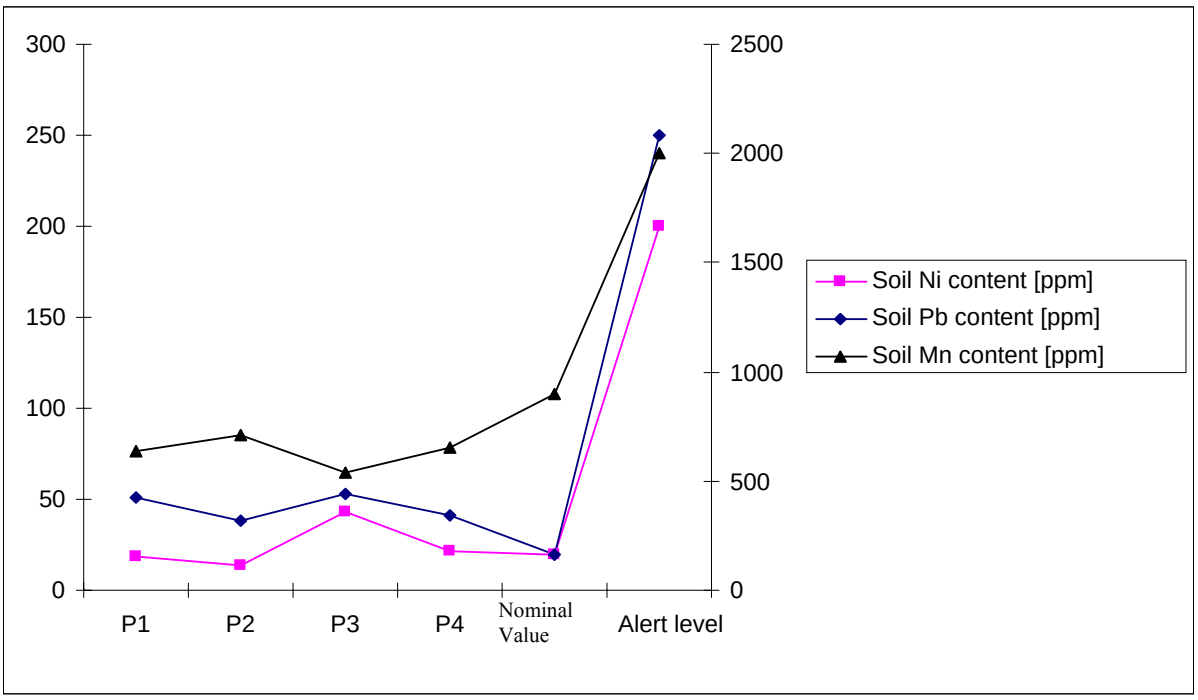

Fig3. *Nickel, lead and manganese content variation of the soil in the four areas analysed.*

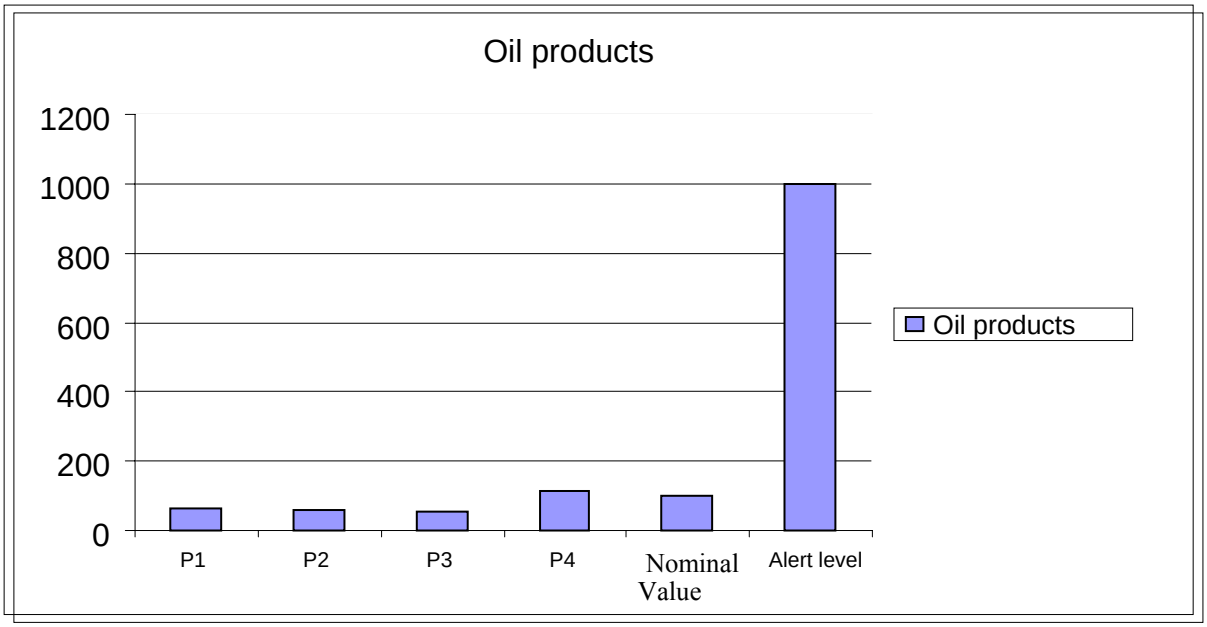

Fig. 4. *The content variation of the oil products in soil, in P1, P2, P3, P4 points.*

Following the analyses performed, it results that the pollution with the oil products, in generally, does not exceed the nominal value of 100ppm, but the existing amounts in the soil could generate certain inconveniences.

For example, the inadequate storages of the municipality wastes in the rubbish ditches are the accidental deposits of the fuels/lubricants, construction materials, leached trickling from these ditches on the soils surface or in the interior layers; this imposes the appropriate hygiene of the polluted areas and the soil treatment through:

- Biological methods (biodegradation in situ, bulk biodegradation, decontamination in bioreactors).

- High temperature methods (decontamination using the combustion, decontamination using the thermal desorption).
- Physical and chemical methods (washing, flotation, extraction, oxidation, precipitation).

3. Conclusions

For the quantification of the pollution level of the soil, were compared the values obtained within the investigations made on the spot, followed by the laboratory analyses and the results were compared with the reference values provided by Minister Order no. 756/1997 for soils having less sensitive usages, as follows:

1. There were identified some exceeds compared to the admissible values for the heavy metals as: Ni, Zn, Pb, and Cr.

2. The contents situated above the admissible limits for Ni, show the possibility of soil pollution with galvanisation mud or any other metallic materials containing Ni resulting from construction materials, electronic components.

In conclusion, the parameters analysed exceed the Maximum Admissible Concentrations values.

3. The impact of landfill waste on the surface soil and inferior layer of earth, has pointed out that the leach ate can transport through the waste layers many organic and inorganic compounds and in the case of not respecting the legislation and normative of constructing ecological landfill, the soil from the surrounding landfill may be polluted.

References

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