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HEAVY METALS IN TOPSOILS OF DWELLING DISTRICTS

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At present time ecogeochemical inventorial work of dwelling and surrounding natural environment is being done in many countries of the world. One of its main directions is geochemical analysis of topsoil which reflects the integral technogenical loading of pollutants including atmo-genical one. The real structure of contamination is being determined with the help of detailed mapping. This is especially important in dwelling districts where both adults and children can inhale contaminated dust. Private gardening is often developed in such districts.

The number of urbanized territories in Lithuania where detailed ecogeochemical mapping is being done (at a scale 1 : 10 000, in zones of recreation - up to 1:20 000) still increases. Šiauliai, Kėdainiai, Panevėžys, Alytus, part of Klaipėda and Vilnius are among them. Wide spectrum of toxic chemical elements, the most important of them - Ag, As, B, Ba, Co, Cr, Cu, Mn, Mo, Ni, Pb, Sn, Sr, V and Zn, is usually determined in town topsoils by DC Arc Emission Spectrometry and XRF. However, without Cd and Hg such evaluation is not complete. This is especially important for determination of total contamination index. At present time the latter elements have been determined by AAS in topsoils of only three districts of Vilnius (Žirmūnai, Žvėrynas and Šnipiškės) and in central part of Copenhagen (Denmark). The investigation has been done using the same laboratory equipment. We shall compare two sets of anomalous (greater than 1.5) chemical element mean indices of loading (in comparison with background level - I_{load}) in two districts of Vilnius - Žvėrynas (potentially clear infrastructure) and Žirmūnai (a lot of industrial enterprises).

Žvėrynas. Total area - 2.6 km². Private gardening prevails there. Industrial district (mainly food industry) is situated at its outskirts. 199 topsoil samples have been collected in dwelling districts: $Zn (I_{load} = 10.7) > Ag (8.8) > Hg (8.5) > Pb (4.3) > Cu (3.4) > Cd (2.9) > Sn (2.9) > P (2.4) > Mo (1.9) > Ni (1.8) > Cr (1.8) > As (1.7) > Ba (1.6) \dots$. Mean total contamination index $Z_{mean} - 35$.

Žirmūnai. Total area - 5.7 km². Many-storied dwelling houses prevail there. There is a lot of transport enterprises, industrial enterprises of mechanical and electrotechnical engineering. The territory of the former military object is situated in the centre. 239 topsoil samples have been collected in dwelling districts: $Hg (5.7) > Zn (4.7) > Pb (4.2) >$

$Ag (4.0) > Cu (2.9) > As (2.2) > Sn (2.1) > Cd (2.1) > Ni (1.5) \dots$. Mean total contamination index $Z_{mean} - 22$. At all, on the territory of the district (including samples taken near enterprises and military object) 321 sample has been collected. The greater mean values are characteristic of the following elements: $Pb (I_{load} = 9.9)$, $Zn (5.7)$, $Ag (4.1)$, $Cu (4.0)$, $Mo (3.1)$, $Ni (2.7)$, $Sn (2.5)$, $As (2.3)$, $Cd (2.2)$, $Cr (2.1)$, $Co (1.6)$. Mean total contamination index $Z_{mean} - 35$.

Conclusion: in dwelling districts of gardening type the prevailing pollution is caused by municipal wastes. The component of contamination determined by enterprises is obvious at a small distance from them.

Copenhagen. Total area - 6.0 km². There are many private gardens, parks, offices, bus depot and several enterprises. 379 topsoil samples have been collected: $Ag (10.2) > Cu (7.7) > Zn (6.9) > Sn (6.9) > Pb (5.3) > Hg (4.3) > Mo (3.6) > Cd (2.3) > Ni (2.1) > Mn (1.7) > Cr (1.5) \dots$. The mean total contamination index $Z_{mean} - 43$. It is so...