

PRACTICAL RECOMMENDATIONS FOR SUMMER RESIDENTS ON THE REDUCTION OF HEAVY METALS IN CROP PRODUCTION, GROWN IN SUBURBAN AREAS IN THE BREST REGION

G. Talkach, S. Poznyak

Belarusian State University, ISEI BSU,

Minsk, Republic of Belarus

gal-mush@yandex.ru

The article provides recommendations intended for owners of holiday homes and household plots to reduce the accumulation of heavy metals in crop production.

Keywords: heavy metals, soils, crop, pollution.

The toxic effect of heavy metals in soils leads both to a decrease in yields and contamination of the product. To reduce these negative consequences, it is necessary to carry out the following measures:

1. Cultivation of special resistant and weakly accumulating plant species on the lands contaminated with heavy metals. The weakest heavy metals accumulate tomatoes, potatoes. When it is impossible to obtain products with the permissible content of heavy metals in the plant parts of the plant, it is possible to grow technical crops, as well as for processing (potatoes for starch, alcohol, sugar beet for sugar, etc.). In various tissues the plant accumulates a different amount of heavy metals. In general, the most contaminated roots, then leaves, stems, grass or grain.

2. The content of heavy metals in potatoes and vegetables is significantly reduced due to their cleaning and cooking. So, as a result of cleaning, washing, peeling, rubbing and blanching, the content of lead and mercury is reduced by 50 % in vegetables and 80–85 % in potatoes, and cadmium by 20 %. Reduction of lead content with a single wash of salad can reach 30–40 %. According to Yu.V. Alekseeva, the content of zinc in peeled tubers is reduced to 1,5 times, lead – 2–6 times, cadmium – 1,4–3,5 times.

3. Growing of agricultural crops (primarily vegetable) in protected soil (greenhouses), since the main pollution of HM soil occurs as a result of precipitation of polluted precipitation and dust emissions.

4. Removal and binding of heavy metals in the root layer of soil. The phytotoxicity of heavy metals largely depends on their mobility in the soil, and it, in turn, depends on the soil properties, the type of metal salts, and also on their shape (anions, cations, amphoteric elements, which, depending on soil pH, can be charged positively or negatively, neutral forms of metals). Therefore, it is possible to apply such agrotechnical methods as liming, application of organic and mineral fertilizers, application of natural zeolites, and use of biological methods.

5. Investigation affects the mobility of heavy metals as a result of a complex of changes in the soil system at different levels (physical, chemical and biological). When the acidity of the soil solution decreases, the solubility and mobility of heavy metals decreases, and their consumption by plants decreases. This is due to the fact that liming promotes the formation of complex compounds of soil organic compounds with heavy metals, with increasing pH, heavy metals (except As, Cd, Cr, Sr) precipitate in the form of carbonates, phosphates; With increasing pH and increasing calcium content in the soil, the activity of plant root systems decreases with respect to the absorption of a number of heavy metals. The accumulation of heavy metals in plants and the use of mineral fertilizers is reduced. Zinc and lead form poorly soluble, inaccessible compounds with phosphates.

6. The introduction of organic matter into the soil increases the fertility of the soil, the organic matter acts as a good adsorbent of cations and anions, increases the soil buffering and reduces the concentration of salts in the soil solution.

7. Using the antagonism of ions of chemical analogs is based on the fact that when the concentration of one ion in the nutrient solution increases, the absorption of the plant by another plant, an "antagonist", is reduced. Usually, antagonism of light and heavy metals (calcium – strontium, potassium – cesium, etc.) is used. The method is effective only for certain, relatively small ion concentrations.

8. The movement of the contaminated soil layer into soil layers that underlie the root layer is made by deep plowing with plant plows. The implementation of this method also leads to a significant loss of the fertile layer.