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ZINC DEFICIENCY IN SOILS OF UKRAINE: POSSIBLE CAUSES AND REGULATORY MECHANISMS

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ABSTRACT

In the context of global pollution, zinc is generally considered a heavy metal that can harm human health and other living organisms. However, it is known that zinc is a necessary micronutrient that is involved in many important metabolic processes. In a coronavirus pandemic, the positive role of zinc in controlling COVID is important. Zinc is one of the priority micronutrients that are deficient for most regions of the planet and its deficiency can lead to serious diseases and Ukraine is no exception. It is established that zinc is in short supply for most regions of Ukraine and products that are part of the diet of Ukrainians do not contain enough of it and do not provide the daily physiological needs of people. One of the reasons for such an unsatisfactory situation may be the insufficient amount of zinc in the soils of Ukraine, or the low level of its mobility. It is shown that Zn was characterized by a low level of transition from soil to crop production - the average transition coefficient ranged from 0.10. The reason for this phenomenon could be the low content of zinc in the soils of Ukraine. The grouping of soils of Ukraine by the potential ability to provide plants with a sufficient amount of Zn, taking into account the physiological needs of man was carried out. Using Zn transition coefficients in the soil-plant system and potential mobility of the element in soils of different soil-climatic zones of Ukraine, the division into groups was made: very low potential ≤ 21 mg Zn kg⁻¹, low potential from 22 to 48 mg Zn kg⁻¹, average potential from 49 to 77 mg Zn kg⁻¹, high potential ≥ 78 mg Zn kg⁻¹. According to the division, an assessment was made and it was found that the population of most of Ukraine cannot get enough zinc naturally through food of plant and, accordingly, animal origin. It is shown that one of the effective mechanisms of regulation of zinc inflow into the soil and increase of its mobility is the system of fertilization of agricultural plants. The analysis of traditional fertilizers of Ukraine and phosphorites from deposits of Ukraine is presented. It was found that the highest content of Zn was in phosphorites - it ranged from 7.8 to 14.2 mg kg⁻¹. It is shown that, depending on the peculiarities of the technology of growing crops, the soil can be annually introduced from 200 to 20.000 and more mg kg⁻¹ of Zn. It is proved that it is possible to increase the content of zinc in soils by applying agrochemicals, first of all, phosphorus fertilizers, and to increase its mobility and transition to plants - by introduction of technological operations of cultivation of crops, especially in conditions of low level of natural mobility Zn (south and east of Ukraine).

Key words: Zinc, Micronutrient, Deficiency, Soil, Agricultural plants.