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Bioaccumulation and distribution of heavy metals in Maize, Oat and Sorghum Plants, grown in industrially polluted region

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The uptake of heavy metals (Cd, Pb and Zn) by maize, oat and sorghum plants cultivated, under field conditions, in industrially polluted soils was studied. The experimental plots were situated at different distances (0.1, 2.0 and 15.0 km) from the source of pollution - the Non-Ferrous Metal Works near Plovdiv, Bulgaria. On reaching commercial ripeness the crops were gathered and the contents of heavy metals in their different parts – roots, stems, leaves and grains, were determined after dry ashing. The quantitative measurements were carried out with ICP.
A clearly distinguished species peculiarity existed in the accumulation of heavy metals in the vegetative and reproductive organs of the studied crops. Sorghum plants accumulated larger heavy metal quantities compared to maize and oat plants, as the major part of heavy metals was retained by roots and a very small part was translocated to epigeous parts. The studied crops may be considered as metal-tolerant crops and may be cultivated on soils which are low, medium or highly contaminated with lead, zinc and cadmium, as they do not show a tendency of accumulating these elements in epigeous parts and grains above the maximum permissible concentrations. The possible use of aboveground mass and grains for animal food guarantees the economic expedience upon the selection of these crops.

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