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Effect of heavy metals on soil fungi

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Fungi constitute a high proportion of the microbial biomass in soil.Being widespread in soil their large surface-to-volume ratio and high metabolic activity, fungi can contribute significantly to heavy metal dynamics in soil. At neutral pH heavy metals in soils tend to be immobilized to precipitation and/or absorption to cation exchange sites of clay minerals. In the acidic soils, metals are more mobile and enter food webs easier. Microbial production of acids and chelating agents can mobilize to toxic metals. Mobilization is often by uptake and intracellular accumulation of the heavy metlas, and in this way, the bioavailability of metals towards other organisms can be more reduced.
Fungi were isolated from soils from Upper Silesia in Poland and belonged to widespread genera: Aspergillus, Cladosporium, Penicillium and Trichoderma. Fungi from different taxonomic groups differ greatly in their tolerance to heavy metals. This could be related to their wall structure and chemistry as well as biochemical and physiological characteristics of fungi. Localization of metals in fungal cells was studied using electron microscopy analysis. Metal biosorption in the cell wall can be complex as melanin granules. Fungal vacuoles have an important role in the regulation of the cytosolic concentration of metal ions, and may contribute to heavy metal tolerance.In polluted soils with heavy metals, fungal species composition can be changed and their physiological activity can be changed, too.