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Heavy metals uptake by the hybrid aspen and rowan-tree clones

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[fulltext]

Micropropagated plantlets derived from selected clones of the hybrid aspen (*Populus tremula* × *Populus tremuloides*) and the rowan-tree (*Sorbus aucuparia* L.) were used to determine the comparative study of uptake of the toxic, heavy metals Cd, Pb and the essential metal Mn. Samples of roots and aboveground parts (hypocotyl-derived tissues, leaves and stems) were taken from the plantlets grown for 24, 48, 96, or 168 hrs under aseptic conditions, in hydroponics with the toxic heavy metal and the essential metal salts. The concentration and distribution of the accumulated metals were determined using the ICP-OES method. The differences in the uptake capacity of hybrid aspen and rowan-tree clones for Cd, Pb and Mn were identified. Generally, the amounts of accumulated Cd and particularly Pb were much higher in the roots of both hybrid aspen and rowan-tree clones, than in their shoots, at all sample times. Conversely, the amounts of accumulated Mn were significantly lower than Cd and Pb in all

plant parts of the hybrid aspen and rowan-tree samples. Patterns of Mn uptake were similar in the above-mentioned tissues of both clones, at all sample times. We concluded that the two clones of hybrid aspen and rowan-tree, lacking auxiliary soil microbiota, can accumulate large amounts of the toxic heavy metals Cd (800–1,500 mg/kg) and Pb (5,000–13,000 mg/kg) in roots and about 100 mg/kg of Cd was determined in aboveground part of hybrid aspen.

Keywords:
phytoremediation; heavy metals; hybrid aspen; rowan-tree; micropropagation

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