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Hypericum perforatum L. and *Chamomilla recutita* (L.) Rausch. – accumulators of some toxic metals

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The most important properties of medicinal plants used in phytotherapy are connected with the production of specific secondary metabolites exhibiting biological activity. Since medicinal plant species could sequester metal ions by some of these specific secondary metabolites, they are potentially useful in the process of phytoremediation.

Hypericum perforatum L. belongs to the class of cadmium hyperaccumulators. Cd(II) (toxic even at low concentrations) and Zn(II) (toxic only at high concentrations), can form somewhat less toxic organometallic complexes by binding with secondary metabolites. This finding was confirmed by an experiment with *H. perforatum* where the root system of six month old plants cultivated hydroponically in the presence of 12 μmol dm^{-3} Cd accumulated 7-times more Cd than the shoots. However, no significant changes were observed in production parameters (dry mass of roots and shoots) or in certain physiological characteristics (photosynthesis and mitochondrial respiration rates, photosynthetic electron transport chain between photosystem I and II, chlorophyll and carotenoid concentrations). On the other hand, root respiration rate significantly increased as a result of Cd treatment indicating a higher energy requirement for more intensive ion uptake mainly into the roots and thereafter also into the shoots [1, 2].

Grejtovský and Pirč [3] investigated the effect of Cd on two cultivars of *Chamomilla recutita* (L.) Rausch., diploid Novbona and tetraploid Lutea. They found that high Cd concentration in the soil (up to 30 mg kg^{-1}) caused stronger inhibition of growth parameters in diploid cv. Novbona. Addition of Cd to the soil resulted in higher Cd accumulation in all parts of the plants, however diploid Novbona exhibited higher Cd accumulation. We investigated the effects of Cd on 6 week old plants – *H. perforatum* and two cultivars of *Ch. recutita*, cv. Novbona and cv. Goral. The first cultivar of chamomile was more tolerant than the plants of *H. perforatum*. Comparing the two chamomile cultivars we found that at a Cd concentration of 120 μmol dm^{-3} cv. Novbona was more tolerant than cv. Goral. Even at a Cd concentration of 240 μmol dm^{-3} the growth parameters of the cv. Novbona plants were not influenced (except the root dry mass). Cv. Goral cultivated at 120 μmol Cd dm^{-3} accumulated 29.491 mg Cd g^{-1} in the roots and 1.543 mg Cd g^{-1} in the shoots whereas Cd accumulation in plant organs of cv. Novbona were approximately two times lower (13.994 mg Cd g^{-1} in the roots and 0.850 mg Cd g^{-1} in the shoots). The non-significant negative effect of the studied metal on cv. Novbona could also be explained by lower Cd uptake by roots