Potential of Brassica juncea and Helianthus annuus in phytoremediation for uranium.

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To investigate the efficiency of the phytoremediation of uranium-contaminated soil by *Brassica juncea* and *Helianthus annuus*, greenhouse experiments with both plant species and soil from the "Fuhrberger Feld" (near Hanover, Germany) with defined enhancement of the uranium concentrations up to approximately 6 mg kg^{-1} have been carried out. A part of the test plants has been treated with citric acid buffer (pH =4,8) since citric acid as a chelating agent was shown to enhance the uranium uptake into the plants in previous studies (e.g. HUANG et al. 1998). For control reasons, plants of both species (control plants) have been grown in soil from the "Fuhrberger Feld" without any treatment. The plants were harvested 13 weeks after settling and the uranium concentration in shoots and roots and the remaining soil were measured. The uptake of uranium into the shoot was clearly lower than into the roots. Uranium concentration in the shoots of the control plants was below the detection limit.

The addition of the citric acid buffer leads to an enhancement of the uranium concentration in the soil water by factors of up to approximately 80.

A visible effect of this enhanced concentration on the uptake into the plant and on the distribution on shoot and root was only shown for *Brassica juncea*, where the concentration in the shoot doubled. The reverse effect was shown for *Helianthus annuus*, where the citric acid buffer treatment caused a lower concentration in roots and shoots compared to the untreated soil with the same uranium concentration.

Generally, the uranium uptake into the plants was very low (<1 µg per plant) for all experiments.

The results of these plant experiments point out that the effectiveness of uranium uptake into plants cannot be increased by citric acid buffer treatment in every case, even if the uranium concentration in soil solution is increased considerably. No decrease of uranium concentration in soil due to the uptake into plants could be shown. Thus a special suitability of *Brassica juncea* and *Helianthus annuus* for phytoremediation could not be proven.