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The Use of Edible Plants for Rhizofiltration under Different Hydroponic Conditions

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This study conducted a rhizofiltration experiment for uranium-removal with the edible plants (*Lactuca sativa*, *Brassica campestris* L., *Raphanus sativus* L., and *Oenanthe javanica*) which generally consumed in South Korea. Various batch experiments were performed with different initial uranium concentrations, pH conditions, and genuine groundwater. The results showed the uranium accumulation and bioconcentration factor (BCF) of plant roots increase with an increase in initial uranium concentrations in the solution. Of the four plants, the amount of uranium accumulated in *Raphanus sativus* L. roots was 1215.8 µg/g DW with the maximum BCF value of 2692.7. The BCF value based on various pH conditions (pHs 3, 5, 7 and 9) of artificial solutions was highest at pH 3 for all four plants, and the BCF value of *Brassica campestris* L. was the maximum of 11580.3 at pH 3. As a result of rhizofiltration experiments with genuine groundwater contaminated with uranium, the BCF values of *Raphanus sativus* L. were 1684.7 and 1700.1, the highest among the four species, in Oesam-dong and Bugokdong groundwater samples with uranium concentration of 83 and 173 µg/L. From SEM/EDS analysis, it was confirmed that uranium in contaminated groundwater was adsorbed as a solid phase on the root surface. These results demonstrate that *Raphanus sativus* L. not only has a high tolerance to high concentrations of uranium and low pH conditions but also has a remarkable potential for uranium accumulation capacity.