

Publication**Uptake and speciation of vanadium in the rhizosphere soils of rape (*Brassica juncea* L.)****JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 3290465**Author(s)** Tian, Li-Yan; Yang, Jin-Yan; Huang, Jen-How**Author(s) at UniBasel** [Huang, Jen-How](#) ; [Tian, Liyan](#) ;**Year** 2015**Title** Uptake and speciation of vanadium in the rhizosphere soils of rape (*Brassica juncea* L.)**Journal** Environmental science and pollution research**Volume** 22**Number** 12**Pages / Article-Number** 9215-23

The response of rape (*Brassica juncea* L.) to different vanadium (V) speciation in rhizosphere soils was investigated in pot experiments using an agricultural soil containing 147 mg V kg⁻¹ supplemented with 0-500 mg V kg⁻¹ of pentavalent V [V(V)] and a mining soil containing 774 mg V kg⁻¹. Tetravalent V [V(IV)] accounted for 76.1 and 85.9 % of total V in the untreated agricultural soil and mining soil, respectively. The proportion of both V(V) and water-extractable V increased with increasing concentrations of V(V) in the agricultural soil. The growth of rape substantially reduced the concentrations of V(V) but not V(IV) in the rhizosphere soil, suggesting that V(V) was actively involved in the soil-rape interaction of V. Both soil V(V) and water-extractable V were negatively related to the total rape biomass, but were positively correlated with the concentration of root V. No such relationships were found for total V and soil V(IV). Together, these results indicate that soil V(V) and water-extractable V might better reflect the toxicity of V in soils than total V and soil V(IV). Rape accumulated V in the sequence: roots > > stem > leaf > seed. As indicated by the remarkably low root bioconcentration factor of V(V) (0.41-7.24 %), rape had a lower ability to accumulate V than other plants reported in the literature (14.6-298 %). Only a small fraction of V in rape roots was translocated to the aboveground organs (the translocation factor was 3.57-46.9 %). No V was detectable in seeds in the soils at 147 and 197 mg V kg⁻¹, and no seed was produced in the soils at higher V concentrations. Thus, the risk of V intake by humans via the consumption of rapeseed-based foods under normal conditions is considered to be lower than that of other plants.

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