Fractionation of Stable Cadmium Isotopes in the Cadmium tolerant *Ricinus communis* and hyperaccumulator *Solanum nigrum*

RONGFEI WEI[1], QINGJUN GUO[1*], CONGQIANG LIU[2], HANJIE WEN[2], JUNXING YANG[1], JIAN HU[2], LIYAN TIAN[1], XIAOKUN HAN[1], JING KONG[1]

[1] Center for Environmental Remediation, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing 100101, China (*Corresponding Author: guoqj@igsnrr.ac.cn)

[2] Institute of Geochemistry, Chinese Academy of Sciences, Guiyang 550002, China

Cadmium (Cd) isotopes in plants provide new insights into biological processes, such as Cd uptake, transport and storage mechanisms. In the present study the Cd-tolerant *Ricinus communis* and Cd-hyperaccumulator *Solanum nigrum* were cultivated under controlled conditions in a nutrient solution with variable Cd supply, in order to test the isotopic fractionation of Cd during plant uptake. The Cd isotopic compositions of nutrient solutions and organs of the plants were measured by multiple collector inductively coupled plasma mass spectrometry (MC-ICPMS). The Cd isotope mass balance yields isotope fractionations between plant and Cd source ($\delta^{114/110}Cd_{organs\text{-}solution}$) from -0.70‰ to -0.22‰ in *Ricinus communis* and from -0.51‰ to -0.33‰ in *Solanum nigrum*. Moreover, Cd isotope fractionation during Cd transport from stem to leaf differs between the Cd-tolerant and -hyperaccumulator species. Based on these results, the processes (diffusion, adsorption, uptake or complexation), which may induce Cd isotope fractionation in plants, have been discussed. Overall, the present study indicates potential applications of Cd isotopes for investigating plant physiology.

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