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X-ray absorption spectroscopy evidence of sulfur-bound Cadmium in the Cd-hyperaccumulator *Solanum nigrum* and the non-accumulator *Solanum melongena*

MARIE-LAURE PONS[1], BLANCHE COLLIN[1], EMMANUEL DOELSCH[2], PERRINE CHAURAND[1], TILL FEHLAUER[1], CLEMENT LEVARD[1], CATHERINE KELLER[1], ABEL GUIHOU[3], PIERRE DESCHAMPS[3] AND JEROME ROSE[1]

[1]Aix Marseille Univ, CNRS, IRD, INRAE, Coll France, CEREGE UMR 7330

[2]CIRAD, UPR Recyclage et risque, Univ Montpellier

[3]CEREGE, Aix Marseille Univ, CNRS, IRD, INRAE, Coll France

Presenting Author: dr.marie.laure.pons@gmail.com

The environmental pollution by ecotoxic heavy metals is a problem of increasing significance for ecological and human health reasons. Among these elements, cadmium (Cd) is of special concern due to its high mobility in the soil/plant system and its acute toxicity. To limit Cd contamination in plants, and to enhance food safety, it is critical to understand Cd biogeochemical cycle, in particular what controls the bioavailability of this element. Previous studies have demonstrated that Cd bioavailability in soils depends ultimately on its chemical speciation. It has been proposed that non-protein thiols and organic acids play a major role in cadmium phytoavailability and distribution in plants. In the Cd-hyperaccumulator *Solanum nigrum* and non-accumulator *Solanum melongena*, the role of these organic ligands in the accumulation and detoxification mechanisms of Cd are debated. Here, we used X-ray absorption spectroscopy to investigate Cd speciation in these plants (roots, stem, leaves) and in the soils used for their culture to unravel the plants responses to Cd exposure. The results show that Cd in the 100 $mg.kg^{-1}$ Cd-doped clayey loam soil is sorbed onto iron oxyhydroxides. In both *S. nigrum* and *S. melongena*, Cd in roots and fresh leaves is mainly bound to thiol ligands, with a small contribution of inorganic S ligands in *S. nigrum* leaves. We interpret the Cd binding to sulfur ligands as detoxification mechanisms, possibly involving the sequestration of Cd complexed with glutathione or phytochelatins in the plant vacuoles. In the stems, results show an increase binding of Cd to -O ligands (>50% for *S. nigrum*). We suggest that Cd is partly complexed by organic acids for transportation in the sap. To further constrain the fate of Cd in *S. nigrum* and *S. melongena*, we performed Cd stable isotope analysis of our samples. These new isotopic results will be presented and put in perspective with the XAS measurements.