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**Cadmium Speciation and Release Kinetics in a Thai Paddy Soil Subjected to Varying Redox Regimes.**

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Understanding the factors controlling Cd speciation and bioavailability in flooded, drained, and alternate flooded/ drained paddy soil will be crucial to developing and implementing best management practices needed for productive agricultural areas. Transformation of Cd species can occur in response to fluctuating soil moisture conditions. Redox potential is a master variable controlling Cd speciation and bioavailability in paddy soils, and soil pH influences the transport and fate of Cd. This research aims to study speciation of Cd and mobility of Cd and Zn under varying redox conditions. Synchrotron X-ray absorption spectroscopy (XAS) at the Advanced Photon Source (APS) was used to investigate Cd speciation in a contaminated paddy soil incubated at redox regimes representative of field conditions (e.g., flooded and drained). Bulk XAS data revealed CdCO<sub>3</sub> was the most abundant species in the limed Thai paddy soil (90 % in dry soil and >67 % in flooded soil). A stirred-flow reaction chamber was used to investigate Cd and Zn release kinetics from the paddy soil. Kinetic experiments revealed Cd and Zn release from soil was initially rapid followed by a gradual slow release of the metals at longer periods of time. The cumulative release of Cd and Zn were less than 15 % both in dry and flooded soil.

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