Changes in Availability of Zn in Several Soils With Redox Variation Resulting From Flooding. (S02-johnson014949-Oral)

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Abstract:

Although Zn is not oxidized or reduced under conditions commonly found in soils, it may be complexed with organic compounds or adsorbed to the surfaces of iron- and manganese-oxides, each of which is affected by soil redox conditions. Zn availability could be indirectly affected in some soils by redox variation as the oxides or OM are oxidized or reduced, changing the way they interact with Zn. In this study, DTPA-ammonium bicarbonate extractable Zn was measured over time at 2-cm depth beneath soil surface in 6 soils at various initial pH and Zn levels for 4 months after flooding in pots. Extractions were performed on wet soils to avoid oxidation during drying, and results were periodically compared with traditionally air-dried samples. Redox potential was also monitored. In all soils, both slightly acidic and slightly basic, available Zn decreased over time as the soils became more strongly reduced. This decrease is predictable based on the frequent observation of Zn-deficiency in paddy rice, but further research is necessary to determine which chemical processes are most important. Decreasing availability of Zn under flooded conditions has implications for the timing and method of soil testing and Zn fertilizer application in rice systems.

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