Effect of Copper Adsorption on Al Concentration and pH Decline of Equilibrium Solution in Two Variable Charge Soils from China. (S11-yu074337-Poster)

Authors:

- S.Yu - *Zhejiang Unversity*
- Z.L.He - *University of Florida*
- C.Y.Huang - *Zhejiang University*
- D.V.Calvert - *University of Florida*

Abstract:

Effects of copper (Cu) input on soil acidification were studied on two variable charge soils: one developed on the Arenaceous rock (RAR soil, clayey, mixed siliceous thermic typic Dystrochrept) and the other derived from the Quaternary red earths (REQ, clayey, kaolinitic thermic plinthite Aquult). Solution pH decreased with increasing Cu adsorption in both soils, whereas aluminum ion (Al3+) concentration in the equilibrium solution of the RAR soil increased linearly with the initial Cu2+ loadings, but an increase in Al3+ concentration was detected only at initial Cu2+ loadings above 750 umol Cu2+ L-1 for the REQ soil. The release of H+ and Al3+ ions were related to Cu2+ adsorption mechanisms in the variable charge soils. Both specific adsorption and cation exchange of Cu2+ with adsorbed H+ and Al3+ contributed to soil acidification. The exchange occurred when exchangeable bases were exhausted. In addition, hydrolysis of released Al3+ could produce additional protons in the soils. Therefore, replacement of exchangeable Al3+/H+ by added Cu2+ is an important mechanism for acidification of variable charge soils at contaminated Cu2+ levels.

Corresponding Author Information:

Shen Yu
Zhejiang University
Rm 202, Unit 2, Bldg 14, Cuiyuanwuqu
phone: +86-571-88920795
e-mail: yu_shen@mail.hz.zj.cn

Hangzhou 310012
China

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