

Supplementary Information

Ferrihydrite Reduction Increases Arsenic and Uranium Bioavailability in Unsaturated Soil

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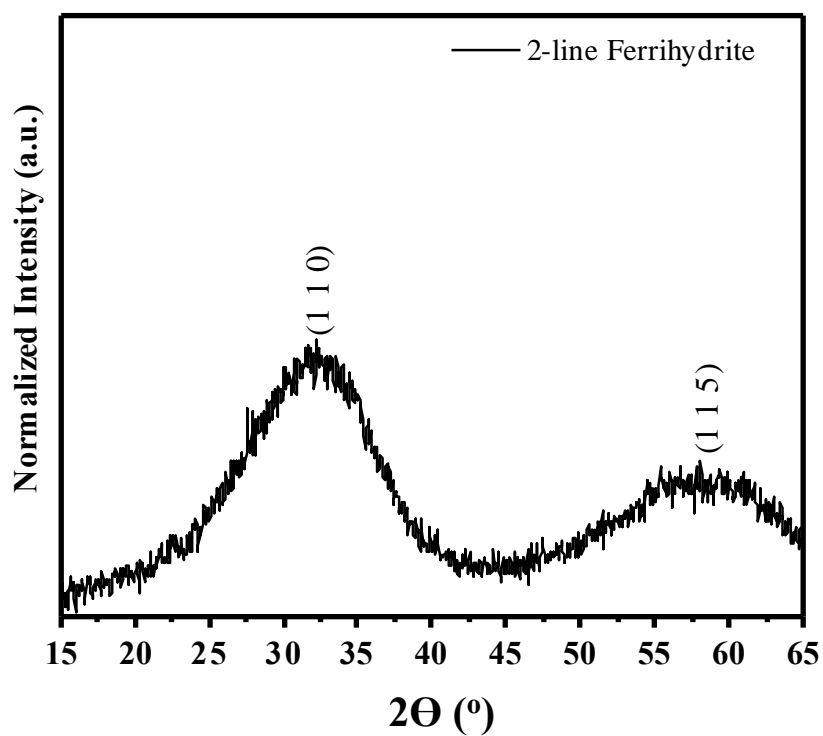


Figure S1. 2-line ferrihydrite powder X-ray diffraction data, matches well with PCPDF#29-0712.

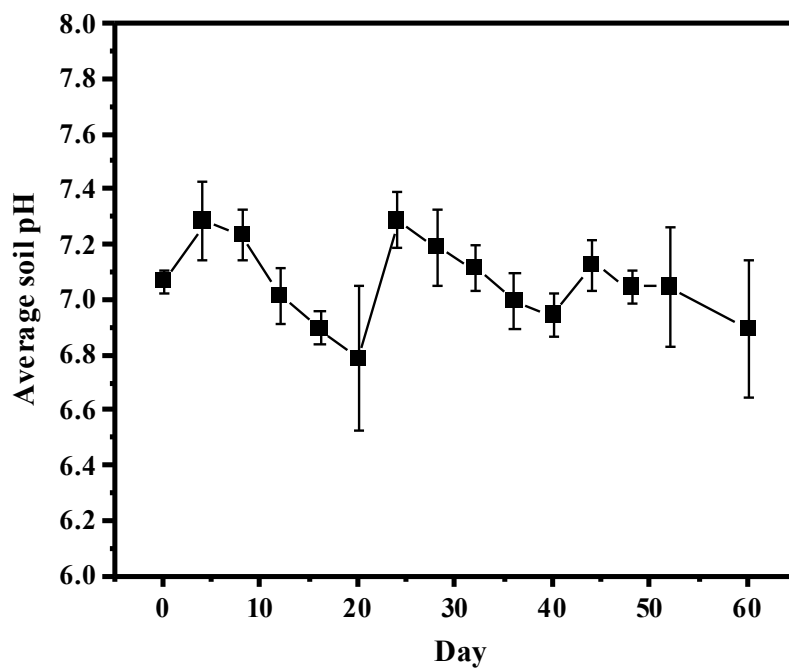


Figure S2. Average soil pH of all the pots, error bar represents the standard deviation between pH values.

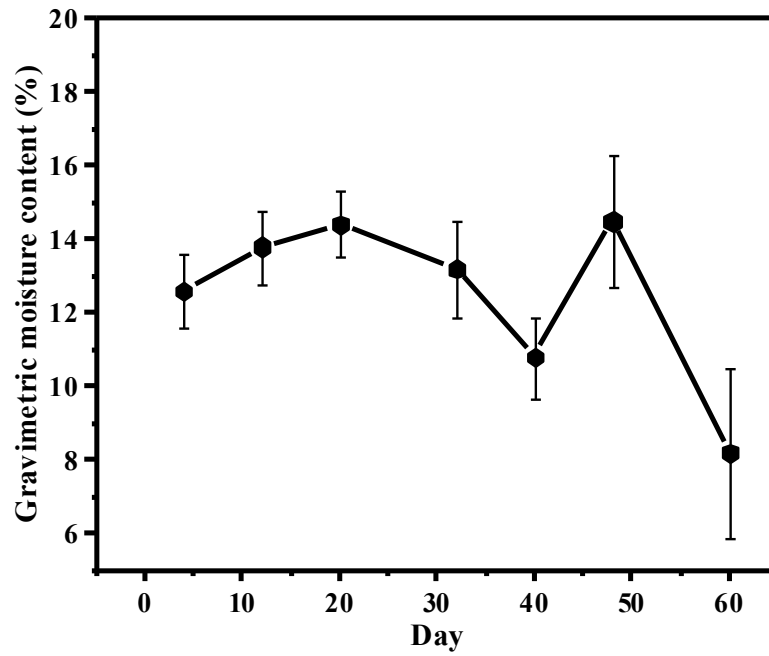


Figure S3. Average gravimetric moisture content of all the pots, error bar represents the standard deviation between gravimetric moisture content values.

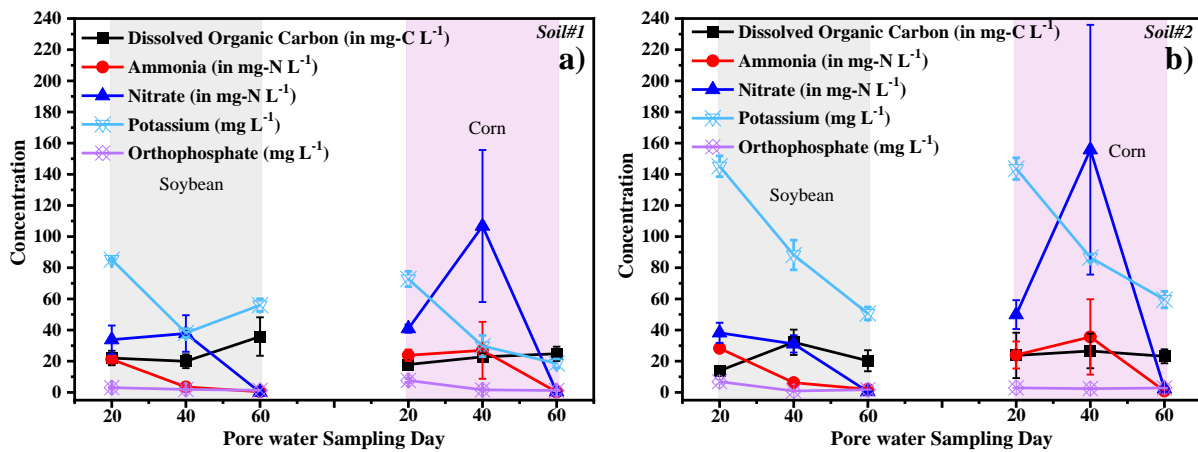


Figure S4. Shows dissolved organic carbon, ammonia, nitrate, potassium, and orthophosphate concentrations in leachate for a) soil#1 and (b) soil#2.



Figure S5. Shows soybean and corn crops in soil#1 (left) and soil#2 (right).

Table S1. Fe²⁺ values as predicted by chemical equilibrium model compared with experiment value.

Soil 1	Fe²⁺ Exp (mol L⁻¹)	Fe²⁺ Model (mol L⁻¹)
Soybean	4.6 * 10 ⁻⁶	2.7 * 10 ⁻⁵
Corn	2.5*10 ⁻⁶	1.5*10 ⁻⁶
Soil 2	Fe²⁺ Exp (mol L⁻¹)	Fe²⁺ Model (mol L⁻¹)
Soybean	5.0*10 ⁻⁶	1.7*10 ⁻⁶
Corn	4.4*10 ⁻⁶	2.5*10 ⁻⁶

Table S2. Saturation index of ferrihydrite mineral as per chemical equilibrium model.

Soil#1	Corn	Soybean
Day 20	-0.87	-1.03
Day 40	-0.71	-0.98
Day 60	0.32	1.47
Soil#2	Corn	Soybean
Day 20	-2.9	-3.1
Day 40	-1.18	0.01
Day 60	0.23	1.09

Table S3. Shows iron (Fe) mass balance mean and standard deviation of all replicates for each crop and soil type.

Acid Digested Initial Fe	Initial DCB* Fe	Acid Digested Final Fe	Final DCB* Fe	DCB* Difference	Fe in leachate within 1 st hour	Fe in crop	Unaccounted Or Converted Fe
(in mg)							
Soil#1 Soybean							
4739±235	4599±232	4337±193	4216±90	382±154	1.4±1.5	2.3±.8	379±152
Soil#2 Soybean							
6132±363	5873±307	5882±332	5682±227	245±85	0.7±0.2	1.2±0.6	243±85
Soil#1 Corn							
4809±82	4608±156	4329±145	4151±252	457±160	0.6±0.2	3.0±1.2	454±160
Soil#2 Corn							
6643±897	6020±161	6108±1048	5513±490	506±410	0.7±0.3	3.0±1.0	502±410

*DCB: Dithionite-citrate-bicarbonate method Fe extraction.