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Supplementary Material

Selenium bioconcentration in Canadian oat (*Avena sativa*) from soils treated with nanoscale elemental selenium

Sahar Zeinali[A], *Kyong Sup Yoon*[A], *Elizabeth Esselman*[B], *and Zhi-Qing Lin*[A,B,*]

[A]Department of Environmental Sciences, Southern Illinois University, Edwardsville, IL 62026, USA.

[B]Department of Biological Sciences, Southern Illinois University, Edwardsville, IL 62026, USA.

[*]Correspondence to: Zhi-Qing Lin Department of Environmental Sciences & Department of Biological Sciences, Southern Illinois University, Edwardsville, IL 62026, USA Email: zhlin@siue.edu

Chemical synthesis of Se nanoparticles

According to the synthesis protocol, 1% (w/w) of polyvinyl alcohol (PVA) was dissolved in 100 mL double deionized water in a beaker and heated for 20 minutes at 80 °C while stirring with magnetic stir bar until PVA became completely dissolved, at the same time 1% (w/w) of sodium dodecyl sulfate (SDS) also was dissolved in 100 mL double deionized water in a different beaker. At the room temperature these two solutions were then mixed well in a 500 mL volumetric flask. This was the mixed surfactant matrix for all concentrations of SeNPs. The amounts of the four chemicals used for producing different amounts of SeNPs for the selected soil Se treatments were compiled in Suppl Table 1. In brief, selenious acid and ascorbic acid were first dissolved in 100 ml of double deionized water separately, and then mixed the solutions in a 500-ml flask containing the surfactant solution of 200 ml. The chemical reduction took place for approximately 7 minutes. The pH of the SeNP solution was also adjusted from acidic to neutral by adding 20% sodium hydroxide solution.

Suppl Table 1. The amount of chemicals used for producing different concentrations of SeNPs. PVA: Polyvinyl alcohol; SDS: Sodium dodecyl sulfate.

Soil SeNP Treatment (mg/kg)	PVA (g)	SDS (g)	Ascorbic acid (g)	Selenious acid (g)
1	1	1	0.9604	0.0100
5	1	1	0.4684	0.0490
10	1	1	0.9369	0.0980

The major physical and chemical properties of the experimental soil

The major physical and chemical properties of the experimental soil have been determined and shown in Suppl Table 2.

Suppl Table 2. Major physical and chemical properties of the experimental soil. Values are means ± standard deviations (n=3)

Soil parameter	Mean ± STD	Soil parameter	Mean ± STD
OM (%)	4.1±0	S (mg/kg)	89.3±4.9
pH	7.33±0.05	Zn (mg/kg)	10.8±0.1
CEC (meq/100g)	18.90±0.1	Mn (mg/kg)	95±3.6
Na (mg/kg)	27±1	Fe (mg/kg)	75.7±1.1
P (mg/kg)	57.3±4.0	B (mg/kg)	1.1±0
K (mg/kg)	252.00±3.6	Al (mg/kg)	336.7±36.5
Ca (mg/kg)	3030±36	Mo (mg/kg)	0.1±0
Mg (mg/kg)	363.33±5.7	Cu (mg/kg)	2.6±0.05