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LETTER TO THE EDITOR

Reply to the Comments by Dr. S. Goldberg on "Adsorption Sequence of Toxic Inorganic Anions on a Soil" by K. Saeki, *Bull Environ Contam Toxicol* (2008) 81:508–512

Kazutoshi Saeki

I am grateful for the opportunity to reply to the letter from Dr. S. Goldberg about the errors in my paper published in Bull Environ Contam Toxicol (2008) 81:508–512.

Dr. S. Goldberg pointed out an oversight about As adsorption in the method section in the text. This is with regard to the sentence "The anion solutions were prepared from analytical grade $NaAsO_2$, $Na_2HAsO_4 \cdot 7H_2O$, $Na_2CrO_4 \cdot 4H_2O$,…" on L. 11 and 12 of the left column on p. 509 of my paper. I made the error of adding "$NaAsO_2$," which is an As(III) salt. To clarify, in this study, I did not prepare $NaAsO_2$, but I used only $Na_2HAsO_4 \cdot 7H_2O$ as an As(V) salt. I would like to apologize for this oversight. This is probably what led Dr. S. Goldberg to believe that I should have investigated As(III) adsorption in this study. In fact, I prepared a $Na_2HAsO_4 \cdot 7H_2O$ [As(V)] solution and investigated only As(V) adsorption; I did not investigate As(III) adsorption. As(III) adsorption does not involve ligand-exchange reactions, as revealed in my other study (Saeki 2008). However, the results in Fig. 2 showed that H^+ consumption occurred together with As adsorption, which confirms that I used "$Na_2HAsO_4 \cdot 7H_2O$ "to investigate As(V) adsorption. Therefore, I believe that the data on As(V) adsorption that I have presented in this paper are valid, whereas I have to apologize for the oversight.

Dr. S. Goldberg expressed concern about the oxidation of As(III) and Se(IV) in the solutions during the reaction. I would also like to apologize for not providing the details of the experiment in the text. In this study, we examined the chemical speciation of As and Se in the solutions as well as in the filtrates by using an atomic absorption spectrophotometer with a hydride generator (HG–AAS), other than the estimation using SOILCHEM (Sposito and Coves 1988). Any oxidation of Se(IV) to Se(VI) can be neglected in the Se(IV) adsorption experiments because the Se(VI) in the final solutions scarcely existed (<0.1%) in the solution, based on the HG–AAS analysis. This stability in the apparent concentration is probably attributable to the high concentrations of Se and As added to the suspensions in this experiment. In a series of anion sorption studies, including this study, conducted by us, we used considerably high concentrations (1–50 mmol L^{-1}) of anions to enhance their adsorption reactions in order to elucidate the ligand-exchange reactions, and the reactions were carried out at pH 5 for a relatively short period (6 h) of time in this study. Dr. S. Goldberg and her colleagues reported in another study that oxidation of As(III) to As(V) did not occur in the adsorption suspensions of soils at $pH < 8$ for a reaction time of 16 h (Manning and Goldberg 1997) in which the As concentration added seemed to be about 13 mmol L^{-1}. Therefore, their study can suggest that an oxidation of As(III) to As(V) could have been neglected, if As(III) adsorption experiments had been carried out in the present condition, although not relevant to the purpose of this study. In conclusion, the concern about the oxidation of As(III) and Se(IV) would not decrease the validity of the results of this study, whereas I have to apologize for the poor description on the method section in this paper.

References

Manning BA, Goldberg S (1997) Arsenic(III) and arsenic(V) adsorption on three California soils. Soil Sci 162:886–895

Saeki K (2008) The comparison of arsenite and arsenate adsorption on an andosol. Soil Sci 173:248–256

Sposito G, Coves J (1998) SOILCHEM: a computer program for the calculation of chemical speciation in soils. The Kearney Foundation of Soil Science, University of California, Riverside and Berkeley, USA

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