

Labware Evaluation for Selenium Sorption Experiments

Rebecca K. McGrail, Louis M. McDonald, Ph.D.

Davis College of Agriculture, Natural Resources, and Design

West Virginia University, Morgantown, WV



Introduction

- Average Se content is $0.02 \mu\text{g L}^{-1}$ in freshwater and $0.08 \mu\text{g L}^{-1}$ in saltwater.
- Mining discharge can contain considerable Se: $3 - 12 \mu\text{g L}^{-1}$.
- US EPA has established $5 \mu\text{g L}^{-1}$ as the chronic aquatic life criterion.

Objective

- Assess suitability of labware material for Se sorption studies:
 - glass
 - silanized glass
 - polypropylene
 - polytetrafluoroethylene

Experimental Design

- 1) Se stock solution of 0, 10, 25, and $50 \mu\text{g L}^{-1}$ was delivered to sample containers in triplicate.
- 2) Equilibration period of 6, 12, 24, or 48 hours.
- 3) Analysis by HG-AFS for total Se.

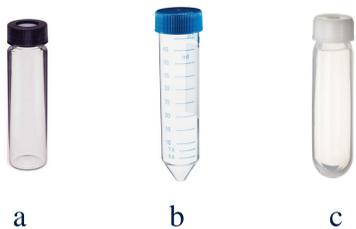


Figure 1. Materials used: (a) glass, (b) PP plastic, and (c) PTFE plastic.

Results

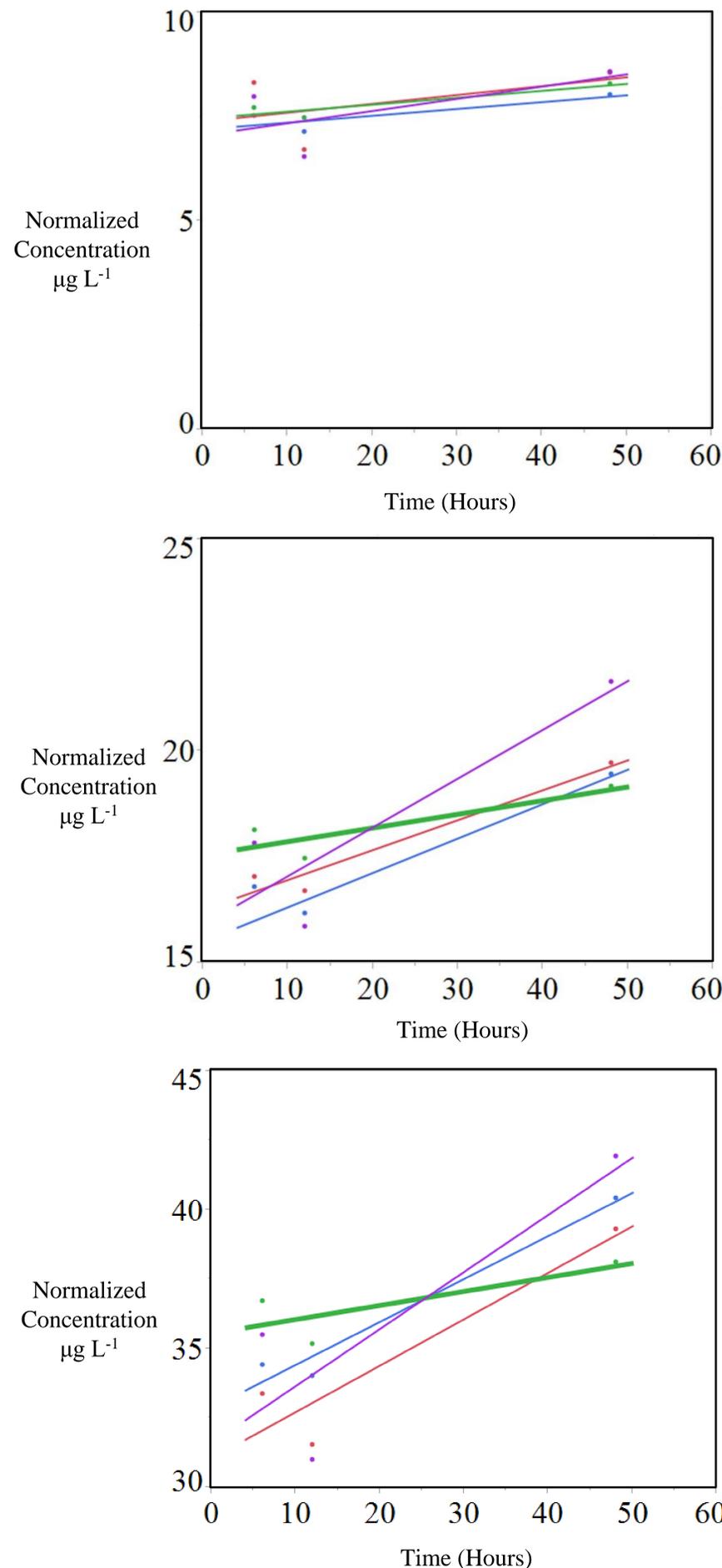


Figure 2. Normalized concentration ($\mu\text{g L}^{-1}$) v. time (hours) by analyzed concentration. Silanized glass had the smallest slopes (0.018, 0.037, and 0.058) at all concentrations as determined by ANACOVA.

Conclusions

- Silanized glass is most suitable for Se sorption studies.
 - Smallest loss in concentration over all times.
 - Small variability between samples.

Future Work

- Silanized glass will be used in all future experimental work.
- Evaluation of AMD treatment solids and overburden materials as sorbents for Se.
- Assess temperature influence on Se sorption to these solids.

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