

Selenium in Saline Waters

The Great Salt Lake (GSL) is a large migratory bird habitat with very high salinities (12% - 27%), up to 7.5x that of seawater. Selenium cycling and monitoring in the lake is the first important step in understanding potential biomagnifications and their impact on bird populations.

The combination of SC-FAST with ELAN DRC ICPMS facilitates low level Se determinations in high salinity samples that are both precise and accurate. The reaction cell is used to remove interferences, while the SC-FAST improves long term stability and throughput.

Benefits of SC-FAST for Elan

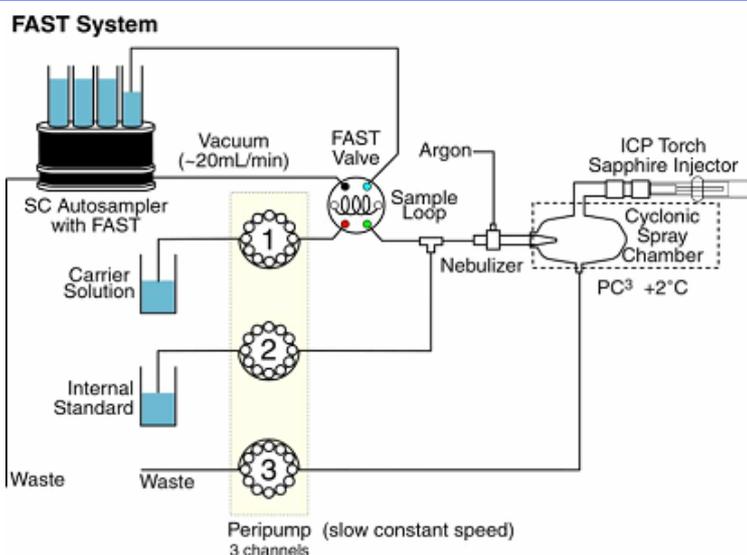
- Signal enhanced
- Stability improved
- Throughput doubled
- Salt load reduced



SC-FAST for Elan

Sample Preparation:

0.5mL methanol and 0.5mL nitric acid are added to 2mL of filtered (0.4µm) sample and made up to 50mL with high purity (18MΩ) water. (25x dilution)

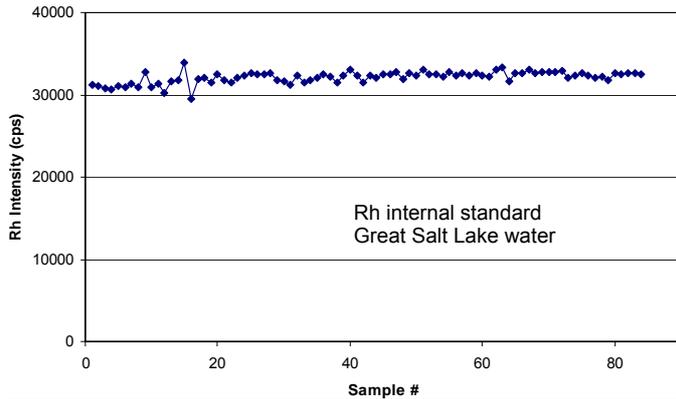


Salt free ELAN sampler cone after >300 GSL samples

Sample Flow rate: 300µL/min
 Internal Standard : Rh, on-line addition
 Carrier Solution: 1% HNO₃
 Nebulizer: PFA-ST
 Peltier Cooler: PC³ 2°C

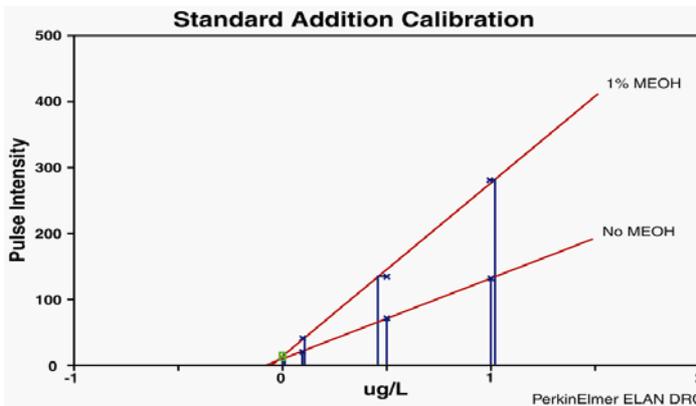
ICP-MS: PE ELAN DRC
 Forward Power: 1600W
 Cell Gas: O₂, 1.5mL/min
 m/z: 80
 Analysis Time: 59 secs/sample

Stability



- 80 replicates injections of 25 fold diluted sample.
- 0.5% Total dissolved solids
- < 3% RSD, excellent precision
- No salt deposition on ICPMS cones
- Increased throughput

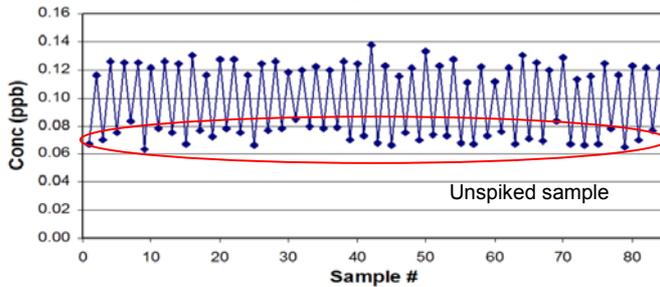
Calibration Data



- Carbon enhancement effect on poor ionizers such as Se
- Low blanks using O₂ as collision cell gas
- Improved detection limits

DL as Analyzed	DL in GSL Water
0.017 ppb	0.40 ppb

Recovery



Precision & accuracy	
Spike	0.040 ppb
Det. (n=5)	0.041ppb
Recovery (%)	103
RSD (%)	4.5

Alternate analysis of GSL sample & 40ppt Se spiked GSL sample, 2.5x the detection limit. Total analysis time 84 minutes.

Summary

The SC-FAST with ELAN method

- Increases signal and stability
- Decreases uptake and wash
- Increases sample throughput
- Reduces salt load and cone deposition



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