

# CSIA Monitoring Scope

PAZ

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## Purpose

Plot sampled cocentrations agains theoretical minimum mass vs. volume relations for multi-element CSIA.

Data file:

- **MonitoringScope\_R.csv** (R generated, Book 5  $\approx$  Line 350 )

## Carbon

### Conversion to ng

For a given sample of concentration  $C$  [ $\mu g/L$ ], considering a 4  $\mu L$  injection and a vial volume  $x_{vial}$  of 500  $\mu L$ :

$$C [\mu g/L] \cdot \frac{10^3 ng}{1 \mu g} \cdot \frac{1 mol_{S-met}}{283.796 g} \cdot \frac{12.0107 g}{1 mol_C} \cdot 15 \cdot \frac{4 [\mu L inj.]}{x_{vial} [\mu L vial]} \cdot X_{smp} [L] = M_C$$

The same equation re-arranged to compute it numerically so as to yield 10 ng of carbon, from a 500  $\mu L$  vial:

$$C [\mu g/L] \cdot \frac{10^3 ng}{1 \mu g} \cdot \frac{1 mol_{S-met}}{283.796 g} \cdot \frac{12.0107 g}{1 mol_C} \cdot 15 \cdot \frac{4 [\mu L inj.]}{500 [\mu L vial]} \cdot \frac{1}{10 ng_C} = \frac{1}{X_{smp} [L]}$$

## Chlorine

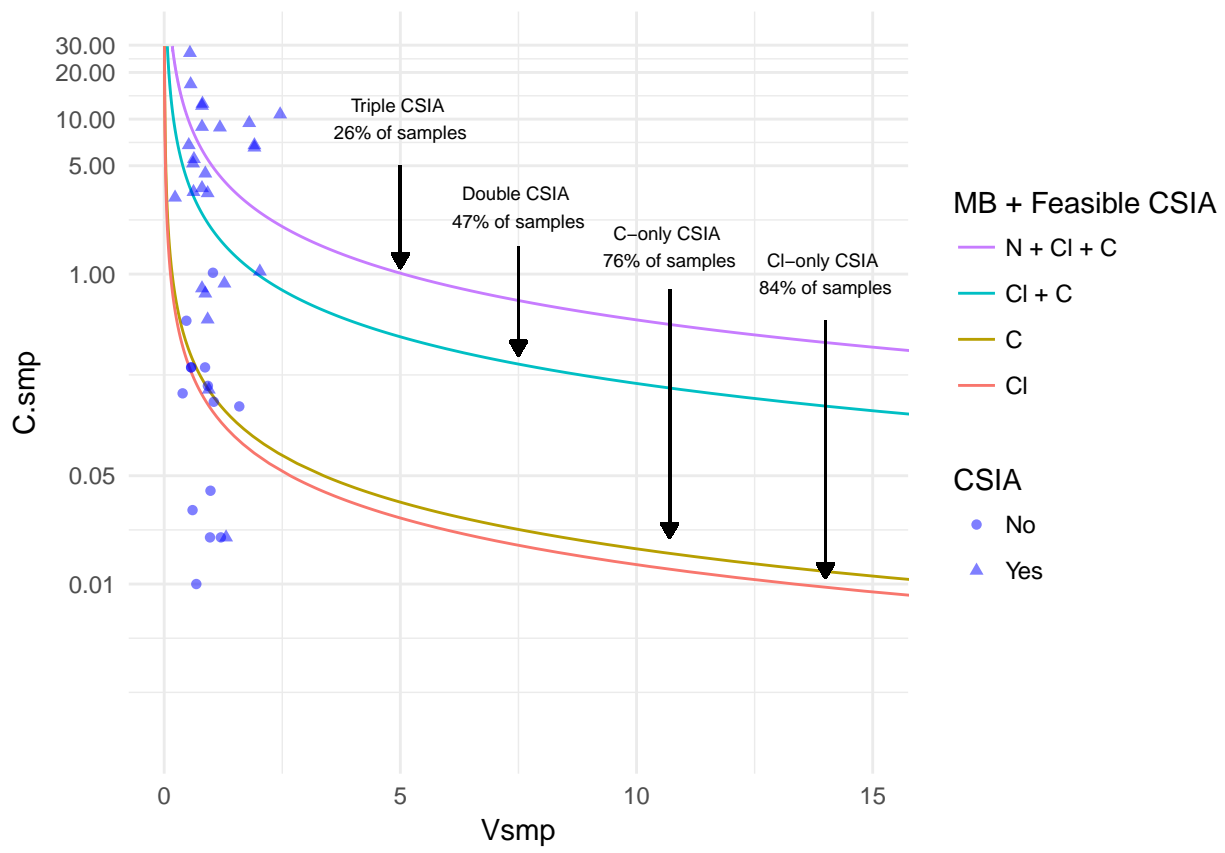
$$C [\mu g/L] \cdot \frac{10^3 ng}{1 \mu g} \cdot \frac{1 mol_{S-met}}{283.796 g} \cdot \frac{35.453 g}{1 mol_{Cl}} \cdot 15 \cdot \frac{4 [\mu L inj.]}{500 [\mu L vial]} \cdot \frac{1}{10 ng_{Cl}} = \frac{1}{X_{smp} [L]}$$

## Nitrogen

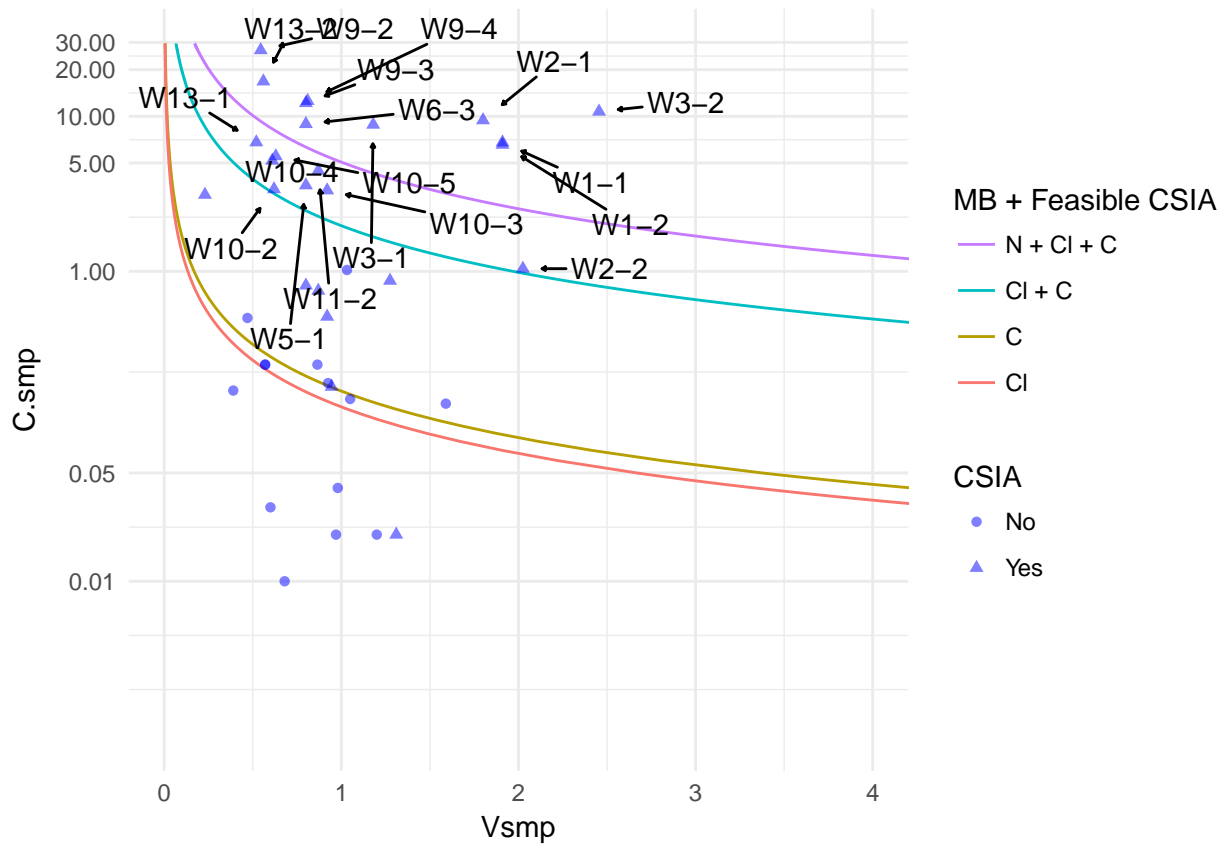
$$C [\mu g/L] \cdot \frac{10^3 ng}{1 \mu g} \cdot \frac{1 mol_{S-met}}{283.796 g} \cdot \frac{14.007 g}{1 mol_N} \cdot 15 \cdot \frac{4 [\mu L inj.]}{500 [\mu L vial]} \cdot \frac{1}{30 ng_N} = \frac{1}{X_{smp} [L]}$$

## Plotting

### Carbon and Chlorine



## Plotting with labels



## Percentages

```
## [1] "% Samples capable of triple CSIA"
## [1] 26.31579
## [1] "% Samples capable of double CSIA"
## [1] 47.36842
## [1] "% Samples capable of single C - CSIA"
## [1] 76.31579
## [1] "% Samples capable of single Cl - CSIA"
## [1] 84.21053
```