

Summary of Method Tritium is measured in 5-10mL aliquots of water using liquid scintillation counting. An Eichrom Tritium column is used to remove potentially interfering nuclides and matrix which can cause quench in the liquid scintillation cocktail. Sample size will be limited by the amount of sample that can be effectively mixed with the liquid scintillation cocktail (typically 5-10mL) and the salt content of the sample which can impact the separation of difficult to remove nuclides, such as isotopes of Cs. For samples which this method is not adequate, distillation methods, such as ASTM D4107 are recommended.

Reagents

Tritium Column (Eichrom H3-C50-A)

Deionized Water

Liquid Scintillation Cocktail

Nitromethane (Or other quench agent)

³H Standard (To measure LSC quench curve)

HCl (for sample pH adjustment)

NaOH or NH₄OH (for sample pH adjustment)

Equipment

Column Rack (Eichrom AC-103)

Extension Funnels (Eichrom AC-120)

Centrifuge Tubes - 50mL

20mL glass liquid scintillation tubes

Liquid scintillation counter

Calibrated pipets and disposable tips

pH meter or pH strips

Analytical balance

Table 1. Sample Processing on Tritium Column

	Tap Water	Ground Water	Sea Water
Sample mL	15	15	3
Dilution	none	none	3mL sample to 10mL
Discard mL	2.5	2.5	2.5
Collect mL	12.5	12.5	5.0
mL to LSC	10.0	10.0	5.0

Sample Preparation

1-25mL of water sample.

Dilute high salt samples as necessary (Table 1)

If necessary, filter sample.

Adjust sample pH to 6-8.

Remove tips from tritium columns.

Allow column storage solution to drain.

Rinse column with 10mL DI water.

Add sample to column.

Allow column to flow by gravity.

Discard first 2.5mL.

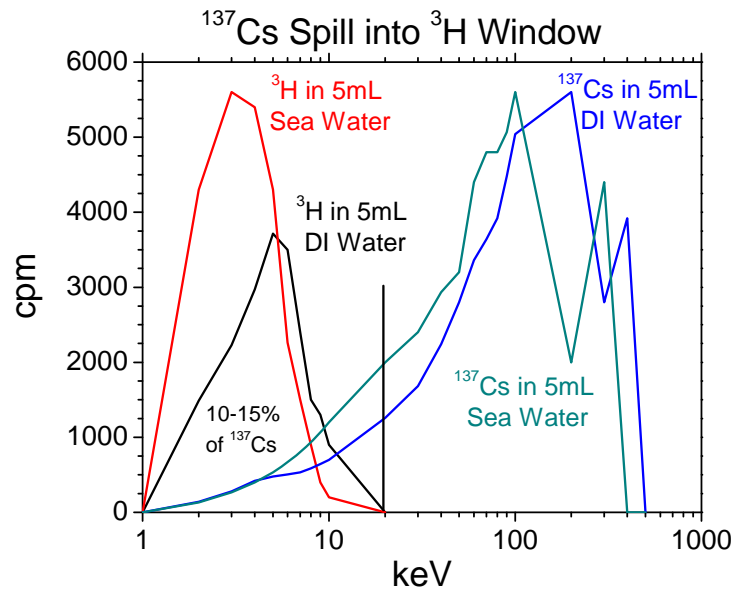
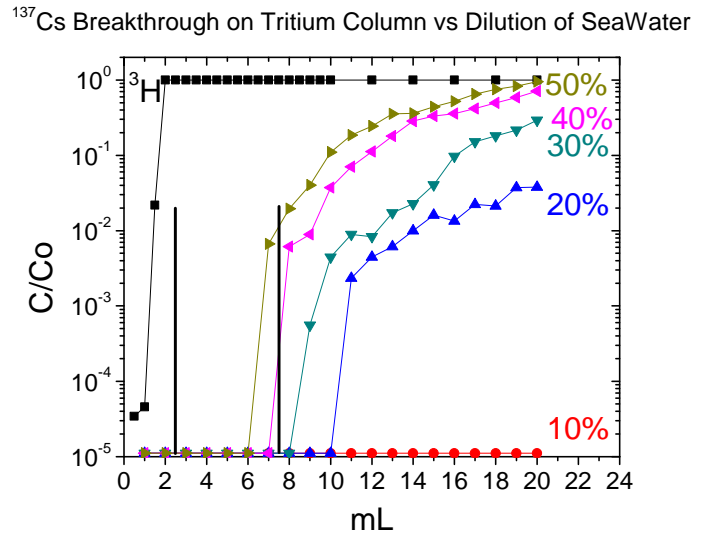
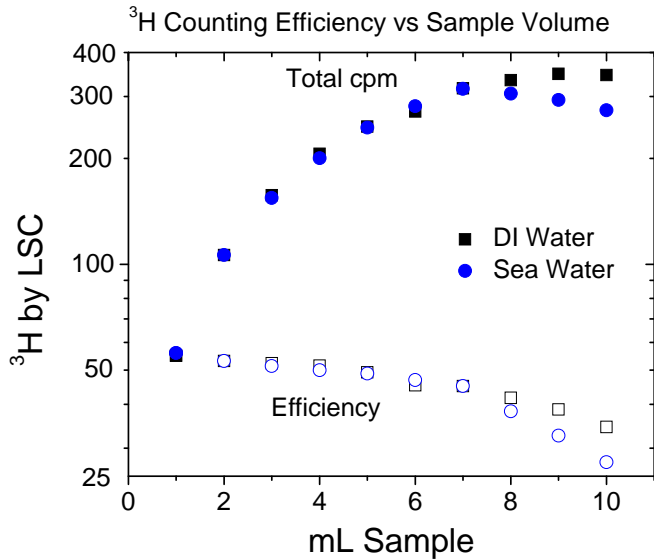
Collect remaining sample in 50mL centrifuge tube.

Aliquot 5-10mL of purified sample to 20mL glass LSC vial.

Add appropriate amount of liquid scintillation cocktail.

Mix samples and cocktail.

Dark adapt samples for 1-2 hours before counting by liquid scintillation.



References

- 1) Eichrom Method H3W02. "Tritium in water," <http://www.eichrom.com/eichrom/radiochem/methods/eichrom/>