

Method Number: TM 420

Updated: 16/03/2022

Issue Number: 02



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Method Summary**Determination of 1,4-Dioxane in Liquid by GCMS****Scope and Range**

This method is used to determine 1,4-dioxane in water samples.

Detection limit: 0.07µg/L

This method is currently unaccredited.

References

U.S. EPA 2014 - EPA 3511 - Organic compounds in water by microextraction.

U.S. EPA July 2014 - EPA 8270D - Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS).

1,4-dioxane is an emerging contaminant completely miscible with water. It is a likely contaminant at many sites contaminated with certain chlorinated solvents (particularly 1,1,1-trichloroethane) because of its widespread historical use as a stabilizer for chlorinated solvents. It may migrate rapidly in groundwater, ahead of other contaminants.

It is also used as a purifying agent in the manufacture of pharmaceuticals and a by-product in the manufacture of surfactants and polymers such as polyethylene terephthalate (PET) plastic.

Principle

Preparation and Extraction:

An isotope labelled analogue is added prior to sample extraction and carried through the entire extraction procedure and used as internal standard (IS).

A microextraction is performed, using dichloromethane, to extract 1,4-dioxane from the sample.

Analysis:

Extracts are analysed via GCMS operating in the SIM mode:

Type	Compound	Quantifier (m/z)	Qualifier (m/z)
IS	1,4-dioxane-d8	96	64
Analyte	1,4-dioxane	88	58

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Interferences

Matrix interferences may be caused by contaminants that are co-extracted from the sample. These will vary considerably depending on the nature of the matrix. The method operates in selected ion monitoring mode and the masses of interest are low. Chromatographic resolution is required to ensure separation of the target analyte from potential interferences.