

Method for the Extraction of Environmental Contaminants Including Dioxins and Furans from Soil and Sediment Samples Using ISOLUTE[®] NH₂ and RapidTrace[®] Workstation

Introduction

This application note describes for the extraction of environmental contaminants including Dioxins and Furans from soil and sediment samples using ISOLUTE NH₂ and RapidTrace Workstation

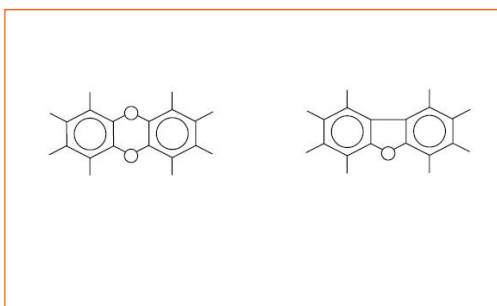


Figure 1. Basic dioxin and furan structures

The US EPA (United States Environmental Protection Agency) methods 8260 & 8270 cover the analysis of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans in ground & surface waters, as well as 1,4-dioxane and PCB 's. Dioxins and furans are a family of toxic chemicals that share similar chemical structures with a common mechanism of toxic action formed from the production of pesticides and herbicides. The levels of these chemicals in air, water and soil are constantly monitored through screening according to EPA guidelines, typical detection limits for these compounds in soil and sediments are 0.1 -1.0 parts per billion.

Columns

ISOLUTE NH₂ columns (3 mL, 500 mg part number 470-0050-B) contain a weak anion exchange sorbent specifically designed for the isolation and elution of strongly acidic and polyacidic analytes.

'The methods offered within this application are meant to represent a starting point and guide for method development and some amendment may be necessary.'

Analytes

Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans.

Sample pre-treatment

A 10 - 20 g dry weight sample of soil or sediment is mixed with several 20 mL volumes of hexane: acetone (v/v, 90:10) to extract the organic compounds from the matrix. The resulting solvent then needs evaporation using a TurboVap to reduce the volume to approximately 1 mL. The Acetone will be lost by this stage so that the Dioxins and Furans in Hexane can be separated from the interferences to allow the low detection limits required by the standards set by the US EPA.

The SPE steps were configured schematically using the RapidTrace software as follows:

RapidTrace procedure

	Step	Source	Destination	Volume (mL)	Flow (mL/min)
1	Condition	Hexane	Organic Waste	5.0	15.00
2	Load	Sample	Fraction 1	1.0	1.00
3	Collect	Hexane	Fraction 1	2.0	1.00
4	Purge-Cannula	Hexane	Cannula Waste	2.0	30.00

Reagent lines

Line 5: Hexane (sip speed = 30 mL/min)

Air push: 2 mL

Air push multiplier: 2

Biotage recommends TurboVap Workstations post elution to blow down your samples.

Ordering information

Part number	Description	Quantity
470-0050-B	ISOLUTE NH2 3 mL 500 mg	50
C50000	RapidTrace 3 mL Workstation	1
C50974	Tube Rack (13 x 100 mm Sample Tubes & 12 x 75 Fraction Tubes)	1
C40707	Test Tubes - 13 x 100 mm	1000
C44651	Test Tubes - 12 x 75 mm	1000
C52006	RapidTrace Start-Up Kit	1
C52689	RapidTrace Notebook Controller	1

RapidTrace Overview



The RapidTrace has been designed to eliminate sample preparation bottlenecks and it is a modular, highly scalable, automated platform designed for high throughput. Units are available to accommodate 1 mL, 3 mL and 6 mL SPE cartridges. Up to 10 modular units can be connected together and controlled through a simple, easy-to-use software package. The systems are widely used within analytical industry and are ideal both for industrial settings and for efficient SPE method development.

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