

# Analysis of Semi-Volatile Organic Compounds in Drinking Water Using EPA Method 525.3 with Semi-Automated Solid Phase Extraction (EZSpe™)

## Introduction

EPA Method 525.3 outlines the procedure for the extraction and analysis of a wide range of organic compounds in water. The extraction method outlines the use of solid phase extraction for water matrix samples employing both cartridges and disks. Consistent with other EPA 500 series methods, EPA 525.3 incorporates a rigid set of QC and acceptance criteria requiring precise and reproducible analytical practices. The potential for error and the variability associated with manual extractions makes the benefits of semi-automating these processes apparent.

To meet demands for a low cost method that requires less financial investment than fully automated systems, FMS developed a simple semi - automated system which is fast, inexpensive and yields high quality data.

## Instrumentation

- FMS EZSpe™ System
- FMS SuperVap®
- Vacuum pump
- Thermo Trace GC w/DSQ MS and AS3000 Autosampler

## Consumables

- FMS, Inc. 1 g DVB cartridge
- FMS sodium sulfate cartridge
- Ultra pure DI water
- Fisher 6 N Hydrochloric Acid
- Fisher Pesticide Grade Methanol
- Fisher Pesticide Grade Dichloromethane

- Ultra Scientific Calibration/Spiking solutions (SVM-525, PPM-525E, NPM-525C, NPM525B, NPM-108B, ISM-510)

## Procedure

- 6 samples (1L water each) are prepared and acidified with 1 mL HCl till pH ~ 2
- Add 5-10 mL methanol and spike with various standards
- Put sample bottles in place and fill dichloromethane rinse bottles with 25 mL solvent
- Cartridges are installed in each of the six positions.

### Stage 1:

- Vacuum is turned on
- Cartridges are conditioned with 5 mL dichloromethane, methanol and water
- Samples are loaded across cartridges under vacuum
- Cartridges are dried with nitrogen for 10 min
- Sample bottles are automatically rinsed from the rinse bottles with 25 mL dichloromethane

### Stage 2:

- Dichloromethane from sample bottles is loaded across the DVB cartridge and sodium sulfate cartridge and the eluent is collected for analysis into Direct to GC Vial Collection Vessels

## FMS SuperVap®

- Pre-heat temp: 50 °C
- Pre-heat time: 15 minutes
- Heat in Sensor mode at 50 °C under nitrogen (7-10 psi)
- Direct to GC Vial Vessel Reduce to 1 mL
- Samples are now ready for analysis

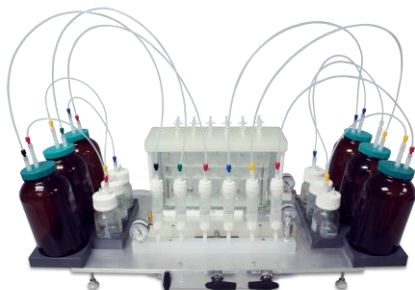


Table 1 with recoveries for a number of 525.3 compound classes

	Average (%)		Average (%)
1,3-dimethyl-nitrobenzene	102.8	Endrin	120.2
Acenaphthylene	92.6	Heptachlor epoxide	111.9
Alachlor	106.8	Isophorone	108.4
Alpha Chlordane	100.6	Methoxychlor	99.8
Atrazine	120.1	Metolachlor	112.0
Butachlor	124.9	Nanopropamide	110.4
Butylate	119.5	Perylene-d12	105.9
Carboxin	75.0	Phenamiphos	109.4
Chrysene-d12	91.1	Phenanthrene	104.8
Cycloate	114.4	Phenanthrene-d10	96.8
DDD	109.0	Prometon	119.1
DDE	101.1	Prometryn	122.8
Diazinon	97.4	Pyrene-d10	101.0
Dieldrin	101.1	Simazine	123.0
Dimethyl phthalate	105.5	Terbufos	107.8
Disulfoton	91.0	Trans-Nonachlor	97.3
Endosulfan I	121.4	Trifluralin	107.7

### Conclusions

Reviewing the sample data shows high recoveries for over 100 spiked analytes, demonstrating excellent efficiency for all classes of compounds. Samples can be taken from collection bottle to GC vial in one quick, consistent, reproducible process that will save laboratories both time and money.



FMS EZSpe system

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