

# Analysis of Nitrosamines in Waste Water with Automated Solid Phase Extraction (FMS TurboTrace®) Using EPA Method 607

## Introduction

Nitrosamines are a group of chemical compounds regulated due to their carcinogenic characteristics. They come from a variety of sources including widespread use in the manufacturing of rubber products, as well as cosmetics. Nitrosamines have also been demonstrated to react with food preservatives. Their analysis is described in US EPA 607.

By implementing an automated SPE system like the TurboTrace® System, samples can be extracted in a fully automated, precise, process that frees up extraction chemists to perform other tasks.

## Instrumentation

- FMS TurboTrace® System
- FMS SuperVap®
- Vacuum pump
- Thermo Trace GC with Trace DSQ MS

## Consumables

- FMS, Inc. 2 g coconut charcoal cartridges
- FMS, Inc. florisil cartridges
- FMS sodium sulfate column
- Ultra pure DI water
- Fisher Pesticide Grade Methanol
- Fisher Pesticide Grade Dichloromethane
- Fisher Pesticide Grade Pentane
- Fisher Pesticide Grade Diethyl Ether
- Relevant Nitrosamines Spiking Solutions

## Procedure

- 6 samples (1 L water each) are prepared, acidified to a pH ~2, and spiked with relevant standards
- Put sample bottles in place and fill automated rinse bottles with 100 mL 5% acetone in diethyl ether
- Cartridges are installed in each of the six positions.
- Vacuum is turned on
- Cartridges are conditioned with 40 mL of 15% diethyl ether in pentane
- Samples are loaded across cartridges under vacuum
- Cartridges are washed with 90 mL of 15% diethyl ether in pentane and sent to organic waste
- Sample bottles are automatically rinsed from the rinse bottles with 100 mL of 5% acetone in diethyl ether
- Eluent solution from sample bottles is now loaded across the coconut charcoal cartridges and sodium sulfate cartridges and the eluent is collected for analysis into Direct to GC Vial Collection Vessels

## FMS SuperVap®

- Pre-heat temp: 25 °C
- Pre-heat time: 10 minutes
- Heat in Sensor mode at 25 °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 Nitrosamines at 20-25 ng/L

Compound name	Average (%)
NDMA	116
NDPA	104
NDnPA	92

### Conclusions

The results of these wastewater samples demonstrate the ability of the FMS TurboTrace® system to deliver accurate results with excellent reproducibility. The automated TurboTrace® is superior to traditional, time-consuming, inconsistent and expensive liquid/liquid extractions.



FMS TurboTrace® System and SuperVap® Concentrator

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