Application Note

Analysis of Carbamate and Urea Pesticides in Waste Water with Semi-Automated Solid Phase Extraction (EZSpe®) Using EPA Method 632

Introduction

Carbamate and urea pesticides are a group of highly water-soluble compounds that build up in industrial and municipal wastewater systems from agricultural runoff. They are demonstrably toxic to multiple organ systems in both humans and animals. Hence, their extraction and analysis is described in US EPA 632.

To meet demands for a low cost method that requires less financial investment than 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
- Waters Alliance 2695 HPLC, UV254

Consumables

- FMS, Inc. 2 g coconut charcoal cartridges
- FMS, Inc. florisil cartridges
- FMS sodium sulfate column
- Ultra pure DI water
- Fisher Pesticide Grade Hexane
- Fisher Pesticide Grade Acetone
- Relevant EPA 632 Spiking Standards

Procedure

- 6 samples (1 L water each) are prepared, acidified to a pH ~2, and spiked with 632 standards
- Put sample bottles in place and fill automated rinse bottles with 200 mL 6% acetone in hexane
- Cartridges are installed in each of the six positions.

Stage 1:

- Vacuum is turned on
- Cartridges are conditioned with 60 mL of hexane
- Samples are loaded across cartridges under vacuum
- Sample bottles are automatically rinsed from the rinse bottles with 100 mL of 6% acetone in hexane
- The sample bottles are refilled and the above step is repeated 3 times, collecting 4-100 mL fractions

Stage 2:

- 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 LC Vial Collection Vessels

FMS SuperVap®

- Pre-heat temp: 50 ºC
- Pre-heat time: 10 minutes
- Heat in Sensor mode at 25 ºC under nitrogen (7-10 psi)
- Direct to LC Vial Vessel Reduce to 1 mL
- Samples are now ready for analysis

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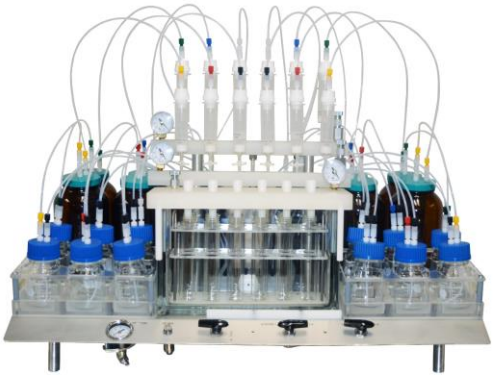
Table 1 with recoveries for Carbamate and Urea Pesticides

Compound name	Average
Aminocarb	93.4
Barban	87.2
Carbaryl	91.1
Carbofuran	96.0
Chlorpropham	83.9
Diuron	88.2
Fenuron	94.2
Fenuron-TCA	92.7
Fluometuron	91.9
Linuron	87.0
Methiocarb	79.6
Methomyl	90.5
Mexacarbate	84.9
Monuron	87.0
Monuron-TCA	93.6
Neburon	89.4
Oxamyl	76.8
Propham	82.1
Propoxur	93.0
Siduron	77.8
Swep	88.5

Conclusions

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



FMS EZSpe® System

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