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Scientific Report

Degradation Study of Methamphetamine by Liquid Chromatography – Mass Spectrometry After Exposure to SoRite® DECON

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1. Introduction

Aseptic Health requested that Triclinic Labs perform a degradation study on methamphetamine after treatment with their novel decontaminant product, SoRite® DECON (SoRite). Analysis of the treated material was performed using liquid chromatography-mass spectrometry (LC-MS). The goal was to quantify the degradation of methamphetamine between 15 seconds and 10 min of treating it with SoRite. A summary of the reference material and submitted sample is given in Table 1. A summary of the analyte is shown in Table 2.

Table 1. Summary of as-received samples

Material Name	Sample ID or Lot #	TCL ID
Methamphetamine Hydrochloride CII	R15780	TCL23803/TCL23804
SoRite® DECON	N/A	TCL23805

Table 2. Analyte summary

Compound Name	Molecular Formula	Exact Mass (g/mol)	Quantitation Ion (m/z)
Methamphetamine	$C_{10}H_{15}N$	149.12045	150.12776 $[M+H]^+$

2. Results and Discussion

As summarized in Table 3, methamphetamine showed a quick increase in percent degradation from 64% at 15 seconds to 99% degradation after 5 minutes of SoRite treatment. The overlaid single-ion chromatograms are shown below in Figure 1.

Table 3. Degradation study results of methamphetamine in SoRite.

	Percent Degradation
Time	Methamphetamine
15 sec	64%
1 min	83%
5 min	99%
10 min	99%

3. Experimental

3.1. Sample Preparation and Analysis

To study the degradation of methamphetamine, 0.25 g of a methamphetamine reference standard was mixed with 2.5 mL of SoRite to prepare a 100 mg/mL mixture and was then shaken for 15 seconds. After shaking, a 200 µL aliquot of the mixture was transferred to a vial containing 200 µL of a sodium thiosulfate neutralizing agent. This step was repeated after 1 min, 5 min, and 10 min (a total of four time). All samples were subsequently diluted 100,000x with water and analyzed for methamphetamine content by LC-MS.

A methamphetamine reference standard was analyzed along with the samples for quantification. The standard mixture was diluted in LC-MS grade water to create calibration standards for linearity and precision. The analysis was performed using the built-in solution of fluoranthene as an internal calibration lock mass (Thermo Easy-IC). Instrument methods are described below in Table 4 and Table 5.

3.2. Liquid Chromatography Method

Table 4. LC instrument method

System	Thermo Vanquish UHPLC		
Mobile Phase A	0.1% Formic Acid in Water		
Mobile Phase B	0.1% Formic Acid in MeOH		
Needle Wash	Water/MeOH (90:10)		
Diluent	Water		
Column	Thermo Accucore C18 (4.6 mm x 100 mm, 2.6 µm)		
Injection Volume	2 µL		
Flow	0.400 mL/min		
Sampler Temp.	10°C		
Column Temp.	30°C		
Run Time	12 min		
Gradient	Time (min)	A (%)	B (%)
	0.00	90	10
	5.00	90	10
	8.00	10	90
	10.00	10	90
	10.10	90	10
	12.00	90	10

3.3. Mass Spectrometry Method

Table 5. MS instrument method

System	Thermo Orbitrap Exploris 120
Source	H-ESI
Scan Type	SIM
Ionization Mode:	Positive
Ion Spray Voltage	2200 V
Sheath Gas	35 arb
Aux Gas	5 arb
Sweep Gas	1 arb
Ion Transfer Tube Temp.	325°C
Vaporizer Temp.	350°C

4. Figures

Figure 1. Overlaid single ion chromatograms of methamphetamine treated with SoRite after 15 seconds (black), 1 minute (blue), 5 minutes (magenta), and 10 minutes (red).