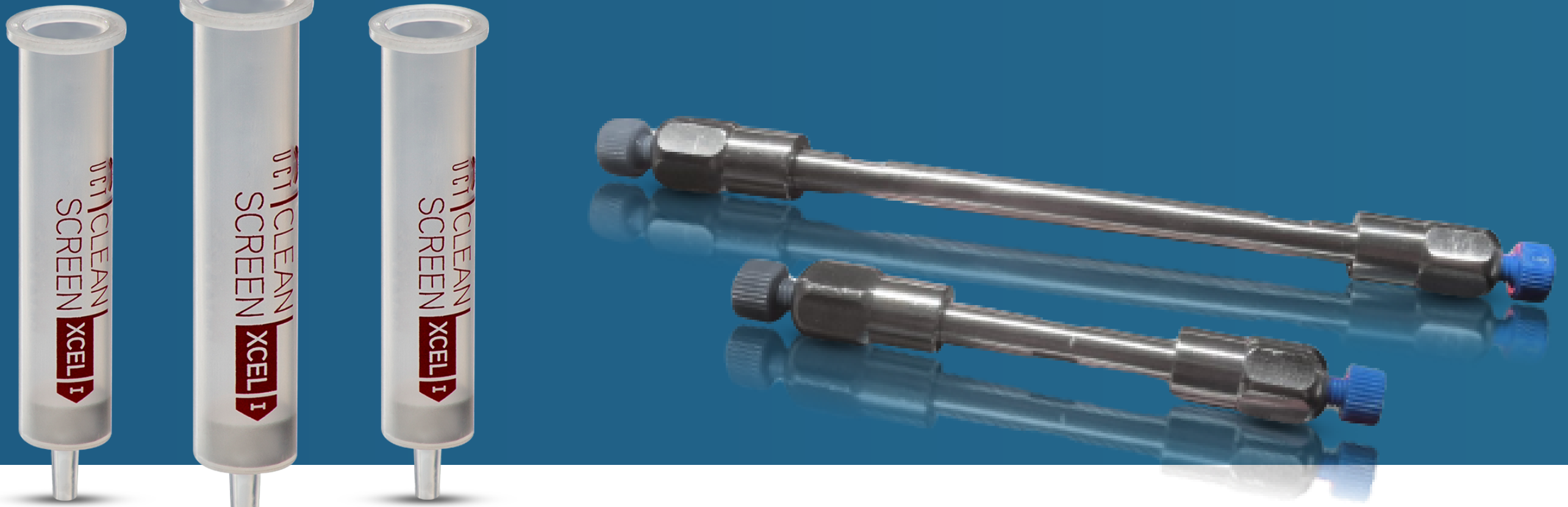




Analysis of Synthetic Cathinones From Blood and Urine By Solid Phase Extraction and LC-MS/MS

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INTRODUCTION

Synthetic cathinones, also known as ‘bath salts’, are a group of designer stimulants related to the naturally occurring alkaloid cathinone, which can be found in Khat.^{1,2} Stimulants cause an increase in activity in the central nervous system (CNS). At lower doses, some effects of stimulants include an increase in attention, alertness, and energy.³ Misuse of stimulants can result in some serious adverse effects such as psychosis, paranoia, aggression, and addiction.^{3,4} Synthetic cathinones are novel psychoactive substances (NPS) which means these drugs are new, and forensic laboratories must continue to update their scope of analysis to include these analytes. Some of the newly discovered synthetic cathinones include N,N-dimethylpentylone and α -PHP.

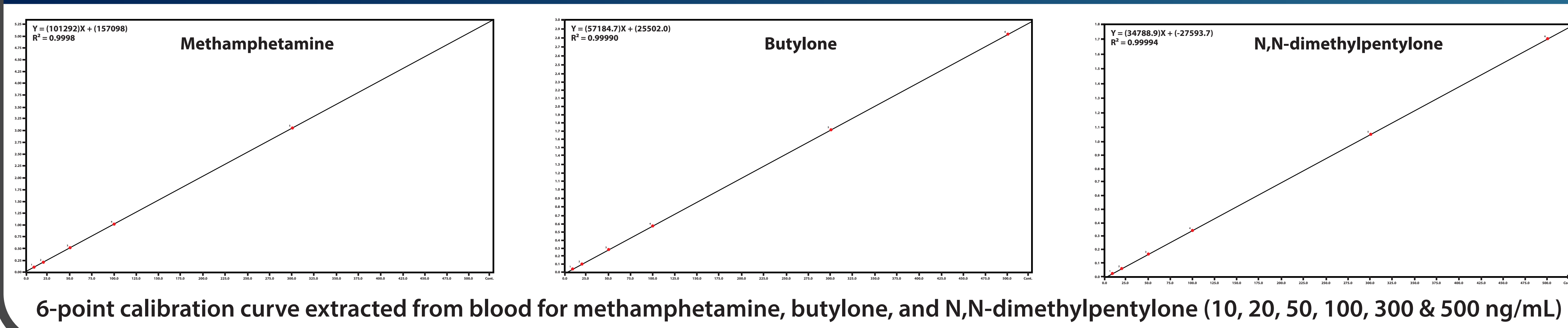
This poster outlines a solid phase extraction (SPE) extraction procedure and LC-MS/MS instrument parameters for analyzing new synthetic cathinones simultaneously with commonly encountered stimulants from blood and urine. The extraction was carried out using UCT’s Clean Screen® XCEL I SPE column and a liquid chromatography separation was achieved with a SelectraCore® DA column. UCT’s Clean Screen® XCEL column is specially formulated to eliminate the need for conditioning, leading to reduced solvent consumption and increased efficiency.

References:
[1] Synthetic cathinones - Alcohol and Drug Foundation. (2021, November 10). Adf.org.au. <https://adf.org.au/drug-facts/synthetic-cathinones/>
[2] Synthetic cathinones drug profile | www.emcdda.europa.eu. (n.d.). www.emcdda.europa.eu.https://www.emcdda.europa.eu/publications/drug-profiles/synthetic-cathinones_en
[3] Stimulants - Alcohol and Drug Foundation. (2021, November 10). Adf.org.au; Alcohol and Drug Foundation. <https://adf.org.au/drug-facts/stimulants/>
[4] Stimulants | Student Health and Counseling Services. (n.d.). Shcs.ucdavis.edu. <https://shcs.ucdavis.edu/health-topic/stimulants#:~:text=Stimulants%20increase%20cognitive%20function%20and>

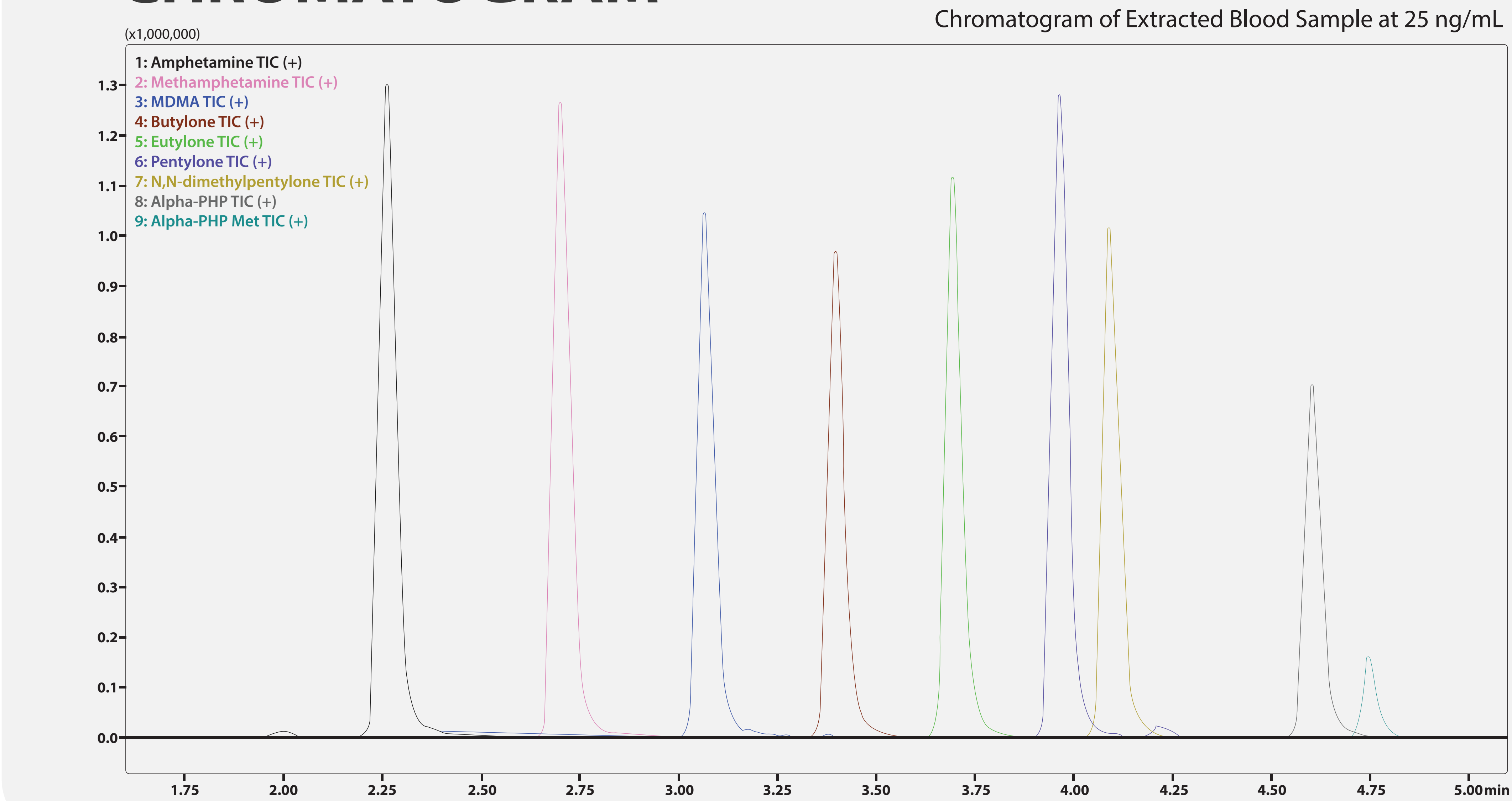
INSTRUMENT PARAMETERS

LC-MS/MS System	Shimadzu Nexera LC-30AD with MS-8050
UHPLC Column	SelectraCore® DA Column 50 mm x 2.1 mm, 2.7 µm (UCT P/N: SCS27-DA521)
Guard Column	SelectraCore® DA Guard Column 5 mm x 2.1 mm, 2.7 µm (UCT P/N: SCS27-DAGDC21)
Column Temperature	35 °C
Flow Rate	0.4 mL/min
Injection Volume	1 µL
Mobile Phase A	5 mM ammonium formate + 0.1% formic acid in water
Mobile Phase B	5 mM ammonium formate + 0.1% formic acid in methanol
Gradient	Conc. B 5% (0 min) - 100% (8-10 min) - 5% (10.20 - 13.20 min)

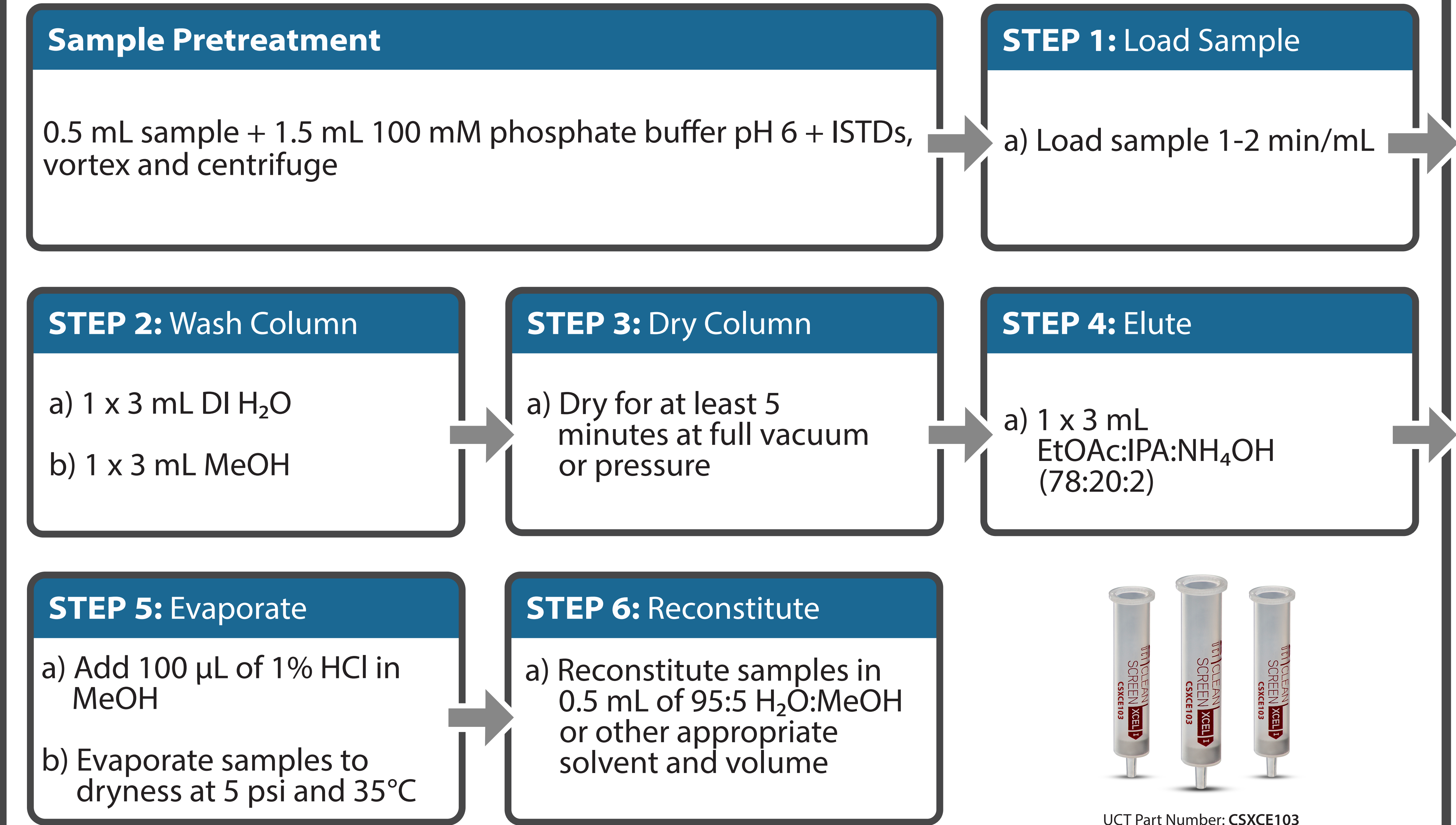
CALIBRATION CURVES



CHROMATOGRAM



SPE PROCEDURE



RESULTS

Urine						
n=5	25 ng/mL			200 ng/mL		
Analyte	Recovery (%)	Matrix Effects (%)	RSD (%)	Recovery (%)	Matrix Effects (%)	RSD (%)
Methamphetamine	100	-5	6	106	-5	2
Amphetamine	101	-6	5	105	-7	2
Eutylone	99	-2	6	101	-2	3
Butylone	98	-4	6	101	-4	2
Pentylone	98	-3	7	100	-4	2
N,N-dimethylpentylone	97	1	7	102	-3	3
MDMA	99	-2	7	100	0	3
α -PHP Metabolite	105	-3	5	103	-4	2
α -PHP	103	-5	6	105	-3	2

Blood						
n=5	25 ng/mL			200 ng/mL		
Analyte	Recovery (%)	Matrix Effects (%)	RSD (%)	Recovery (%)	Matrix Effects (%)	RSD (%)
Methamphetamine	91	-5	9	102	-16	5
Amphetamine	90	-6	8	101	-14	5
Eutylone	90	-5	8	97	-13	5
Butylone	90	-5	8	98	-13	5
Pentylone	91	-10	8	95	-16	6
N,N-dimethylpentylone	89	-9	9	98	-17	5
MDMA	90	-5	9	96	-12	6
α -PHP Metabolite	84	-32	17	80	-37	7
α -PHP	91	-23	12	99	-29	6

*Recoveries were calculated using a pre and post-spike sample technique. Matrix effects were calculated by comparing post-spike samples and solvent standards.

CONCLUSION

This poster presents a simple and effective method for the analysis of novel synthetic cathinones in conjunction with traditionally abused stimulants. The SPE extraction utilizing the Clean Screen® XCEL I is both quick and reliable, resulting in adequate recoveries, precision, and matrix effects. All samples were analyzed using an LC-MS/MS equipped with UCT’s SelectraCore® DA column. The biphenyl phase was able to successfully resolve isomers eutylone and pentylone. A robust analysis method for stimulants was developed that can readily be implemented by forensic and clinical labs.

Disclosure:
The speaker, author, moderator, planning member and/or presenters do have financial relationships with UCT, Inc. as defined in the AACC policy on potential bias or conflict of interest. The specific products: Clean Screen® XCEL I extraction cartridge and SelectraCore® DA column will be mentioned and/or discussed.



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