ENHANCED STABILITY OF DRIED HAEMATIC SAMPLES FOR NEW PSYCHOTROPIC SYNTHETIC COMPOUND MONITORING

LABORATORY OF PHARMACO-TOXICOLOGICAL ANALYSIS

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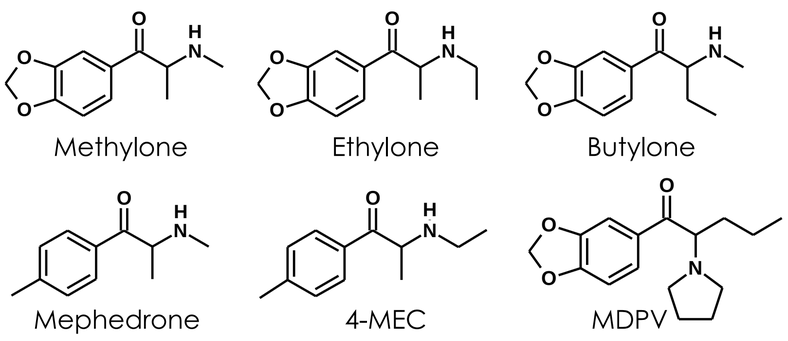
INTRODUCTION

In recent years the rise of New Psychoactive Substances (NPSs, often referred as "legal highs") has acquired increasingly alarming proportions: pharmacological properties, mechanism of action and toxicity in humans are barely known and resulted in intoxications and public health concerns. Typically marketed as "not for human consumption" NPSs are actually labelled and sold as plant food or bath salts, in order to bypass legal controls in countries where such chemical entities lack of regulation. On the other hand, illegal supplies is rapidly evolving and mainly takes advantage of the nebulous "deep web" trade. Cutting edge, fast, feasible and reliable analytical strategies are needed for their detection in biological matrices, with particular emphasis on point-of-care/in situ sampling for toxicological, forensic and sport drug testing purposes.

Synthetic cathinones

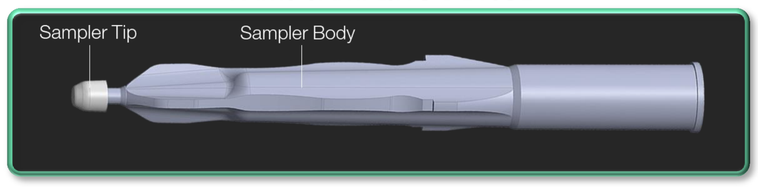


Synthetic cathinones are an amphetamine-like cheap alternative to ecstasy, possessing pharmacological similarity. They have both cardiovascular and neurological side-effects.

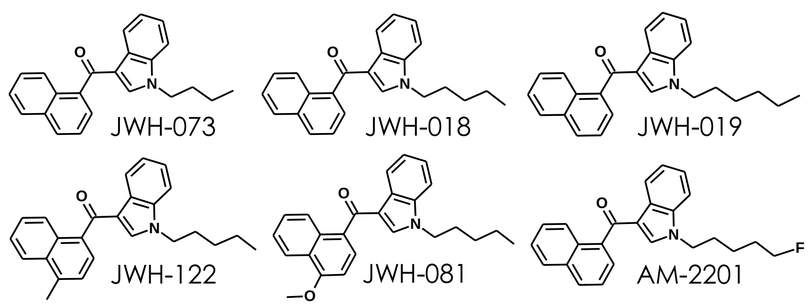
AIM OF THE WORK

Development of a novel, yet simple analytical approach based on Volumetric Absorptive Microsampling (VAMS) coupled to LC-MS/MS for the rapid determination of new psychoactive substances in dried microsamples of the main biological fluids (eg. whole blood and plasma).

VAMS SAMPLING DEVICE



Synthetic cannabinoids

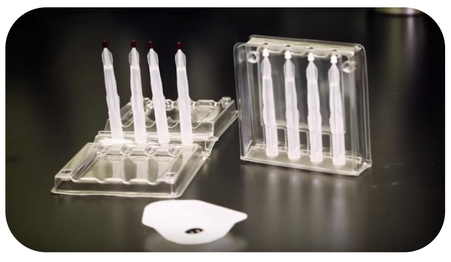


Originally investigated as therapeutic compounds, synthetic cannabinoids emerged as a recreational drug around 2008. The products, advertised as incense or smoking mixtures, are typically sold as inert herbal material, infused with active components.

VAMS-LC-MS/MS WORKFLOW

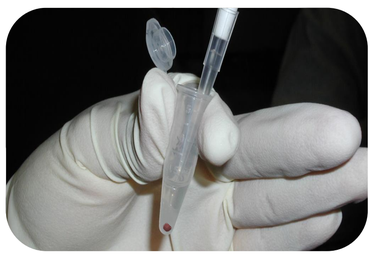
- Sampling by wicking the tip onto the matrix surface
- Adsorbed matrix volume = 10.0 ± 0.5 µL (whole blood, n=6)
- Haematocrit-independent

- Drying for 1h at RT
- Easy handling
- No centrifugation, isolation, nor clean-up
- Increased analyte stability



Extraction solvent (100 µL)
- 100% ACN (cannabinoids)
- 0.1% F.A in MeOH (cathinones)

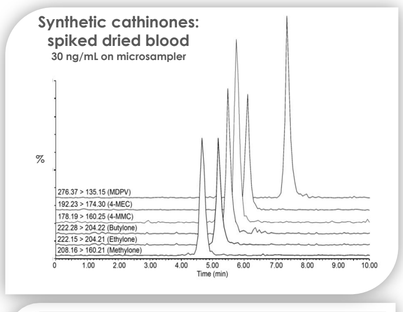
Extraction method:
- MAE (20 sec)
- Drying (N_2 stream)
- Reconstitution in mobile phase

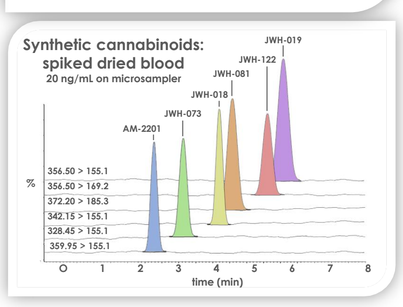


LC-MS/MS
triple quadrupole
ESI+, MRM mode

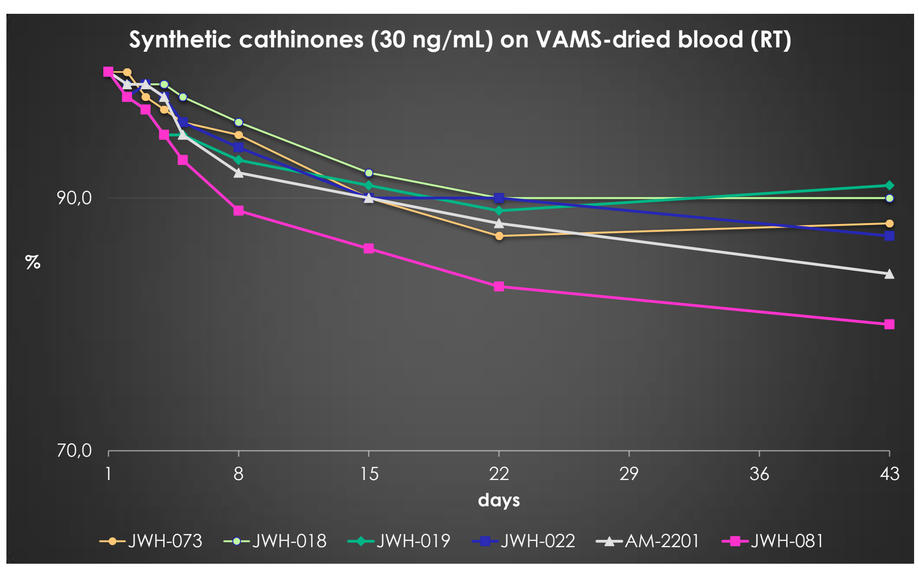
Column:	RP C18, 3.5 µm 50 x 2.1 mm I.D.
Flow Rate:	0.3 mL/min
Mobile Phase:	0.1 % F.A. in ACN/ 0.1 % F.A. in H_2O, gradient elution

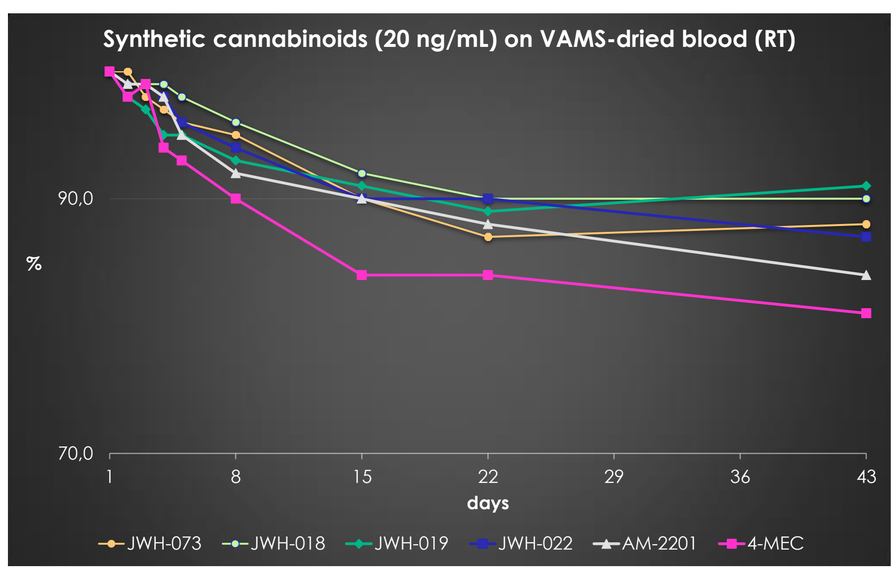
VAMS-LC-MS/MS ANALYSIS





STABILITY STUDY





CONCLUSION

VAMS approach, coupled to LC-MS/MS, is suitable for the simultaneous analysis of several NPSs belonging to synthetic cathinone and synthetic cannabinoid classes. This advanced yet feasible method is fast, cheap but reliable.
In this work, a significant improvement has been proved also regarding compound stability over time, due to sample dehydration process, which leads to a stop of degradation activities, despite lower requirements in terms of sample storage (room conditions).

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