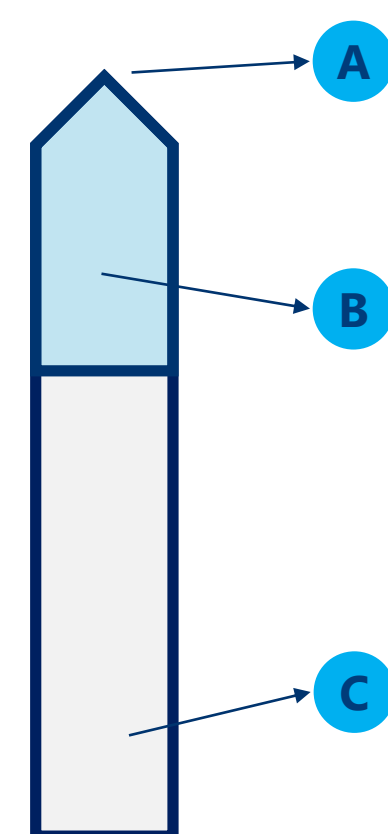


# Coated Blade Spray-Tandem Mass Spectrometry for Rapid Screening and Quantitation of target drugs in Oral Fluids Samples

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## A. Sharp tip for direct transfer to MS

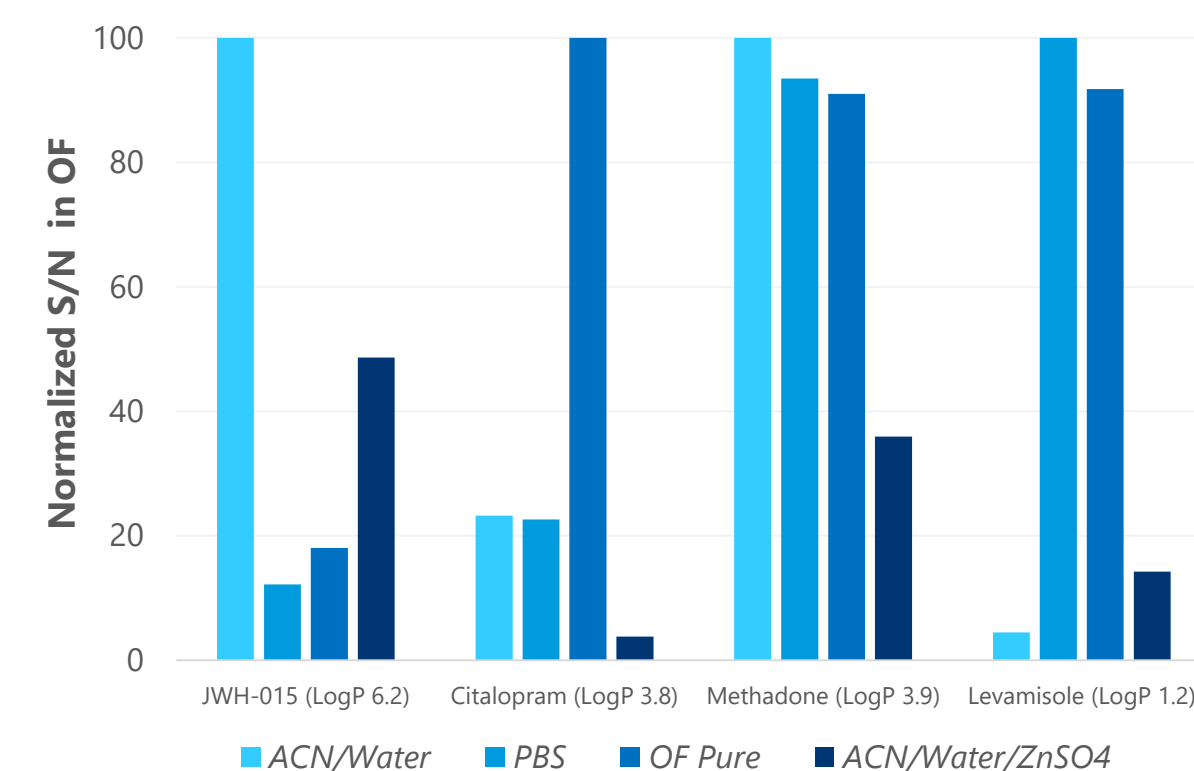
Facilitating stable ESI and ions to be directed to MS inlet to MS

## B. Open-bed SPE

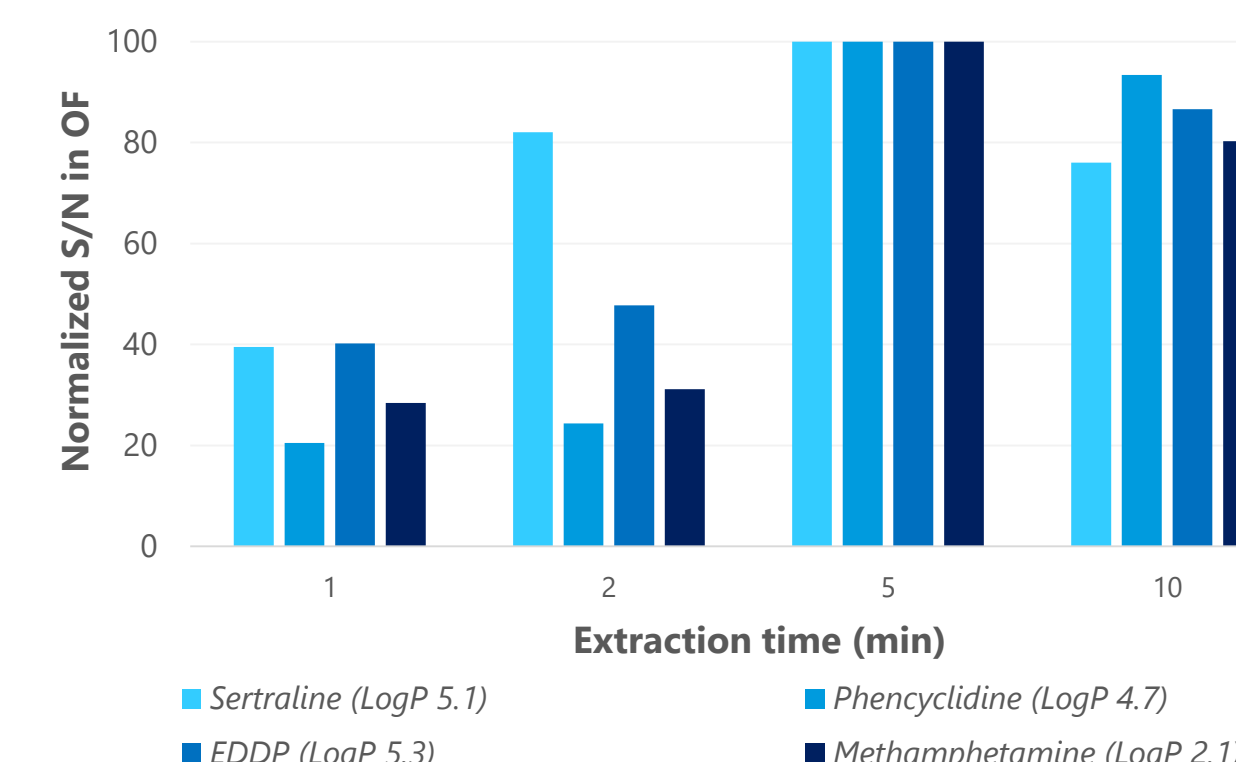
- ✓ Biocompatibility and high selectivity for small molecules (coverage of a wide range of compounds)
- No collection of macromolecules and salts (enrichment of analyte molar fraction). Minimize matrix effects and ionization suppression.
- ✓ Minimum sample pre-treatment. No need for sample filtration.
- ✓ Easy coupling with analytical instrumentation (via either LC-MS/MS or direct to MS)

## C. Stable, conductive and non-porous solid substrate

Stainless Steel blade suitable for matrices with diverse shapes, viscosities and stiffness



**Figure 1** Evaluation of sample modifiers as a means to enhance S/N via CBS-MS/MS. Extractions from analytes spiked at 10 ng/mL in OF



**Figure 2** Effect of increasing extraction time versus S/N of different analytes spiked at 10 ng/mL in OF via CBS-MS/MS

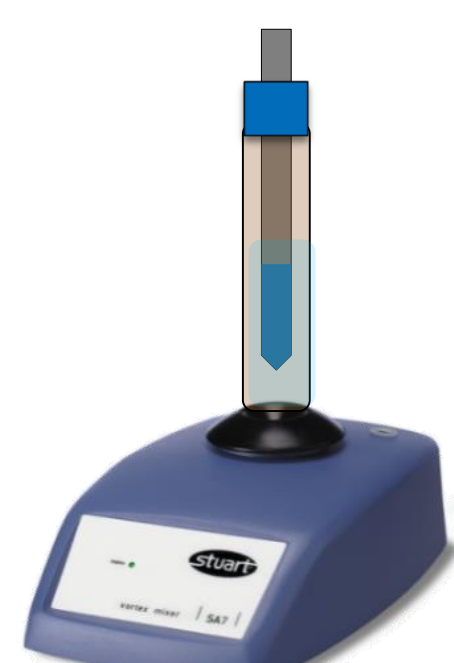
## What is Coated Blade Spray (CBS)?

A sample preparation device that can be directly interface to mass spectrometry instrumentation for rapid screening and quantitation

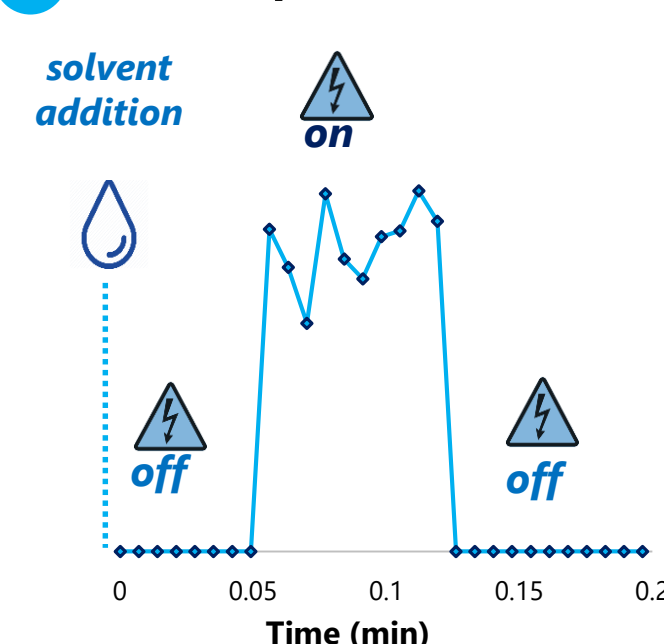
*In this work, we demonstrate how CBS coupled to MS/MS enables rapid screening and quantitation of controlled substances and pain management drugs in bulk and droplet samples of Oral Fluids*

**Our results corroborate that analyte collection times must be selected on the basis of signal-to-noise ratios, rather than mere instrumental signal as when performing SPME-LC-MS/MS based analysis [3-4]**

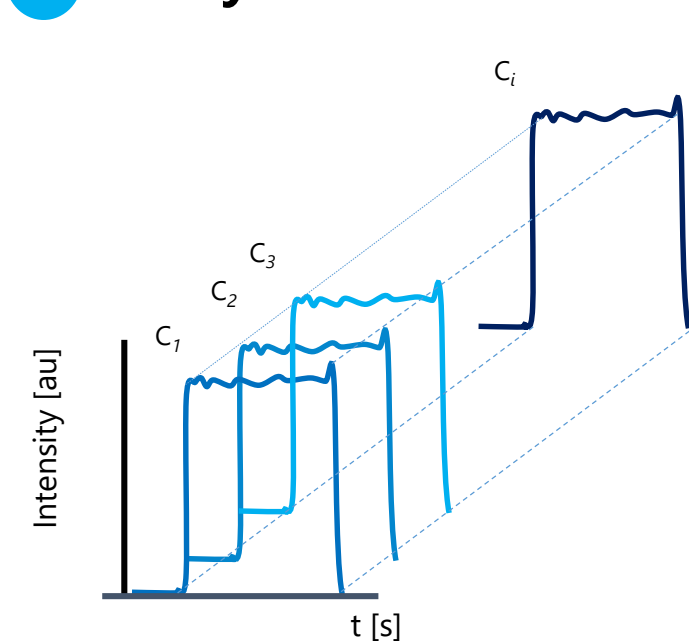
### A Extraction → B Elution/Ionization → C Analysis via direct-to-MS



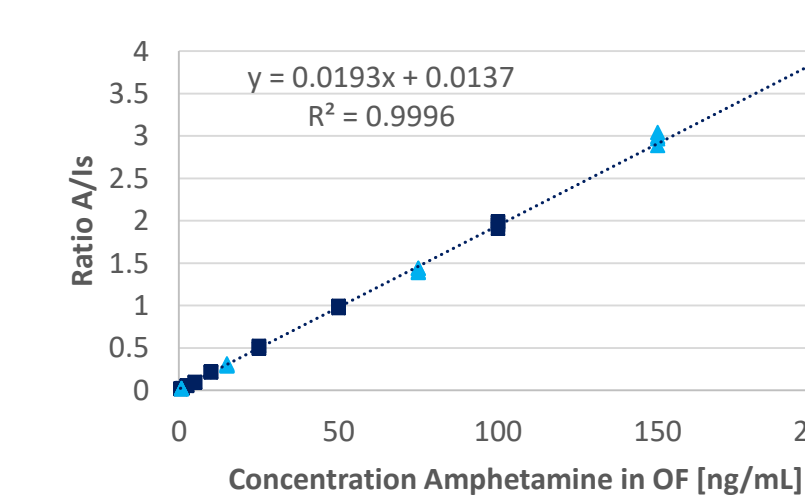
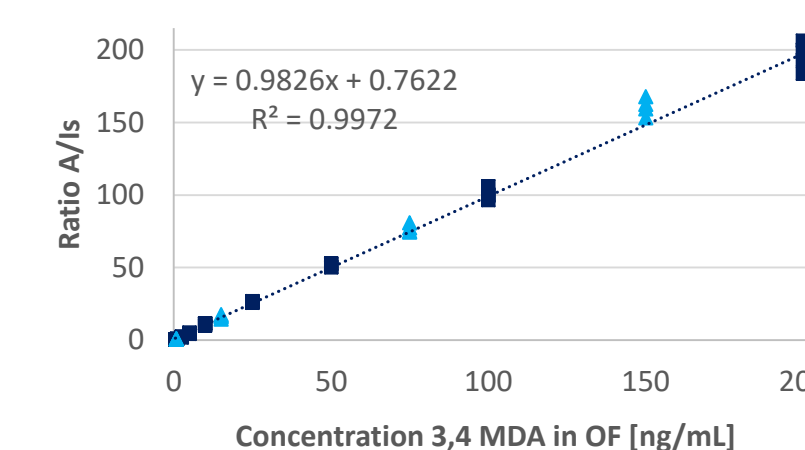
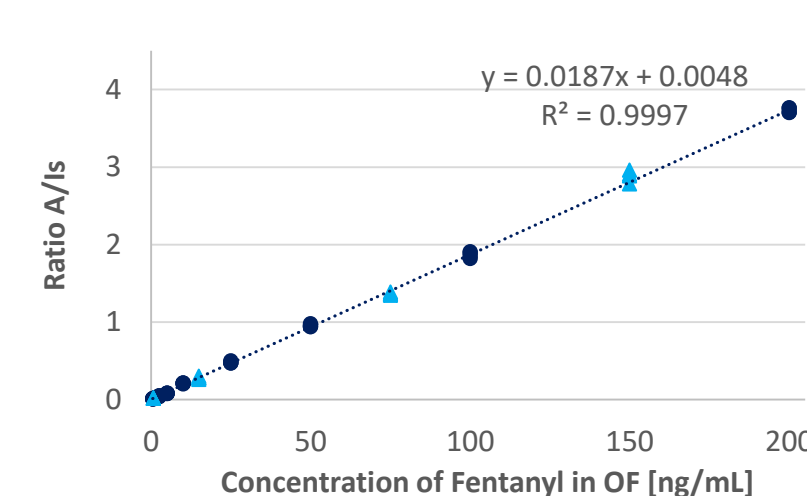
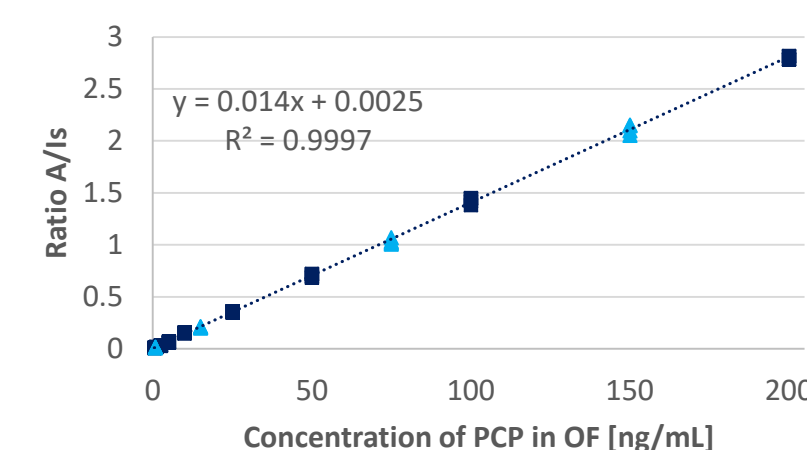
- Blade is immersed in a vial/vessel containing the sample of interest.
- Quick agitation (<5 min).
- Then, the coating is rapidly rinsed with water (<10 s).



- CBS device is placed in the front-end of the MS system for analysis.
- A droplet of solvent is added to the coated area of the device and,
- High-voltage is applied to the non-coated area of the blade to generate an electrospray from the tip of the blade.



- Ratio of analyte signal to the one of the internal standard is calculated.
- Preferably, isotopic label of the analyte of interest is used for correcting potential variability in the instrumental response



**Figure 3** Matrix match calibration plots in bulk samples of oral fluids (300  $\mu$ L) via CBS-MS/MS. Validation points indicated with light blue triangles.

**Technical details**  
Elution volume: 10  $\mu$ L  
Elution time: 10 s  
ESI voltage: 4 kV  
Spray time: 10 s  
Dwell time: 25 ms  
MS: SCIEX-4500 QqQ  
Sample volume: 200  $\mu$ L

**References** 1. Gómez-Ríos, G.A., et al., *Angewandte Chemie*, 2014, 52, 1403-1407; 2. Gómez-Ríos, G.A., et al., *Trends in Analytical Chemistry*, 2019, 112, 201-211. 3. Kasperkiewicz, et al., *Anal. Chem.*, 2019, 91, 20, 13039-13046. 4. Khaled, A., et al., *Anal. Chem.*, 2020, 92, 8, 5937-5943