getxent

REPORT

Report ref.	REPGET22-009	Center of analysis	Biodesiv 25 rue Becquerel 67200 Strasbourg FRANCE
Date of publication	02.05.22		
Category	External		
Subject	**Performance assessment: Cocaine analysis**		

Background

The purpose of this paper is to

- evaluate the ability of the Getxent tubes to capture qualitatively and quantitatively the odor of cocaine
- identify VOCs from cocaine

Identification of samples

- 1 empty vial (blank)
- 1 Getxent tube not impregnated
- 2 Getxent tubes impregnated 1 day with cocaine odor
- 2 Getxent tubes impregnated 7 days with cocaine odor

Sample preparation

Blank vials, not impregnated Getxent tube have been directly analyzed.
2 Getxent tubes have been impregnated for 1 day with 100g of cocaine by the Lausanne police and send to be directly analyzed.
2 Getxent tubes have been impregnated for 7 days with 100g of cocaine also by the Lausanne police and send to be directly analyzed.

Analysis - Procedure

All samples were analyzed by SPME GC-MS on Getxent GC-MS with method "Tube40RD v2" (see Annex 1)

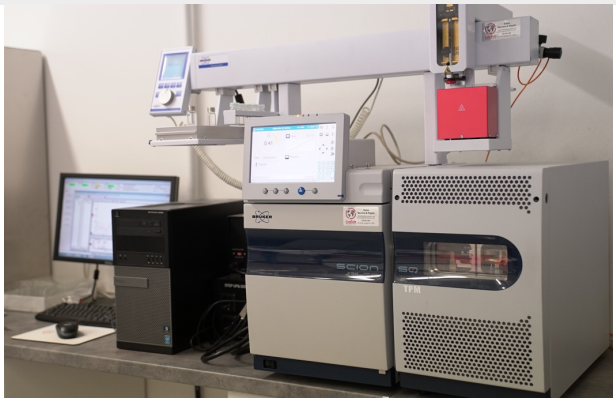
One empty vial has been analyzed in between each duplicate.
Only peaks integrated by the software are considered.

The number of peaks and the identification of compounds has been made by the NIST database. Only identifications with a probability over 60% have been considered.

Analysis - Machine

Brand: Scion
Model: 436-GC, single quadrupole, injector split/splitless
Accessories:

- SPME
- Incubator
- Combi-PAL
- Column: DB-WAX 60m, 0.25mm, 0.25µm (Agilent)
- SPME fiber: DVB/CAR/PDMS 2cm (Sigma-Aldrich 57299-U)



Analysis - Consumables

Gas: 6.0 quality Helium filtered over an Oxygen, Moisture & Hydrocarbon Trap (Restek, RE21982).
Vials:

- Body: clear glass
- Cap: magnetic metal cap with hole + septum PTFE/Silicone
- Volume: 20ml
- Closure diameter: ND18
- Height: 75mm

Results

Qualitative analysis on cocaine odor

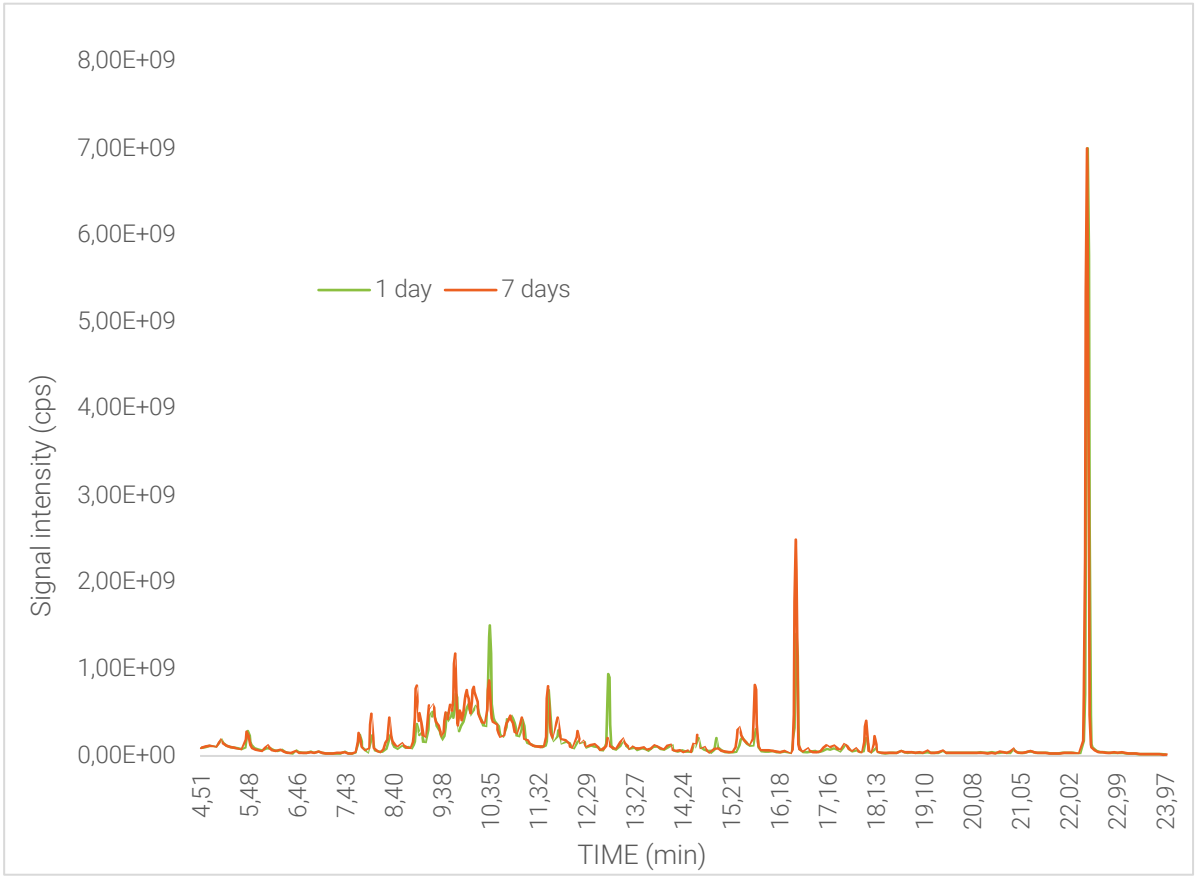


Figure 1: Chromatograms of the Getxent tube impregnated 1 day with cocaine odor (green) and the Getxent tube impregnated 7 days with cocaine odor (orange)

The chromatograms of Getxent tubes impregnated 1 day with cocaine odor and Getxent tubes impregnated 7 days with cocaine odor are very close one from each other. The analysis is reproducible for each day of impregnation.

The chromatogram of the Getxent tube impregnated 1 day with cocaine odor exhibits 34 peaks and Getxent tubes impregnated 7 days with cocaine odor also exhibits 34 peaks.

Quantitative analysis on cocaine odor

The analytical cleanliness of a not impregnated Getxent tube has been checked (see Figure 2).

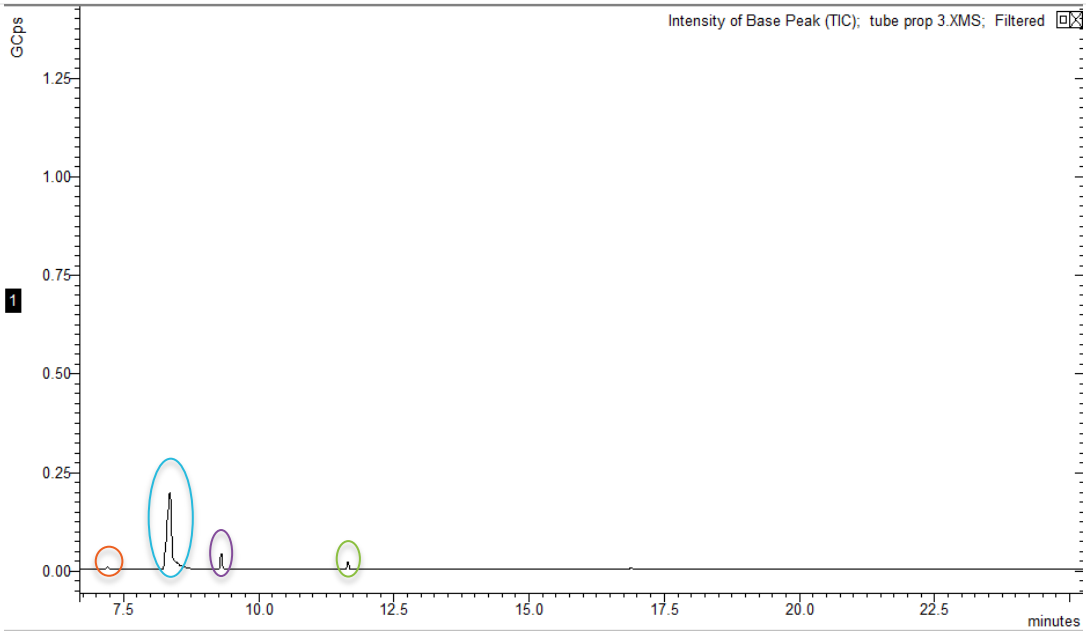


Figure 2: Chromatograms of not impregnated Getxent tube

The chromatogram of the not impregnated Getxent tube shows 4 peaks:

- 7,20 min: octamethylcyclotetrasiloxane
- 8,30 min: water
- 9,30 min: decamethylcyclopentasiloxane
- 11,60 min: dodecamethylcyclohexasiloxane

Same peaks are also found when the analysis is performed with blank vials, without any sample.

After analysis of the chromatograms, five compounds have been identified:

Time (min)	Probability (%)	Molecules
22,398	90,5	Diethylene glycol
18,118	66,5	Acetophenone
16,523	84,3	Benzaldehyde
15,705	64,4	Hexanol 2-ethyl
15,375	90,3	Acetic acid

Figure 3: identification of compounds in the impregnated Getxent tubes

Discussion

Qualitative analysis on cocaine odor

The chromatograms of Getxent tubes impregnated 1 day with cocaine odor and Getxent tubes impregnated 7 days with cocaine odor are very similar.
The chromatogram of the Getxent tube impregnated 1 day with cocaine odor exhibits 34 peaks and Getxent tubes impregnated 7 days with cocaine odor exhibits 34 peaks.

Quantitative analysis on cocaine odor

As siloxane peaks belong to the chromatograms of empty vials and not impregnated Getxent tubes, they are not released by the Getxent tubes. Getxent tubes are thus analytically clean. Due to the presence of hydrophilic blocks in the polymers composing the Getxent tubes, Getxent tubes can release water captured during impregnation (humidity from air or target odor). As siloxanes and water have no impact on the study, they will not be considered.

Five molecules have been identified and measured: acetic acid, hexanol 2-ethyl, benzaldehyde, propenonitrile, acetophenone, diethylene glycol. It has been identified in the literature that acetic acid is a molecule found in cocaine odor (DEJARME LE, LAWHON SJ et al. **Analysis of the volatile organic compounds in seized cocaine hydrochloride**, *SPIE.* 1997; 2937; DOI:10.1117/12.266769)

Being in direct contact with the tubes does not cause any risk of being in contact with the cocaine. Indeed, among the molecules present in the chromatograms, the cocaine molecule is not found, it is safe for dogs and humans to use Getxent tubes impregnated with cocaine odor.

Since the dog's sense of smell is much more accurate than GC-MS, dogs would be able to detect the odors of compounds impregnated in the Getxent tubes.

Conclusion

Getxent tubes are analytically clean.

Getxent tubes can accurately capture the odor of cocaine, qualitatively and quantitatively. However, among the molecules present in the chromatograms, the cocaine molecule is not found. Thus, it is totally safe for the dogs and users of Getxent tubes.

The intensity of the main molecules increases constantly. After 7 days of impregnation, we will obtain the same odor than the pure matrix, but with a higher intensity.

Author	Reviewer
M.Combes Project Leader 05.05.22	G.Herin CEO 05.05.22
	

Annex 1: GC-MS method

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MSWS 8.0.1 for SCION - Method Listing   Mon May 02 10:58:02 2022

Method: Tube40RD v2.mth

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**********************
    CombiPAL AutoSampler
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Module Address: 24

CPAL Method:

                     Injection Mode: GC SPME
                     Read Bar Codes: Never
                   Required Syringe: SPME Fiber
               Agitator Temperature: 40.0 C
        Sample Pre-Incubation Time: 5 min. 0 sec.
     Pre-Incubation Agitator Speed: 250 rpm
    Pre-Incubation Agitation Cycle: 2 sec On, 4 sec Off.
         Extraction Agitator Speed: 250 rpm
           Fiber Depth From Bottom: 10 mm
                    Extraction Time: 25 min. 0 sec.
                          Injector: Front
                       Desorb Time: 2 min. 0 sec.
                Use Bakeout Station: Yes
                 Fiber Bakeout Time: 5 min. 0 sec.
            Fiber Clean Temperature: 225.0 C
    GC Cycle Time (for Prep Ahead): 36 min. 0 sec.

**********************
    SCION Mass Spec
**********************
Module Address: 40

Acquisition Method ==================

Acquisition delay 4.50 min.
No pre run macro.
No post run macro.
CID Gas off
Ion Source: EI
Data Type: Centroid

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    43X-GC  - Model 436-GC
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Module Address: 44

Valve Table
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    No Valves Used

 Front Injector Type S/SL
---------------------------------
            Oven Power: On
               Coolant: Off
     Enable Coolant at: 250.0 C
       Coolant Timeout: 20.00 min

      Temp     Rate       Hold      Total
       (C)    (C/min)    (min)      (min)
      ---------------------------------
    250.0      0.0      20.00      20.00

       Time     Split     Split
       (min)    State     Ratio
       ----------------------
    Initial      On         10
       0.01     Off        Off
       2.00      On         50

 Front Injector EFC Type 21: Enabled
---------------------------
      Constant Column Flow: 1.00 ml/min
            Pressure Pulse: none

             No Backflush.

Column Oven
-----------
               Coolant: Off
     Enable Coolant at: 50.0 C
       Coolant Timeout: 20.00 min
    Stabilization Time: 2.00 min
```

Temp (C)	Rate (C/min)	Hold (min)	Total (min)
40.0	0.0	2.10	2.10
200.0	10.0	5.00	23.10

No Auxiliary Heaters installed

Data Acquisition

```
    Acquisition Frequency : 25.0 Hz
            Monitor Length : 64 points (2.560 sec)
       Front FID/NPD Scale: 10 Volts
      Middle FID/NPD Scale: 10 Volts
        Rear FID/NPD Scale: 10 Volts
```