



MINISTÈRE
DE L'INTÉRIEUR
ET DES OUTRE-MER

*Liberté
Égalité
Fraternité*

POLICE
NATIONALE 

Automatization and miniaturization of toxicological analyzes at the Police Laboratory of Paris

Analysis of narcotics

*February 5th 2024
Amélie LAGARDE*





How do we work ?

1430 blood samples
in 2023

Seals come into the laboratory

420 samples
(blood/urine)

Driving under influence of drugs

Forensic toxicology

Registration in the LIMS

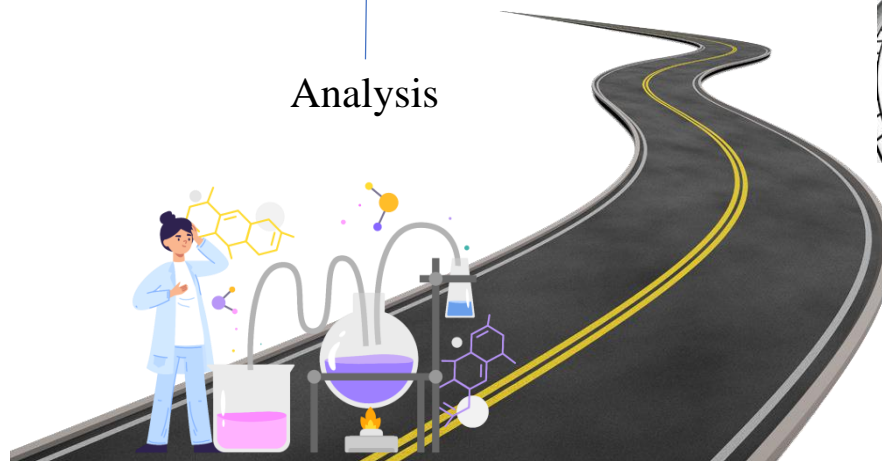
Registration in the LIMS

Analysis

Review of the case by a toxicologist

Pictures and Description of seals

Analysis



Issues and Objectives

Issues/Challenges

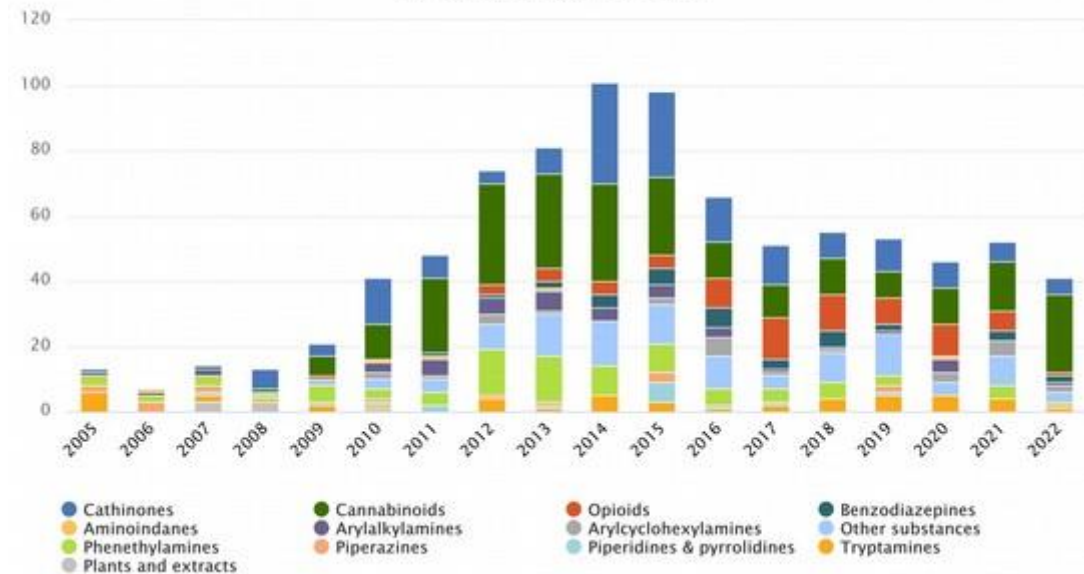
- > In some cases, only few mL of blood or urine are available to perform a complete toxicological analysis
- > Late complaints to police services (in case of chemical submission or chemical vulnerability)
- > New psychoactive substances (NPS) active at low concentrations

Objectives

- > To develop new analytical methods with less sample quantities and to reach, at least, same thresholds as the validated methods in place (5 ng/mL)
- > Automatization of the preparation



Figure. Number of new psychoactive substances reported for the first time to the EU Early Warning System, by category, 2005-2022



EMCDDA (data) | Highcharts (chart tool)

Validated methods 1/2

3 families of narcotics



2 protocols



3h - 1 mL of sample



2h - 1 mL of sample

EXTRACTION
Liquid – Liquid
Manual operations

Opiates - Cocaines	
Cocaïne*	6-MAM*
Benzoylcegonine*	Morphine*
Ecgonine methylester*	Codeine*
Cocaethylene*	Dihydrocodeine
	Ethylmorphine
	Pholcodine
	Methadone

+ 10 internal standards

* Validated molecules

RUN with GC/MS



20 min



12 min

Amphetamines and apparented
Amphetamine*
Metamphetamine*
MDA*
MDEA*
MDMA*
Ketamine
Ephedrine
Pseudoephedrine

+ 7 internal standards


Validated methods 2/2





> Analytical consumables for opiates and cocaine


> Solvents :

2 mL Phosphate buffer pH 6,4

6 mL Dichloromethane/IPA/Heptane 50/17/33 

4 mL HCl 0,2 N 

1 mL NaOH 1 N 

5,15 mL Dichloromethane 

40 µL BSTFA 

→ 18,2 mL





High environmental footprint



> Analytical consumables for amphetamines

> Solvents

De-tox Tube A (~2 mL de solvents + salts (exact composition?)) 

100 µL Isopropanol/Hcl 

60µL HFBA 

55 µL ethyl acetate 

→ 2,3 mL

Solution : Acquisition of a new analytical instrument



> Meeting with suppliers to find a new equipment able to do those analysis



CLAM-LC-MS/MS

> CLAM™-2030
Clinical Laboratory **Automated**
sample preparation Module

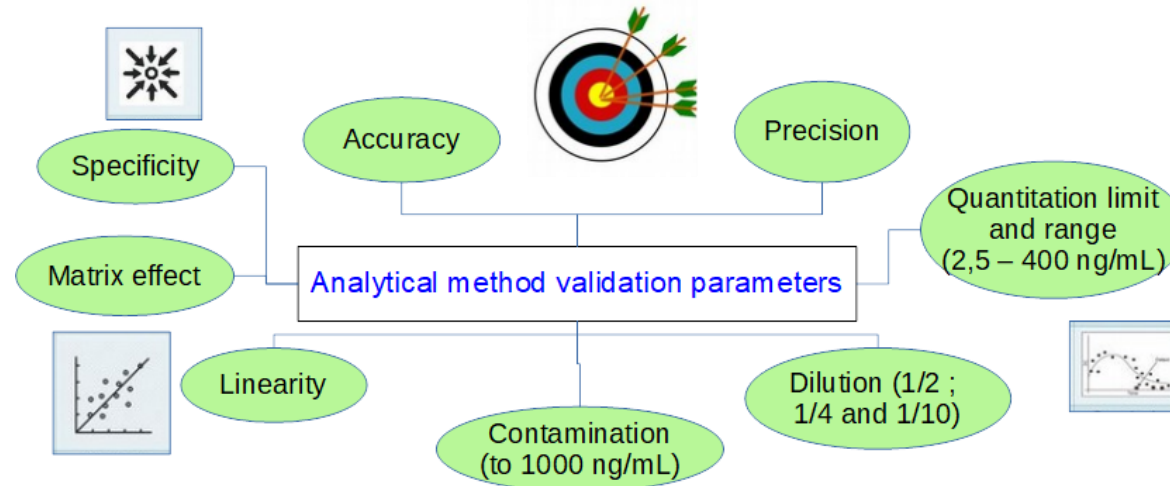
> LC
Nexera™ X2 Model

> MS/MS
8060 Model



CLAM – LC – MS/MS : 1 validated method for OCA

Opiacés – Cocaïniques - Amphétaminiques			
Amphetamine* Metamphetamine* MDA* MDEA* MDMA*	Cocaine* Benzoylecgonine* Ecgonine methylester* Cocaéthylène*	6-MAM* Morphine* Codeine* Dihydrocodeine Ethylmorphine Pholcodine Oxycodon	Hydrocodon Buprenorphin Norbuprenorphin (m) Methadone* EDDP (m) Ketamine*



* Validated molecules
+ 23 internal standards



CLAM – LC – MS/MS










1 method for New Psychoactives Substances and other drugs

> Second method with NPS with add and remove of molecules over time

New Psychoactives Substances and other drugs

3-MeO-PCP PCP 3-OH PCP MDPV Ephedrine ou pseudoephedrine	4-MEC Cathinone MMC CMC ADB-Butinaca	Fénéthylline Fluoroamphétamine CMA Methoxetamine 2C-B	Gabapentin Pregabalin α-PVP α-PHP Benzylpiperazine
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New Psychoactive Substances (NPS)

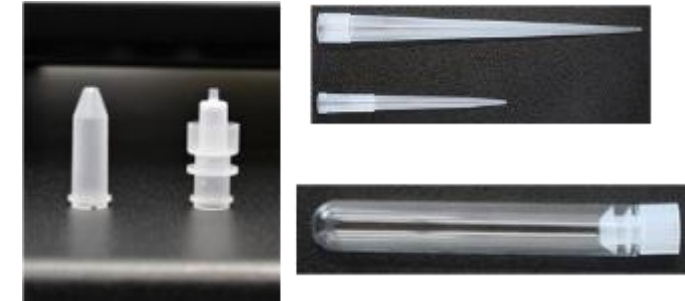
	Piperazines
	Aminoindanes
	Synthetic cathinones
	Phenylethylamines
	Tryptamines
	Synthetic cannabinoids
	Phencyclidine analogs
	Synthetic opioids
	Plant based NPS

> Analysis method modified depending on the market => Apprenticeship project in 2024



CLAM – LC – MS/MS : Analytical method

Step	Operation	Parameter	Value	Reagent	MeOH	Pre-Suck Reagent	Washing after dispensing
1	Reagent Dispense	Volume (uL)	20.0	MeOH			
2	Sample Dispense	Volume(uL)	50.0	Diluent	EAU	Washing before dispensing	Washing after dispensing
3	Reagent Dispense	Volume (uL)	100.0	ACN		Pre-Suck Reagent	
4	Shaking	Time (sec)	120	Speed (rpm)	1900		
5	Filtration	Time (sec)	120				



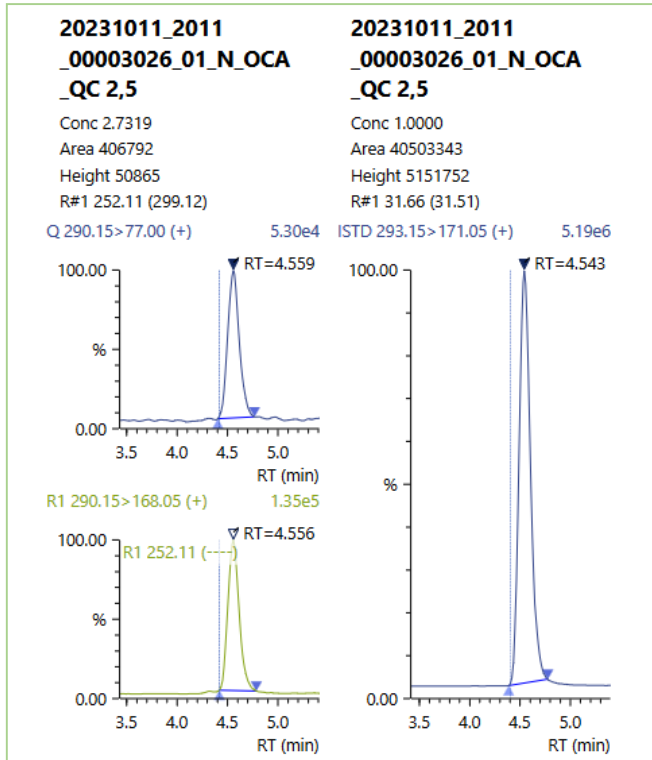
Analytical consumables

> 120 μ L of solvents (extraction)    

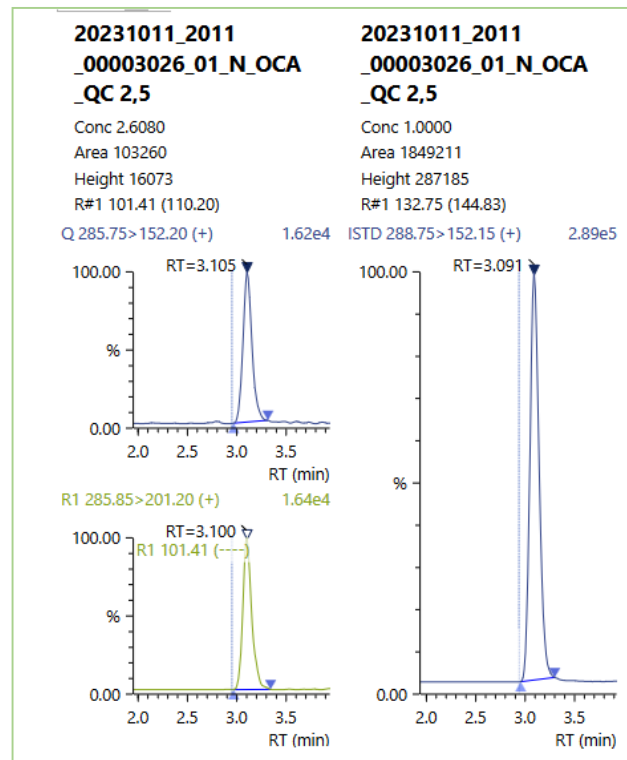
> 1st sample : 8 min for extraction + 18 minutes run (10 minutes analysis + 8 minutes washing)
Next samples : results every 18 minutes

> 5,4 mL of solvents (water + methanol for the analysis)

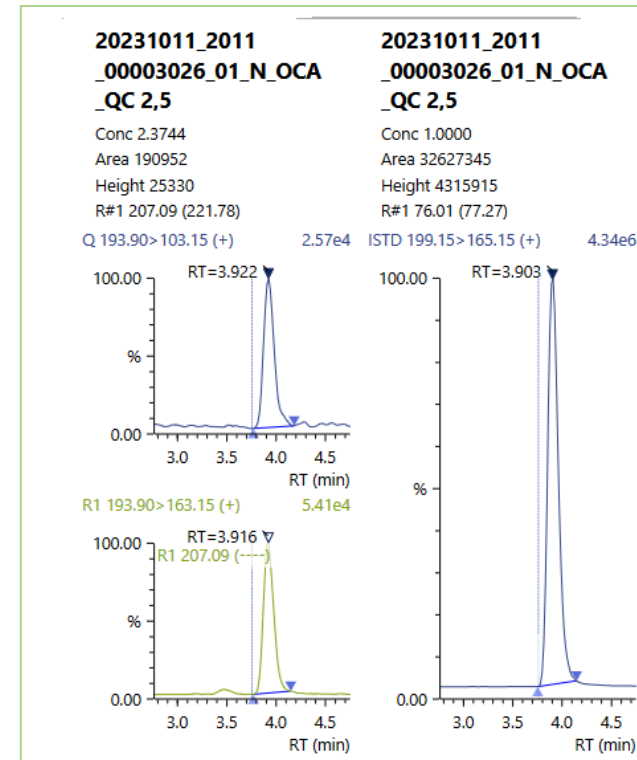
CLAM – LC – MS/MS : Extraction and injection of LQI control (2,5 ng/mL)



BZE and BZE d3



Morphine and morphine d3



MDMA and MDMA d5

Signal / Noise ratio



Summary

	Time	Sample	Validated quantitation limit	Consumables	Solvents	Staff health / Environment
Manual extractions + GC/MS	3h max for extraction + 20 min	2 mL	5 ng/mL	3 glass tubes + plastic cork 2 hemolysis tubes + plastic cork 2 vials + plastic cork 13 plastic tips 4 Pasteur pipettes 1 Detox tube	20,5 mL	Heptane Chlorinated solvents
CLAM-LC/MSMS	26 min for the 1st sample then 18 min/sample (overlap extraction/analysis)	50 µL (divided / 40)	2,5 ng/mL	1 filter + 1 cup 1 hemolysis tube + plastic cork 2 plastic tips	120 µL + 5,4 mL	Reduction in the amount of solvents used NO Heptane and chlorinated solvents



> Higher analytical performance

> Lower environmental impact

Case report

> Context

02/08/2023 around 08.00 am : two highschool students proposed to 3 others to try their e-cigarette.

> Symptoms

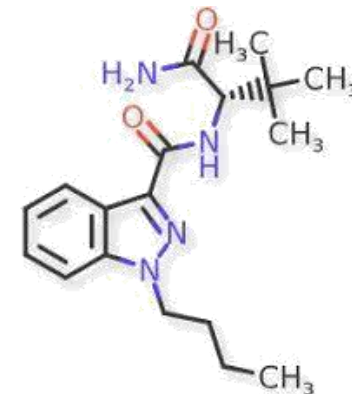
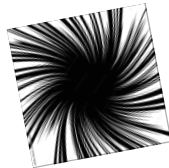
Visual and auditory hallucinations (some tried to throw themselves onto the road, others saw people glowing...)

Sensation of intense heat

Racing heart rate

Palpitations in the eyeballs with red-tinged vision

Loss of consciousness for a moment (1 individual))



> Sample collecting

Victims : 02/08/2023 at 6.35 pm → delay ~ 10h35


Accused persons : 02/09/2023 around 5.00 pm → delay ~33 hours


> Seizure of the e-cigarette :


Analysed by an other laboratory : **ADB-BUTINACA** detected

ADB-BUTINACA 1/2

> First reports in Europe


 2019 : Sweden


 2020 : France


 2021 : Scotland



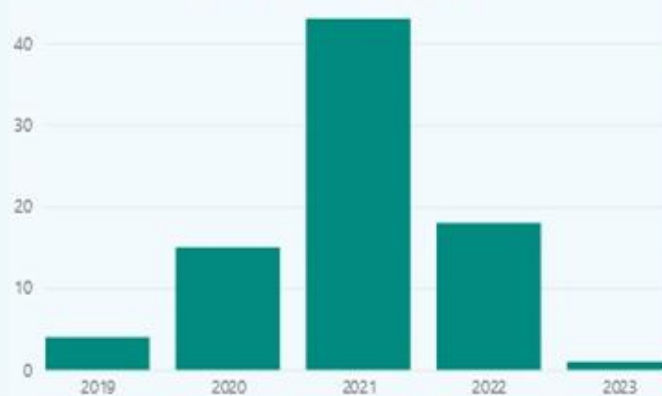
In March 2023, the Commission on Narcotic Drugs decided to include ADB-BUTINACA in Schedule II of [the Convention on Psychotropic Substances of 1971](#).

ADB-BUTINACA is an indazole-carboxamide **synthetic cannabinoid**. It is a full agonist of CB1 and CB2 receptors and exhibits typical psychoactive effects similar to that of Δ^9 -THC.¹

NPS emergence data

ADB-BUTINACA was first reported to the UNODC Early Warning Advisory (EWA) in 2019 and since then, a high number of countries and territories worldwide have reported its emergence.²

Number of countries and territories reporting ADB-BUTINACA, by year*



Year

Tout

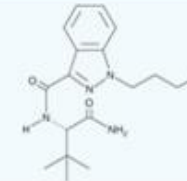
Number of countries and territories reporting ADB-BUTINACA

50

Number of toxicology cases involving ADB-BUTINACA (all years)

76

Source: UNODC Early Warning Advisory on New Psychoactive Substances, 2023. *Note: Data for 2022 and 2023 are not yet complete.



Chemical name: ADB-BUTINACA

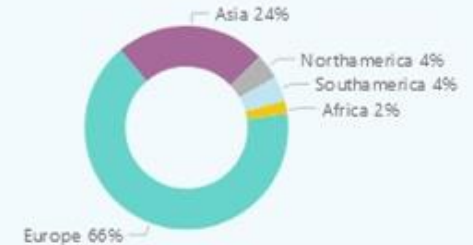
N-(1-Amino-3,3-dimethyl-1-oxobutan-2-yl)-1-butyl-1*H*-indazole-3-carboxamide

N-[1-(Aminocarbonyl)-2,2-dimethylpropyl]-1-butyl-1*H*-indazole-3-carboxamide

Toxicology reports

76 toxicology cases involving the use of ADB-BUTINACA have been reported to the EWA between 2020 and 2022. The substance was reported in different case types including clinical admissions, drug use in criminal cases and a small number of post-mortem cases. In some cases, ADB-BUTINACA was the only substance present but in the majority of cases other controlled substances were also identified.³

Distribution of countries and territories reporting ADB-BUTINACA, by region



Detection and identification

Information on the identification of synthetic cannabinoid receptor agonists is available in the UNODC manual [Recommended methods for the identification and analysis of synthetic cannabinoid receptor agonists in seized materials](#).⁴

ADB-BUTINACA 2/2

- > Few articles, informations come from consumer forums.
- > Reported effects: According to the report “Recent trends in drug use in Reunion in 2021” from the French Observatory of Drugs and Addictive Tendencies, listed reported effects are mainly of three types:
 - Loss of body control: “could no longer move”, “did not speak for 15 minutes”, “like paralyzed”, sudden psychomotor agitation for 10 minutes then calm (cyclically), anesthesia of the limbs, a state of “sexual disinhibition in public places”, shaking or trembling movements.
 - Psychological disorders: [collapse](#) and blurred memories, black gap of 10 to 15 minutes, unusual dark thoughts, “when he uses drugs for several days in a row, he loses the memory of daily actions such as washing the dishes”, moderate anxiety, feeling of imminent death, emotional crisis, [visual hallucinations](#).
 - Heart problems: [palpitations](#), feeling that the heart is about to failed.



J'en ai jamais pris, mais j'ai vu de bons voir excellents retours à son sujet.

Déjà non, ce n'est pas de l'ADB-BUTINACA sous un autre nom, c'est 2 molécules différentes (en cherchant sur google image les molécules, pour l'ADB-BUTINACA on trouve globalement 2 molécules à l'aspect différent, je sais paaaa trop laquelle est "la bonne", mais c'qui est sûr c'est que c'est pas de l'ADB-BUTINACA.

Sur le site avec un 8, si tu vois où j'veux en venir 😊 Ils décrivent la molécule comme TREEES puissante comme cannabinoïde (duuu moins en comparaison avec les autres noids actuels encore autorisés, qui, excusez moi du terme mais j'en vois pas trop d'autres, sont quand même GRAVE FAIBLARDES en terme de puissance (raison pour laquelle l'ADB-BUTINACA vaut 40-50e le gramme, alors que les autres faiblards en question dont je parle type 7-ADD, JWH-210 (sympa, clean, mais dosages élevés, et cher du coup, enfin objectivement c'est pas "cher", c'est un prix similaire à celui du cannabis si tu le fumes en joints, + économique en liquide, mais comparé aux noids d'y a qqes années style mon adoré 4F-ADB (voir le 5F-ADB aussi qui est graaaave potent, mais qu'j'aime pas...) ou le très connu et similaire à la fois au 4F-ADB et au 5F-ADB, un bon mix des 2 : le 5F-MDMB-2201 !)

Avec ce genre de noids (que j'payais 14 euros les 10 GRAMMES sur un site polonais, pour du noid pur hein, à peine 0,15-0,25mg dans un joint et ça décolle même pour moi qui tape des bangs everyday since 5 years at the time who I was testing the noid in question, so... Euuuh, bref :

Avec 1 gramme tu te faisais littéralement 1000-1500 joints, et pas des p'tits stickos façon "dope épicee" hein, des vrais joints, avec le JWH-210 t'en fais genre à peine quelques dizaines de la même puissance pour un prix au gramme similaire...)

Bref, donc : puissant

Et ils disent aussi que apparemment, les effets seraient significativement + durables dans le temps comparé aux autres noids actuellement dispo, qui sont, déjà de toute éternité (gloobalement, je généralise) assez courts en tout cas large + que le THC (grossommodo avec du canna on est def plusieurs heures, avec les noids aussi, mais les effets PRINCIPAUX durent plutôt entre 20 et 50 minutes pour la plupart, y a des excpctions dans les 2 sens : des + courts ou + longs, mais on reste gloobalement dans la fourchette indiquée)

Niveau effets, est ce que c'est + sédatif ? Psychédélique ? Stimulant ? Antidouleur ? Anxiolytique ?

Bonne question, j'ai cherché vite fait sur google, mais vu que j'ai pas trouvé d'infos précises juste sur les résumés de recherche apparaissant sur la première page j'ai abandonné, eh oh c'est dur quand même d'aller à la page 2 :p

antoninn51
Nouveau membre
Inscrit le 17 Jan 2021
10 messages

Bonjour auriez-vous + d'informations aux niveaux des effets du Adb-Butinaca? et des dosages ? à quels autres noids plus connu je pourrais le comparer ?
Merci a vous les psychos

Dernière modification par pierre (24 janvier 2021 à 19:17)

24 janvier 2021 [Forum] C-liquide - Adb-butinaca
par Bingé, dernier post 13 novembre 2022 par Bingé

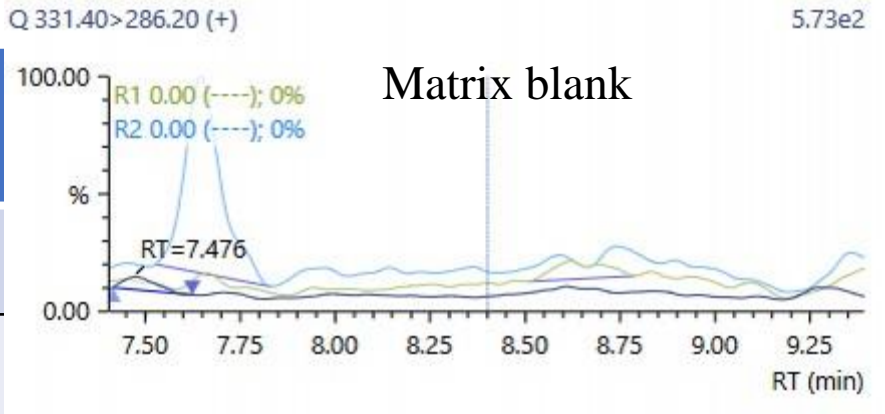
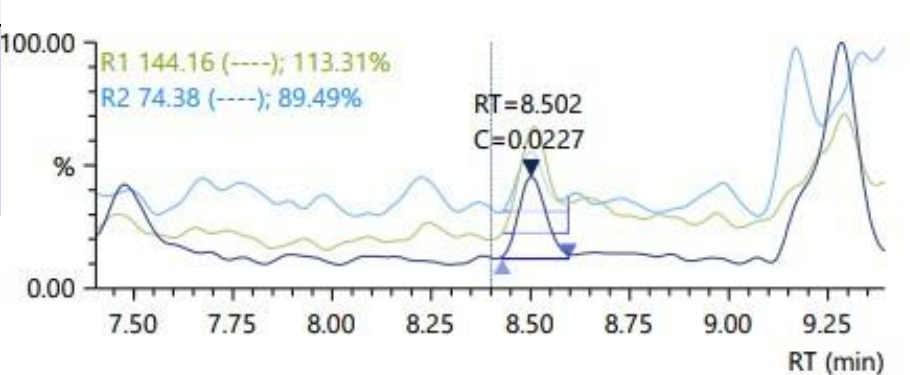
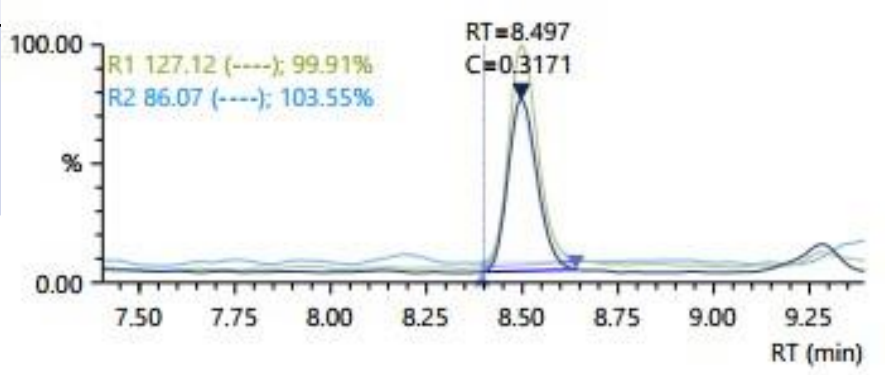
[Forum] ADB-Butinaca information
par antoninn51, dernier post 09 juillet 2022 par Trakass

[Forum] Comment cuisiner du Adb-butinaca?
par Watek, dernier post 29 juillet 2021 par Watek

Results

	Victim # 1	Victim # 2	Victim # 3	Person accused # 1 (loss of consciousness)	Person accused # 2
Delay between facts and samples	~10h30	~ 10h30	~ 10h30	~ 33 h	~33 h
OCA	Not detected	Not detected	Not detected	Not detected	Not detected
NPS	ADB-Butinaca : traces < 0,1 ng/mL	Not detected	Not detected	ADB-Butinaca : 0,32 ng/mL	Not detected

Results

	Victim # 1	Matrix blank	Person accused # 1 (Loss of consciousness)	Person accused # 2
Delay between facts and samples	~10h30		3 h	~33 h
OCA	Not detected		detected	Not detected
NPS		Not detected		

Thank you for your attention

