LAT LUMTOX
LABORATOIRE D'ANALYSES TOXICOLOGIQUES

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LC-DAD: a tool from the past to identify isomers of new psychoactives substances. Application to chloromethcathinones.

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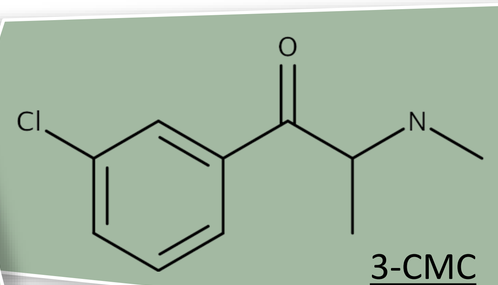
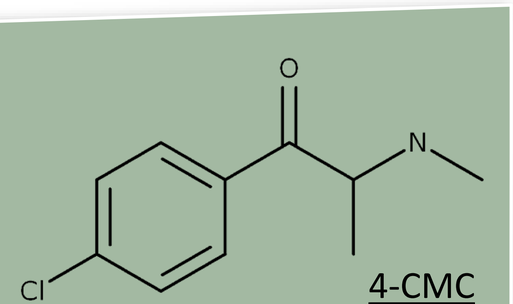
OBJECTIVE

To formally identify the isomers of chloromethcathinone (x-CMC).
X-CMC, chloromethcathinone : Synthetic drug in the cathinone class using like stimulants.
Several isomers: 2,3 and 4 CMC.



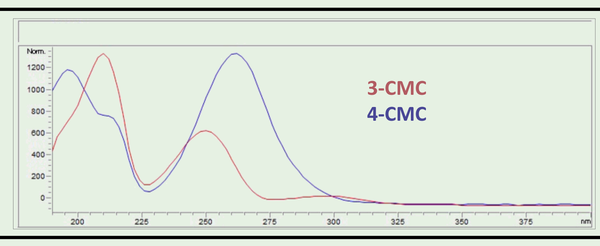
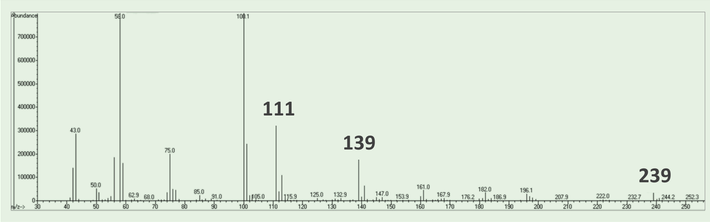
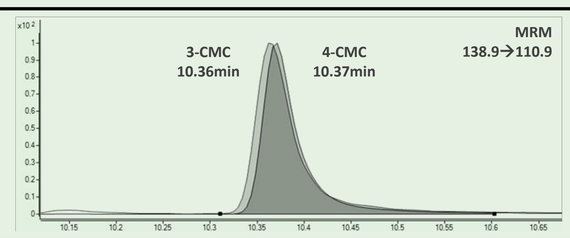
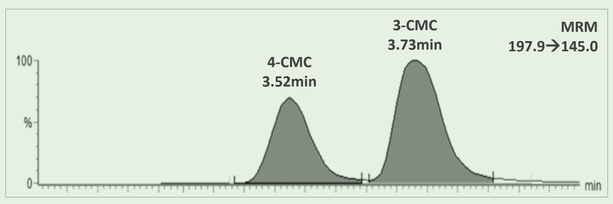
3-CMC



4-CMC

BACKGROUND & METHOD

RESULTS

		3-CMC	4-CMC	Chromatographic conditions	Spectra/Chromatogram
LC-DAD/MS ✓	RT	6.32min	6.54min	Kinetex 2.6µm EVO 150x4.6mm column Ammonium acetate buffer 5mM pH 3.8 Organic phase: ACN	
	Max absorbance wavelength	210nm 250nm	197nm 262nm		
GC-MS	RT	7.74min		HP-5MS column 20m x 0.180mm x 0.18µm	
	Specific m/z ions	111 139 239	⚠ completely indistinguishable, despite many temperature gradient tests		
GC-MS/MS	RT	10.3min		HP-5MS column 30m x 0.250mm x 0.25µm	
	Transitions	**138.9→110.9** 138.9→75.0 112.9→75.0			
LC-MS/MS	RT	3.73min	3.52min	ACQUITY UPLC HSS C18 column 1.8µm 2.1 x 150mm Ammonium formate buffer 5mM pH 3 Organic phase: ACN / 0.1% formic acid	
	Transitions	**197.9→145.0** 197.9→180.0			

DISCUSSION

In some cases, it is difficult to distinguish NPS isomers : it is generally expected that compounds with similar structures will react similarly under given analytic conditions. Therefore, it was initially suspected that the x-CMC isomers would behave identically to the x-MMC isomers: i.e., differentiable by RT on GC and undistinguishable on LC-MS/MS.

The difference in these structures lies in the presence of a chlorine atom (CMC) replacing a methyl group (MMC). On LC, a chloride group allows additional interaction with the stationary phase, and thus facilitates isomer separation. On GC, the position of a chloride group, which has a higher molar mass than a methyl group, has less influence on isomer separation.

CONCLUSION

In the absence of commercial standards, the LC-DAD/MS method alone made it possible to formally distinguish CMC isomers by their UV spectrum, as previously demonstrated for MMC isomers (Bottinelli, Toxac,2017,29,123-129). In first-line analysis in toxicological unknown screening, LC-DAD/MS allowed immediate distinction in the cases analyzed. Quantification could be carried out secondarily using a specific LC-MS/MS method with greater sensitivity and accurate reproducible quantification.

In 2023, six cases of 3-CMC, and no cases of 4-CMC, were identified in the laboratory, all in contexts of chemsex.
In 2024, only one case with 3-CMC was identified.