

**O3 FC**

**DETERMINATION OF FENTANYL DERIVATIVES IN ORAL FLUID BY MEANS OF MEPS EXTRACTION FOLLOWED BY UHPLC-HRMS/MS**

F. Vincenti<sup>1,2</sup>, C. Montesano<sup>1</sup>, S. Pirau<sup>1</sup>, A. Gregori<sup>3</sup>, M. Sergi<sup>4</sup>, D. Compagnone<sup>4</sup>, R. Curini<sup>1</sup>

<sup>1</sup>*Department of Chemistry, Sapienza University of Rome, Rome, Italy*

<sup>2</sup>*Department of Public Health and Infectious Disease, Sapienza University of Rome, Rome, Italy*

<sup>3</sup>*Carabinieri, Department of Scientific Investigation (RIS), Rome, Italy*

<sup>4</sup>*Faculty of Bioscience and Technology for Food, Agriculture and Environment, University of Teramo, Teramo, Italy*

In recent years, the synthesis and introduction into the illicit market of novel psychoactive substances (NPS) has reached alarming levels: more than 700 compounds have been identified by the European Monitoring Center for Drugs and Drug Addiction (EMCDDA) [1]. Among the newest NPS, synthetic opioids deserve special attention, in particular fentanyl derivatives that in 2018 covered more than 70% of the world demand for opioids. Fentanyl produce drowsiness and euphoria, the latter being less pronounced than with heroin and morphine. In 2018 thousands of fatal events were reported in USA [2]. As concern EU, the phenomenon of fentanyl-derivatives consumption is increasing, for example in Estonia, as many as 60 % of applicants for treatment services in 2009 reported fentanyl as their primary drug, and in Spain fentanyl analogues were identified in crypto market-sourced heroin products [3].

In this context it is of significant importance to develop suitable tools for the identification of the most recent NPS and assess their consumption.

The aim of our research is the development of innovative, fast and simple analytical methods, for the determination of these compounds in different biological matrices, both conventional such as urine and plasma and alternative such as oral fluids (OF). All these matrices are equally important for forensic purposes as they give different kind of information about the time of assumption and they show some distinctive features.

A method of pretreatment for OF has been developed by using Microextraction on packed sorbent (MEPS), a novel technique which is based on the miniaturization of SPE. This novel microextraction technique has demonstrated to be suitable for OF handling, allowing the use of a small volume of sample (100 µL) which is a critical issue in OF testing [4]. The developed method allows to effectively extract the analytes from the matrix, and to detect them with high sensitivity thanks to the high enrichment factor and the reduction of the matrix effect. In order to demonstrate its high versatility, the same technique will then be applied to the clean-up of plasma and urine [5].

An UHPLC-HRMS/MS method has been developed for 12 fentanyl-derivatives including 6 metabolites. Target analytes separation was performed by mean of a C18 Polar column which allows the elution of all compounds in 10 min.

### **O3 FC**

Qualitative and quantitative analyses were carried out by means of an high-resolution mass spectrometer with Orbitrap technology equipped with an H-ESI source operating in positive ionization mode. Acquisition mode was data dependent, which consent to perform the identification and the quantitation of all target analytes in a single chromatographic run, comparing retention times, fragmentation spectra and peak areas with an analytical standard. At the same time retrospective data analysis of the analyzed samples would be possible for the potential identification of unknowns. The analytical method was validated according to international guidelines [6].

#### **References**

- [1] European Monitoring Centre for Drugs and Drug Addiction, European Drug Report 2018: Trends and Developments, Publications Office of the European Union, Luxembourg, 2018.
- [2] Heikman P., Sundström M., Pelander A., Ojanperä I., New psychoactive substances as a part of polydrug abuse within opioid maintenance treatment revealed by comprehensive high-resolution mass spectrometric urine drug screening, *Human Psychopharmacol. Clinical Exp.*, 2016, 31, 44-52.
- [3] UNODC, "Understanding the global opioid crisis", Global SMART Update Volume 21, March 2019 .
- [4] Rocchi R., Simeoni M.C., Montesano C., Vannutelli G., Curini R., Sergi M., Compagnone D., Analysis of new psychoactive substances in oral fluids by means of microextraction by packed sorbent followed by ultra-high-performance liquid chromatography–tandem mass Spectrometry; *Drug and Test Anal.*,2018, 10, 865-873.
- [5] L. Nováková, H. Vlčková, A review of current trends and advances in modern bio-analytical methods: Chromatography and sample preparation, *Anal Chim Acta*, 2009, 656, 8–35.
- [6] Scientific Working Group for Forensic Toxicology (SWGTOX), Standard Practice for Method Validation in Forensic Toxicology, *Journal of Analytical Toxicology*,2013, 37, 452-474.