Suspect and non-target screening workflows to investigate the in vitro and in vivo metabolism of the synthetic cannabinoid 5-CI-THJ-018

Philippe Vervliet, Olivier Mortelé, Celine Gys, Maarten Degreef, Kristof Maudens, Adrian Covaci, Alexander L.N. van Nuijs, Foon Yin Lai
Toxicological Centre, University of Antwerp, Antwerpen, Belgium

Introduction
Synthetic cannabinoids cause similar effects as Δ9-tetrahydrocannabinol. (Ab)use can lead to health hazards and fatal intoxications. Most investigated synthetic cannabinoids undergo extensive biotransformation. As a result, parent compounds cannot be detected in urine and serum which hampers forensic investigations. Limited information about biotransformation products of new synthetic cannabinoids makes detection of these compounds in biological matrices challenging.

Experimental setup

Results in vitro metabolism

Objectives
- Identify in vitro metabolites of 5-CI-THJ-018 using suspect and non-target screening workflows
- Evaluate added value of different non-target screening workflows
- Identify in vivo metabolites in an authentic urine sample of a 5-CI-THJ-018 user using suspect screening

Screening workflows

Conclusions
The synthetic cannabinoid 5-CI-THJ-018 underwent extensive in vitro metabolism. Predominant Phase I pathways in vitro are oxidative reactions (with and without dechlorination) and subsequent Phase II glucuronidation and sulfation.

Seven metabolites were also identified in the in vivo urine sample. All these metabolites started from the oxidative dechlorination of 5-CI-THJ-018, followed by further oxidative reactions and/or Phase II biotransformation.

As only the dechlorinated metabolites were identified in this specific in vivo sample, no specific biomarkers could be proposed to distinguish 5-CI-THJ-018 use from the use of the nonhalogenated or other similar halogenated analogues.

References
1. Chimalakona KC, Seely KA, Bratton SM, et al. (2012); Drug Metab Dispos. 40: 2174-84
2. Favretto D, Pascali JP, Tagliaro F (2013); J Chrom A. 1287: 84-95