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Documenting human exposure to cannabinoids using oral fluid

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The importance of studying non-conventional biological matrices such as oral fluid (OF) is increasingly being recognized. This sample presents several advantages, mainly related to its collection procedure: it is non-invasive, easy to perform by non-medical personnel, can be performed under supervision to prevent adulteration, and provides low biohazard risk. OF samples are more likely to contain parent drugs, reflecting recent drug use – a major advantage of this matrix[1].

A fast and robust analytical methodology was developed in OF samples for the determination of tetrahydrocannabinol (THC), 11-hydroxy-tetrahydrocannabinol (THC-OH), 11-carboxy-tetrahydrocannabinol (THC-COOH), cannabinol (CBN) and cannabidiol (CBD) by liquid chromatography coupled with tandem mass spectrometry (LC-MS/MS), aiming at documenting cannabis consumption. Briefly, 200-µL aliquots of OF were subjected to protein precipitation with a refrigerated methanol/acetonitrile mixture (80:20, v/v). After centrifugation, the extracts were evaporated to dryness, reconstituted in methanol, and 5-µL aliquots were injected into the UPLC-QTRAP-MS 6500+ (SCIEX®) system (in a 14-minute run). The analysis was carried out in MRM mode with two transitions for each compound and one transition for each internal standard.

The method was validated according to the guidelines of ANSI/ASB 036[2]. Parameters such as ion suppression/enhancement, interferents, linearity, precision and accuracy, limits of detection and quantification, dilution integrity and stability were studied and showcased satisfactory results. The 2 ng/mL cut-off for THC[3] was achieved, and the method was successfully applied to real samples (57.95-898.28 ng/mL for THC; 0.17-4.09 ng/mL for THC-COOH; 1.26-44.57 ng/mL for CBN; 0.42-1007.86 ng/mL).

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