

Chemistry of Cannabis

Daniel Cini, Janis Vella Szijj, Lilian M. Azzopardi

Department of Pharmacy, Faculty of Medicine and Surgery, University of Malta, Msida, Malta

Email: daniel.cini.16@um.edu.mt

INTRODUCTION

Cannabis sativa is a plant with medicinal and recreational uses. Cannabinoids are active constituents of the Cannabis plant and can be found naturally or synthetically made.

AIMS

To determine the chemistry of cannabinoids and compare different methods of analysis.

METHOD

A literature review was carried out about the chemistry and analytical methods for the natural cannabinoids: Δ^9 -Tetrahydrocannabinol (THC), Cannabinol (CBN), Cannabidiol (CBD) and synthetic cannabinoids: JWH-018, JWH-250 and HU-210.

Information from open-access peer-reviewed journals and books published between 2000 and 2019 was included in the study.

RESULTS

Chemistry:

Cannabinoids are relatively lipophilic with HU-210 being the most lipophilic from the six cannabinoids included having a logP value of 8.19 and JWH-250 being the least lipophilic having a logP value of 5.12. Melting points for the six cannabinoids ranged from 60°C (JWH-018) to 200°C (THC).

Analysis: Screening and confirmatory tests were identified in literature.

Screening tests: 33 screening tests for natural cannabinoids and 10 screening tests for synthetic cannabinoids were identified. The most common type of screening test for natural cannabinoids was thin layer chromatography (n=18) and the most common type of screening tests for synthetic cannabinoids were immunoassays (n=7).

Confirmatory tests: 210 confirmatory tests for natural cannabinoids and 85 confirmatory tests for synthetic cannabinoids were identified. The most commonly used confirmatory test for natural cannabinoids was high performance liquid chromatography (n=106) and the most commonly used confirmatory test for synthetic cannabinoids was ultra-high-performance liquid chromatography (n=37).

	HPLC (n=138)	GC (n=85)	UHPLC (n=67)
Matrix	Cannabis plant material (n=45)	Hair and cannabis based samples (n=40)	Biological fluids (n=37)
Sample Preparation	Solid-Phase extraction (n=59)	Solid-Phase microextraction (n=21)	Solid-Phase extraction (n=53)
Mobile Phase	Methanol and buffer (n=48)	Helium gas (n=71)	Acetonitrile and buffer (n=29)
Stationary Phase	C18 columns (n=92)	5MS (fused silica) columns (n=53)	C18 columns (n=38)
Detector	Triple quadrupole mass spectrometer detector (n=74)	Mass selective detector (n=68)	Triple quadrupole mass spectrometer (n=66)

Table 1: The most common types of test parameters for natural and synthetic cannabinoids identified from literature

CONCLUSION

Identification of different parameters used for screening and confirmatory tests can help the analyst select efficient methods for the determination of natural and synthetic cannabinoids.