COMPARATIVE ANALYSIS OF TETRAHYDROCANNABINOL AND CANNABIDIOL LEVELS IN CANNABIS SATIVA L. SAMPLES COLLECTED AT MUSIC FESTIVALS IN PORTUGAL

Rodriguez, Carlota[a,b]; Oliveira-Torres, Edite[a]; Neng, Nuno[a,b]; Quintas, Alexandre[a]

[a] Laboratório de Ciências Forenses e Psicológicas Egas Moniz, Egas Moniz Center for Interdisciplinary Research, Egas Moniz School of Health & Science, Quinta da Granja, 2829-511 Caparica, Portugal.
[b] Centro de Química Estrutural, Institute of Molecular Sciences, Departamento de Química e Bioquímica, Faculdade de Ciências, Universidade de Lisboa, Campo Grande, 1749-016 Lisboa, Portugal.

INTRODUCTION

- Cannabis sativa is cultivated in over 86 countries.
- The psychoactive compound Δ⁹-THC[1] affects the CNS via CB1 and CB2 receptors.
- Increasing interest in natural and synthetic cannabinoids has driven forensic research.
- Music festivals are critical settings for evaluating recreational drug use.
- European law permits hemp cultivation with ≤0.3% Δ⁹-THC.

[1]Delta-9-tetrahydrocannabinol

OBJECTIVE

- To analyse cannabis samples from music festivals (2023 and 2024)
- To characterise substance use trends using attendee questionnaires.

METHODOLOGY

Sample Collection → **Extraction** → **Analytical Techniques**

Exctraction

Ultrasound-assisted solid-liquid extraction

GC-MS[1]
HPLC-DAD[2]

[1]Gas Chromatography – Mass Spectrometry
[2]High-Performance Liquid Chromatography with Diode Array Detection)

RESULTS

- Δ⁹-THC and CBN[1] detected in all samples;
- CBN levels suggest Δ⁹-THC degradation;
- CBD[2] and CBG[3] present in many samples.
- No synthetic cannabinoids found.
- 1 sample (2023) tested positive for cocaine.
- Survey: high cannabis use (ages 19–26), mostly men.
- 45% say festivals influence consumption.

73 total samples
51 (2023), 22 (2024)

2,476 answers

[1]Cannabinol; [2]Cannabidiol; [3]Cannabigerol

Figure 1. Prevalence of cannabis use in the EU taken from the European Drug Report, 2025. Last updated: 5 June 2025.

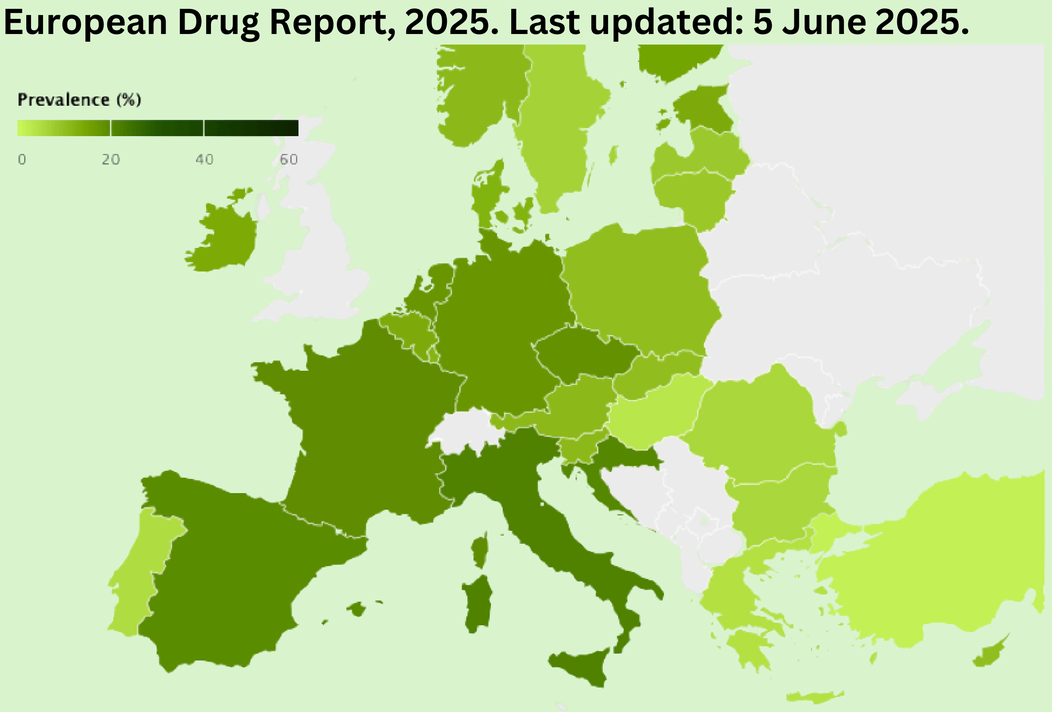
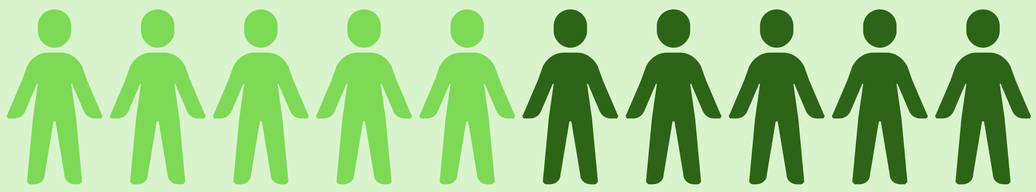
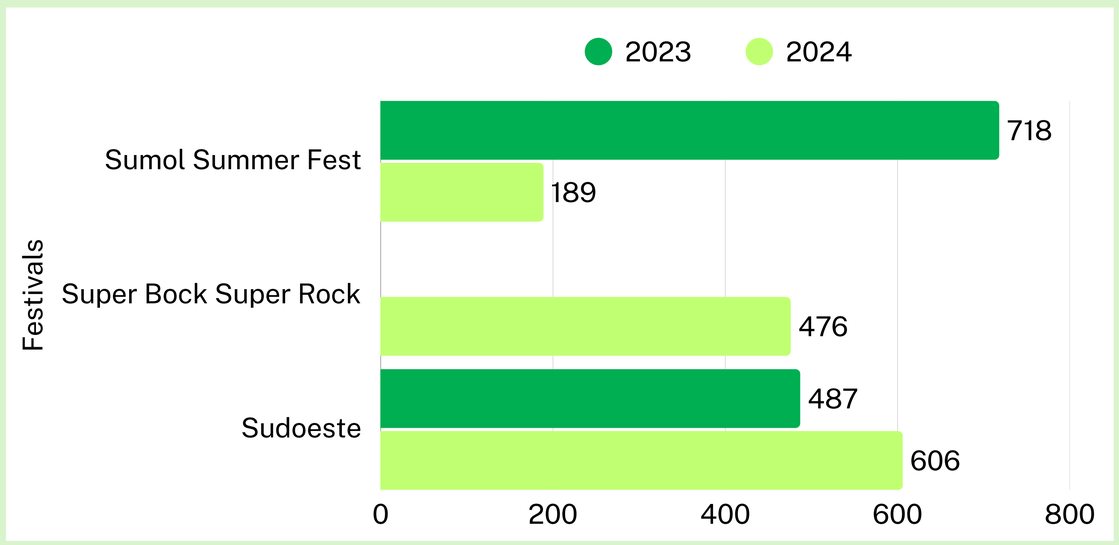


Figure 2: 45% of participants reported that the festival environment influenced their substance use.



Graphic 1: Answers to the questionnaires on consumption and trends at the different music festivals between 2023 and 2024



CONCLUSION

- This is the first study in Portugal that combines lab analysis and field surveys in festivals.
- In 2022, the average content of herbal and hashish in the seized samples was 10.1% and 24.8%, respectively.
- This shows that we need to keep checking things and making policies based on facts.
- HPLC-DAD and GC-MS are both reliable techniques.

REFERENCES

- Šantavý F. Notes on the structure of cannabidiol compounds. Acta Univ Palacki Olomuc. 1964;35:5–9.
- Correia-da-Silva G, Fonseca BM, Soares A, Teixeira N. Canábis e canabinóides para fins medicinais. Rev Port Farmacoter. 25 de julho de 2019;11(1):21–31.
- Pellati F, Brighenti V, Sperlea J, Marchetti L, Bertelli D, Benvenuti S. New Methods for the Comprehensive Analysis of Bioactive Compounds in Cannabis sativa L. (hemp). Molecules. outubro de 2018;23(10):2639.

EGAS MONIZ CENTER for INTERDISCIPLINARY RESEARCH
LABORATÓRIO DE CIÊNCIAS FORENSES E PSICOLÓGICAS EGAS MONIZ