

DETERMINATION OF CANNABINOIDS IN PLASMA

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INTRODUCTION

The use of cannabis for medicinal use is increasing. Tetrahydrocannabinol (THC)'s psychoactive properties and Cannabidiol (CBD)'s analgesic, neuroprotective, anticonvulsant, anti-inflammatory and anti-emetic properties contribute to the different conditions for which medical cannabis can be used.

AIMS

To develop and validate a quick and efficient method to quantify THC in plasma, using High Performance Liquid Chromatography (HPLC), coupled with Ultraviolet (UV) detection.

METHOD

Literature Review

- Journal articles published between 2010 and 2023 on PubMed, describing analysis of cannabinoids in biological fluids were identified.

Method Development

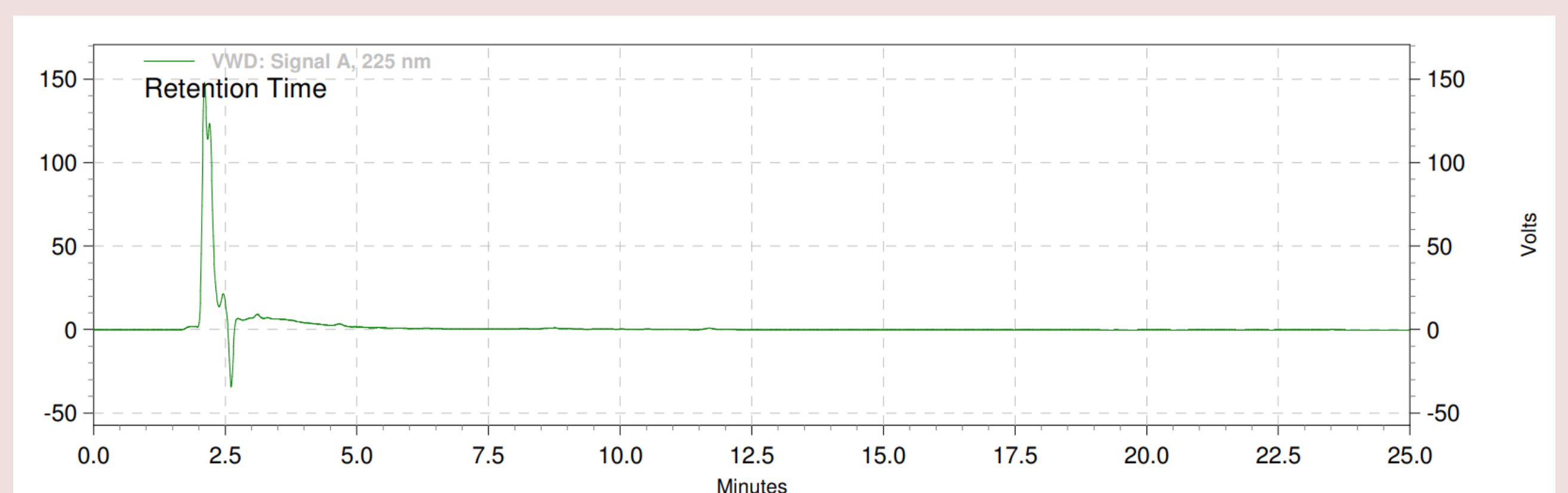
- Sample preparation procedure, stationary phase, mobile phase, flow rate and detector wavelength were selected.

Method Validation

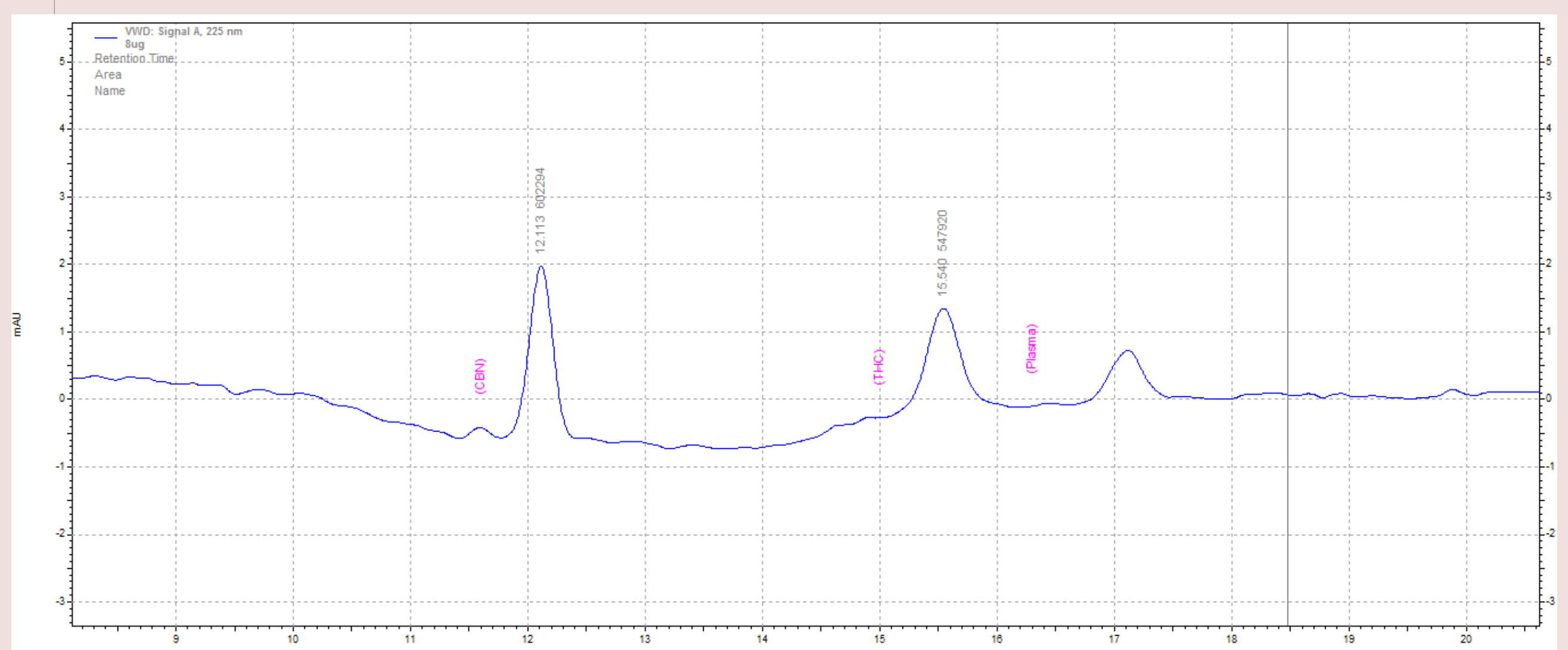
- Developed method was validated for intra-day and inter-day precision, selectivity, specificity, linearity and stability, in line with ICH guidelines.¹

RESULTS

The method developed used protein precipitation in a 1:1.5 plasma to acetonitrile ratio, followed by vortex mixing and centrifugation as the sample preparation technique. Samples were analysed using an Agilent 1260 Infinity II series chromatographic system, equipped with an ACE 5 C18 column as the stationary phase, and water (+0.1% acetic acid) and acetonitrile (+0.1% acetic acid), as the mobile phase, in a 30:70 ratio (v/v), using isocratic conditions. THC had a retention time of 16 minutes. The method was selective and specific (Figure 1). The method was found to be linear between 0.25 and 8µg/ml THC ($R^2=0.9945$).



(a) Chromatogram of blank plasma



(b) Chromatogram of 8µg/ml calibration standard

Figure 1: Chromatograms of (a) blank plasma and (b) 8µg/ml calibration standard

CONCLUSION

The developed method utilises equipment that is accessible in many laboratories. Further research can involve application of method to determine THC in plasma of patients. Determination of cannabinoids in biological fluids of patients can help provide more pharmacokinetic information leading to better dosing of cannabinoids and increased patient safety.

REFERENCES

- ¹International Council of Harmonisation (ICH) Harmonised Guideline. Bioanalytical Method Validation and Study Sample Analysis M10.; 2022. [cited 2023 Dec] Available from: <https://www.ich.org/page/multidisciplinary-guidelines>