



Application Note AN-NIR-088

CBD 油的质量控制

Fast and easy determination of cannabinoid content

Cannabidiol (CBD) is a popular natural remedy used in many pharmaceutical, food, and cosmetic products. CBD is just one of over 100 chemical compounds found in the cannabis plant. Unlike tetrahydrocannabinol (THC), CBD is not psychoactive. This characteristic makes CBD an appealing option for those who are looking for relief from pain and other symptoms without the mind-altering effects associated with

consuming marijuana or resin concentrates. CBD oil is made by extracting the compound from the plant, then diluting it with a carrier oil (e.g., coconut or hemp seed oil).

The standard HPLC method requires 45 minutes to perform by highly trained analysts. In contrast to the primary method, Vis-NIR spectroscopy is a cost-efficient and fast analytical solution for the determination of cannabinoid content in oils.

EXPERIMENTAL EQUIPMENT

17 samples of three different CBD carrier oils (hemp, fish, and MCT (medium-chain triglycerides) oil) were measured in transmission mode with a DS2500 Liquid Analyzer. The built-in temperature control was set to 40 ° C to acquire reproducible spectra. For convenience, disposable vials with a path length of 8 mm were used, which made cleaning of the sample vessels unnecessary. The Metrohm software package Vision Air Complete was used for all data acquisition and prediction model development.



Figure 1. DS2500 Liquid Analyzer and a sample filled in a disposable vial.

Table 1. Hardware and software equipment overview

Equipment	Metrohm number
DS2500 Liquid Analyzer	2.929.0010
DS2500 Holder 8 mm vials	6.7492.020
Disposable vials, 8 mm	6.7402.000
Vision Air 2.0 Complete	6.6072.208

RESULTS

All 17 measured Vis-NIR spectra (**Figure 2**) were used to create a prediction model for quantification of the cannabinoid content. The quality of the prediction models was evaluated using cross-validation, which display a very high

correlation between Vis-NIR prediction and primary method values. The respective figures of merit (FOM) display the expected performance of a prediction during routine analysis.

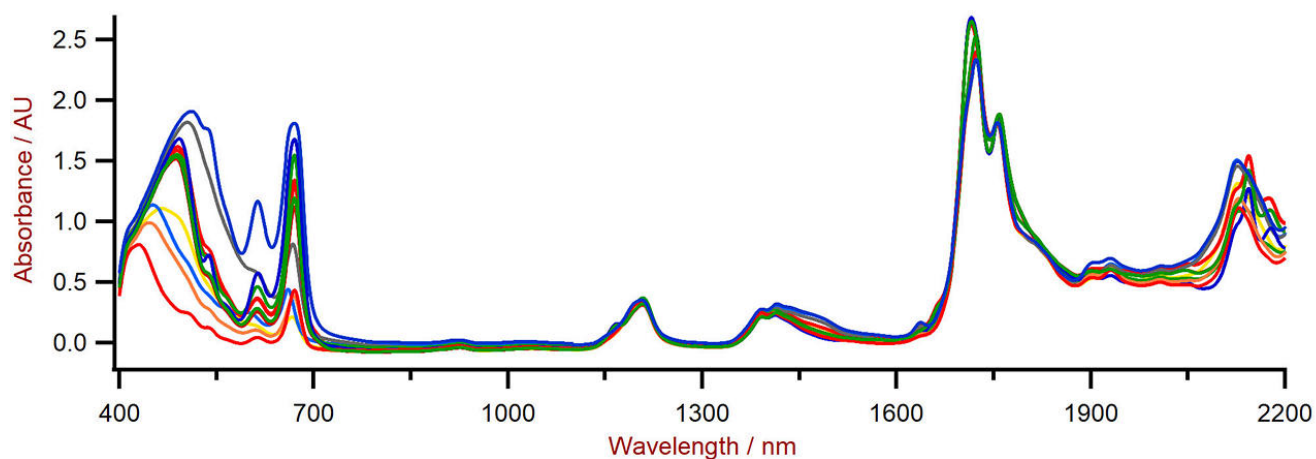


Figure 2. Vis-NIR spectra of CBD oils with varying cannabinoid content measured on a DS2500 Liquid Analyzer.

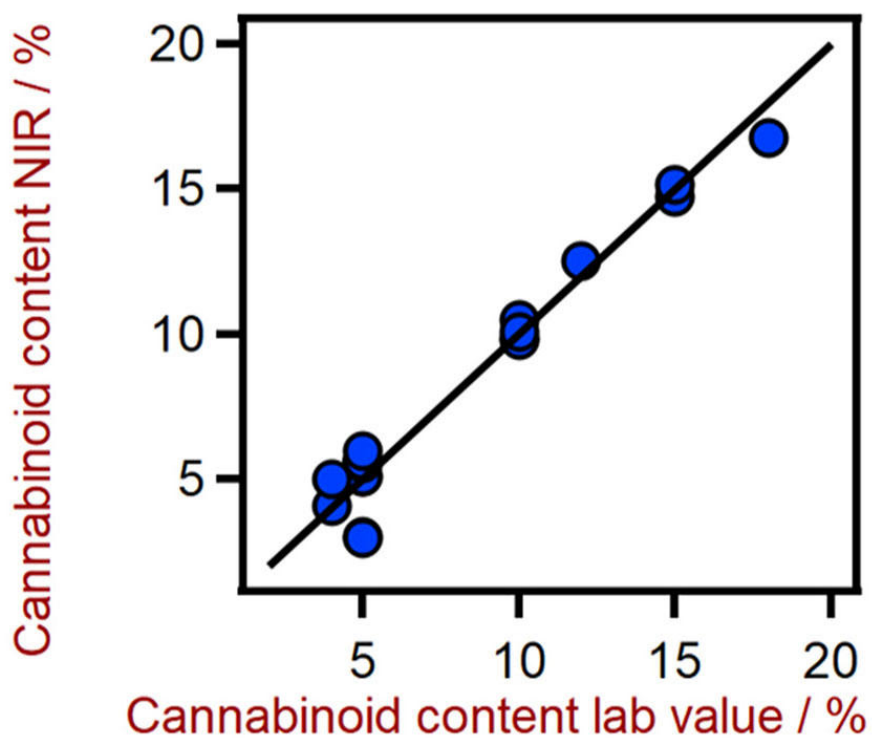


Figure 3. Correlation diagram for the prediction of cannabinoid content in CBD oils using a DS2500 Liquid Analyzer.

Table 2. Figures of merit for the prediction of cannabinoid content in CBD oils using a DS2500 Liquid Analyzer.

Figures of Merit	Value
R ²	0.959
Standard error of calibration	0.99%
Standard error of cross-validation	1.21%

CONCLUSION

This application note demonstrates the feasibility of the DS2500 Liquid Analyzer for the determination of cannabinoid content in CBD oils. In comparison to the HPLC method (Table

3), the time to result is a major advantage of NIR spectroscopy, since a single **measurement is performed within one minute.**

Table 3. Time to result for the cannabinoid content determination in CBD oils using HPLC method.

Parameter	Method	Time to result and workflow
Cannabinoid content	HPLC	5 min (preparation) + 40 min (HPLC)

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DS2500 Liquid Analyzer

坚固结实的近红外光谱仪,用于生产环境和试验室中的质量检查。

DS2500 Liquid Analyzer 是一种成熟且灵活的解决方案,其用于在整个生产链中进行液体常规分析。其坚固结实的设计使 DS2500 Liquid Analyzer 不受灰尘、潮湿、振动的影响,因此非常适用于在恶劣的生产环境中使用。

DS2500 Liquid Analyzer 覆盖 400 至 2500 nm 的整个光谱范围,将样品加热至 80° C 高温,并与各种不同的一次性小瓶和石英比色皿兼容。因此,DS2500 Liquid Analyzer 可适应您的个性化样品要求,帮助您在几分钟内获得精确和具有可重现性的结果。借助集成的样品架识别装置和自带的 Vision Air 软件,还保证了用户能轻松和安全地进行操作。

如果是较大的样品量,则可通过将流通池与一个 Metrohm 机器人自动进样器搭配使用的方法显著提高生产率。



DS2500 8 mm

直径为 8 mm 且更加智能的一次性玻璃小瓶支架



Vision Air 2.0 Complete

Vision Air – 通用的光谱分析软件。

Vision Air Complete 是用于监管规范环境的先进易用的软件解决方案。

Vision Air 优点一览:

- 便捷的软件应用和经过适配的用户界面保证了直观简单的操作方式
- 操作过程的创建与维护方式简单
- SQL 数据库,可安全且简单地管理数据

Vision Air Complete (66072208) 版本包含所有用于可见近红外光谱分析质量保证过程的应用:

- 仪器和数据管理应用
- 方法开发应用
- 常规分析应用

其它 Vision Air Complete 解决方案:

- 66072207 (Vision Air Network Complete)
- 66072209 (Vision Air Pharma Complete)
- 66072210 (Vision Air Pharma Network Complete)