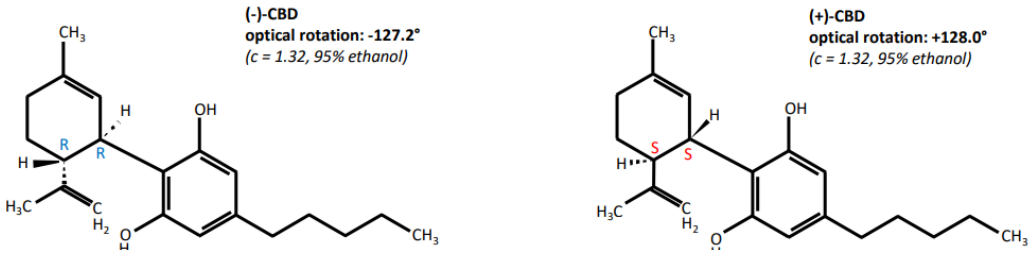
Application Note
Pharmaceutical Industry

SCHMIDT HAENSCH

Measuring Optical Rotation of Cannabidiol

Analysing Cannabidiol products for purity



Successful Separation of Cannabidiol Enantiomers by LC-UV Analysis using Lux Amylose Chiral Columns; Phenomenex 2021

The Significance of Optical Rotation Measurement for Structure, Purity, and Quality Assurance

Cannabidiol (CBD) is a natural compound found in the **Cannabis sativa** plant. CBD is one of the numerous cannabinoids present in the plant, alongside tetrahydrocannabinol (THC). However, unlike THC, CBD is non-intoxicating, which means it does not produce the psychoactive effects typically associated with marijuana. CBD has gained significant attention in recent years due to its potential therapeutic properties. It interacts with the body's endocannabinoid system, which plays a role in regulating various physiological functions such as pain sensation, mood, appetite, and sleep.

CBD is available in various forms, including oils, tinctures, capsules, edibles, topicals, and more. Besides the pharmaceutical industry it has become increasingly popular as a dietary supplement and alternative wellness product.

The measurement of the optical rotation of cannabidiol (CBD) is an important method for obtaining information about the structure and purity of CBD products. Here are some useful aspects of this measurement:

1. Structural elucidation: CBD is a chiral molecule. The measurement of optical rotation allows us to determine whether a CBD product consists of pure (-)- or (+)-CBD or a mixture of enantiomers. This is important because the pharmacological properties and potential effects of enantiomers can differ.

2. Purity testing: The measurement of optical rotation can also be used to verify the purity of CBD products. Impurities or adulterants can affect optical activity. By comparing the measured optical rotation with the expected rotation for pure CBD, we can determine if the product contains impurities. By comparing the measured rotation with reference values for CBD, we can determine if the product indeed contains CBD or if it is a counterfeit.

3. Quality assurance: The measurement of optical rotation is a method for quality control of CBD products. By regularly measuring the rotation, manufacturers can monitor the consistency and quality of their products during or after production. Deviations from the expected values may indicate issues in manufacturing or storage.

It is important to note that the measurement of optical rotation alone is not sufficient to obtain a comprehensive picture of CBD products. Additional analytical methods such as chromatographic techniques and mass spectrometry are often used in conjunction with the measurement of optical rotation to enable a comprehensive characterization of CBD products.

Normative reference:

a. Monography DAC/NRF 2020/2, C – 052
b. Ph. Eur. chapter 2.2.7 „Optical Rotation"
c. USP chapter <781> „Optical Rotation/Specific Rotation"

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Solution from SCHMIDT + HAENSCH

For measuring pharma-grade CBD, 0.250 g of the white/yellowish (-)-CBD powder have to be diluted in 25,0 mL 96 % Ethanol. The solution has to be measured in a calibrated Polarimeter at 589 nm, 20 °C. The specific optical rotation has to be within a range of -129.5 and -135.0 (°) · ml · dm^{-1} · g^{-1}. With just a few milliliters of sample, analysis of pure enantiomers can be conducted that are quantitatively comparable to an HPLC analysis.

Using our new VariPol polarimeter with complete 21 CFR part 11 compliance and a high reproducibility the quality control of CBD can be guaranteed. Configuring a specific CBD-method within the software will enable the user to have direct visual feedback if the value is within the range.

Advantages of using the VariPol

- Time and space saving
- Complete temperature control within 10-40 °C
- Direct visual feedback
- All devices controlled via display or remote (PC, Smartphone, Tablet)
- Collected evaluation of data

Product packages	Product	ID-N°
VariPol	VariPol B 101 P	31006
	+ Display	16700
	+ 100 mm Flow through tube	100000
	or 100 mm Bubble Trap tube	360021
	+ Single Quartz control plate	18792
	+ Connection cable for quartz plate	16534

Benefits

- Cost and time savings
- Accurate, fast and precise measurement
- Product quality securing

Typical industries

- Pharmaceutical industry
- Cosmetic industry
- Food and Beverage industry