CANNAPIO

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How to Read a Certificate of Analysis (COA)

Checking the lab report of a CBD product in 7 steps

A Certificate of Analysis (COA) is a laboratory report on the analysis of a specific production batch. It shows how many cannabinoids the product actually contains and whether it passed testing for unwanted substances. Here is how to read it.

7 steps to check

1. **Batch.** The batch number on the certificate must match the batch number on your package. A certificate for a different batch tells you nothing about your product.
2. **Laboratory.** Look for the name and address of the laboratory, ideally independent and accredited to ISO/IEC 17025. The certificate must be signed or otherwise verifiable.
3. **Date.** The sampling and analysis date should correspond to the time the batch was produced.
4. **Method.** Cannabinoids are normally measured by liquid chromatography (HPLC), terpenes and residual solvents by gas chromatography (GC).
5. **Cannabinoid profile.** Find the rows for CBD, CBDA, Δ9-THC, THCA, and possibly CBG, CBN and others, together with the units they are given in.
6. **Conversion to the package.** Compare the result with the figure on the label (see the calculation below).
7. **Contaminants.** A full analysis also covers heavy metals, pesticides, residual solvents, mycotoxins and microbiology, with a pass / fail result.

Units and abbreviations

Notation	Meaning
% (w/w)	percentage by weight: grams of substance per 100 g of product
mg/g	milligrams per gram of product, 10 mg/g = 1 %
mg/ml	milligrams per millilitre, used for liquids
ND	not detected: the substance was not found above the limit of detection
LOD	limit of detection: the smallest amount the method can pick up
LOQ	limit of quantification: the smallest amount the method can reliably measure
< LOQ	the substance is present but below the limit of quantification

Total CBD and total THC

In the plant, cannabinoids are mostly in their acidic form (CBDA, THCA). When heated, they convert to the neutral form and lose part of their mass. That is why the total content is calculated as follows:

Total CBD = CBD + 0.877 × CBDA
Total THC = Δ9-THC + 0.877 × THCA

Example: the analysis states CBD 9.50 % and CBDA 0.60 %. Total CBD = 9.50 + 0.877 × 0.60 = 10.03 %.

Conversion to the package

Multiply the weight percentage by the weight of the contents. A 10 ml oil weighs approximately 9.2 g (the density of vegetable oils is around 0.92 g/ml). At 10 % (w/w) it contains roughly 920 mg of CBD. Some manufacturers state the content by volume (w/v), in which case 10 % corresponds to 1,000 mg in 10 ml. That is why it is important to know which unit both the certificate and the label use.

Sample results (fictitious example)

Analyte	Result	LOQ	Assessment
CBD	9.50 %	0.01 %	–
CBDA	0.60 %	0.01 %	–
CBG	0.21 %	0.01 %	–
Δ9-THC	0.08 %	0.01 %	–
THCA	< LOQ	0.01 %	–
Lead (Pb)	ND	0.05 mg/kg	pass
Pesticides (screening)	ND	0.01 mg/kg	pass
Residual solvents	ND	–	pass

Warning signs

- the certificate has no batch number, or it does not match your package,
- the laboratory name or a verifiable contact is missing,
- the CBD content differs significantly from the label (the usual tolerance is around ±10 %),
- total THC exceeds the limit applicable in the country of sale,
- the document is just a blurry image without a date or signature,
- the analysis covers only cannabinoids and lacks contaminant testing (common for older batches, but a full analysis is better).

> We will gladly send you the certificates for our products. Send us the batch number from the package and we will reply with the matching analysis.

This material explains the content of a laboratory report. It does not describe the effects of CBD and is not health or legal advice. More free guides and resources at www.cannapio.com