Your Guide to Understanding a COA (Certificate of Analysis)

What's a COA, Anyway?

Hello, hemp enthusiasts! Whether you're a seasoned hemp connoisseur or just dipping your toes into these green waters, understanding the Certificate of Analysis (COA) is crucial. A COA isn't just paperwork; it's a seal of transparency and trust. Essentially, it's the manufacturer's way of saying, "We have nothing to hide, and your well-being is our priority. It tells you the exact composition of your hemp product, ensuring it meets both safety standards and your high expectations.

Why COAs Matter

Transparency in the hemp industry is vital, and it starts with demystifying the COA—a document that may seem daunting at first glance but is actually a treasure trove of valuable insights. By becoming familiar with the nuances of cannabinoid profiles, terpene compositions, and purity tests, you're not just reading a report; you're educating yourself on the quality and safety of what you're ingesting.

Common Tests Included in a COA:

A "COA" could refer to a single potency test, or it could refer to a range of different tests that cover many areas of potency and purity - often referred to as a "Full Panel COA". The most common tests you will see as part of a full panel include the following:

Cannabinoid Profile (Potency) When we talk about cannabinoids, we're referring to the stars of the hemp show. Each cannabinoid, from CBD to HHC and beyond, plays a unique role. In the EU, THC is limited to under 0.3%—that is the psychoactive stuff. All of our products will be well below that limit, or contain none at all. The 'Total Cannabinoids' percentage is a bit like the horsepower of a car; it tells you how potent your product is. More isn't always better, but it's essential to know what you're working with.

Terpene Profile: The Flavor and Aroma Wizards Terpenes are the unsung heroes behind the scent and flavor profiles of hemp. But they're not just there to please your nose; they also affect how a cannabinoid interacts with your body. The percentages you see? They indicate the terpene concentration in the overall product. The terpene content does not need to be too high to provide all of the desired benefits, as these are highly concentrated oils on their own and should always be diluted (similar to how it's not advised to put pure essential oil directly on skin, as it's too strong).

Heavy Metals Analysis: We test for heavy metals because the hemp plant is great at absorbing stuff from the soil—good and bad. This analysis makes sure the bad (like lead or cadmium) hasn't made its way into your product.

Pesticides Analysis: Just as you'd wash your apples, we test for pesticides to ensure nothing unwanted sneaks into your product. A clean COA means a clean product, one that's been grown with care for both you and the environment.

Residual Solvents: Residual solvents are the remnants of the extraction process, and we don't want them lingering. This test is like checking your dishes for soap before you eat off them—necessary for a truly clean experience.

Mycotoxins: Mycotoxins are toxic compounds produced by fungi, which can contaminate crops under certain conditions. Hemp, like any agricultural product, can be susceptible to such contamination. Testing for mycotoxins is critical as they can pose health risks even at low exposure levels. Our rigorous testing ensures these unwanted guests are not present in your hemp, keeping the final product safe for consumption.

Microbials: Microbial testing searches for the presence of microorganisms such as bacteria, yeast, and mold. These can affect the safety and shelf life of hemp products.

Testing Thresholds:

We prioritize product purity, and to ensure this, we look at specific tests for contaminants which are measured against strict thresholds. These thresholds vary from place to place; for instance, the U.S. has different standards state by state. Our goal is simple: keep these contaminant levels as low as possible, ideally undetectable, to guarantee the safety and quality of our products.

In Ireland and across the EU, specific regulations for testing hemp contaminants are still developing and are mostly aligned with general agricultural standards for food. Because of this, and the lack of specialized facilities in Ireland, we conduct all our testing in the United States. American labs offer advanced testing services that comply with the strictest of standards. By choosing to test our products in such an environment, we can ensure they meet the highest international benchmarks for quality, purity, and safety.

COA Lingo Decoded:

Results as mg/g When a COA lists a result in milligrams per gram (mg/g), it's indicating the exact amount of a substance in a specific quantity of product. This measurement is a direct reflection of the mass-to-mass ratio. For example, if a cannabinoid is listed as 10 mg/g, this means that in every gram of the product, there are 10 milligrams of that cannabinoid. This unit is particularly useful because it gives a clear picture of the quantity of an ingredient in a given mass of the product, which can be especially helpful when dosing is critical.

Results as Percentage (%) On the other hand, a result listed as a percentage (%) describes the concentration of a substance in terms of its proportion of the total mass or volume of the product. This is a dimensionless ratio, which means it tells you how much of the substance there is, relative to the whole product. If a COA states that a cannabinoid concentration is 1%, this indicates that one percent of the total weight or volume of the product is that cannabinoid. Percentages are often used because they provide an intuitive understanding of the proportion of a substance in the product.

PPB (parts per billion) vs **PPM (parts per million)**: These are units of measurement used to describe the concentration of one substance within another. They are commonly used in scientific and industrial contexts, including the testing of hemp and cannabis products, because they offer a way to express very small quantities of a substance in terms of a ratio to the product being tested.

ppm (parts per million): Imagine splitting a chocolate bar into a million pieces. One piece is one part per million.

ppb (parts per billion): This is a much more sensitive measure the ppm – imagine splitting a chocolate bar into a billion pieces now. One piece would be one part per billion

LOQ (Limit of Quantitation): This is the smallest amount the lab can measure with confidence. Below this number, things get a bit blurry.

LOD (Limit of Detection): This is the hide and seek limit—the point at which the lab can spot a compound is there, but can't say how much of it there is with certainty.

'ND' (Not Detected): The best news on a COA. It means the lab's game of hide and seek found no traces of unwanted compounds, like heavy metals or solvents.

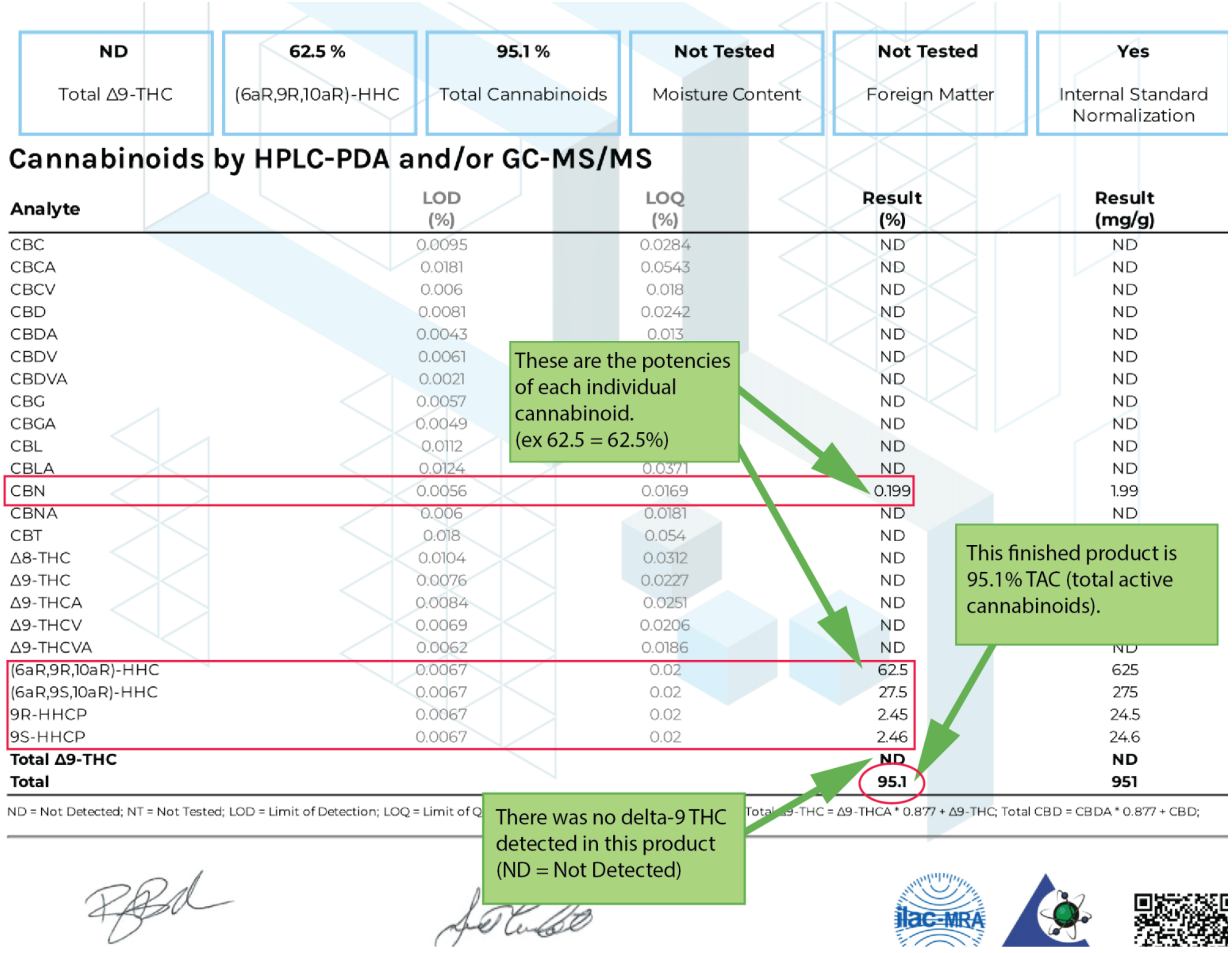
Understanding 'ND' and Pass Criteria Seeing 'ND' on your COA is great; it means the lab found none of what it was looking for—like pesticides or heavy metals. The 'P' for Pass indicates that either zero was detected, or even if something was detected, it's at a safe level according to regulations.

Virtual Tour of a COA:

Let’s dive into an actual COA so you can get familiar with the different elements that make up the pages. Once you know what you are looking at, it becomes easy to understand. The following images are taken from our Platinum Owl HHC Vape Cartridges

Cannabinoid Tests: Below is a snapshot of the cannabinoid (aka Potency) test. You can see a list of all the different types of cannabinoids that have been tested for, and the result that was picked up for each one.

In this vape cart we see that the majority of the product is HHC, which is what we were expecting. There are four different sub-classes of HHC. Overall this vape cartridge consists of 95.1% active cannabinoids - meaning there really isn't much else in the cart other than pure potency (and terpenes which we will see next).



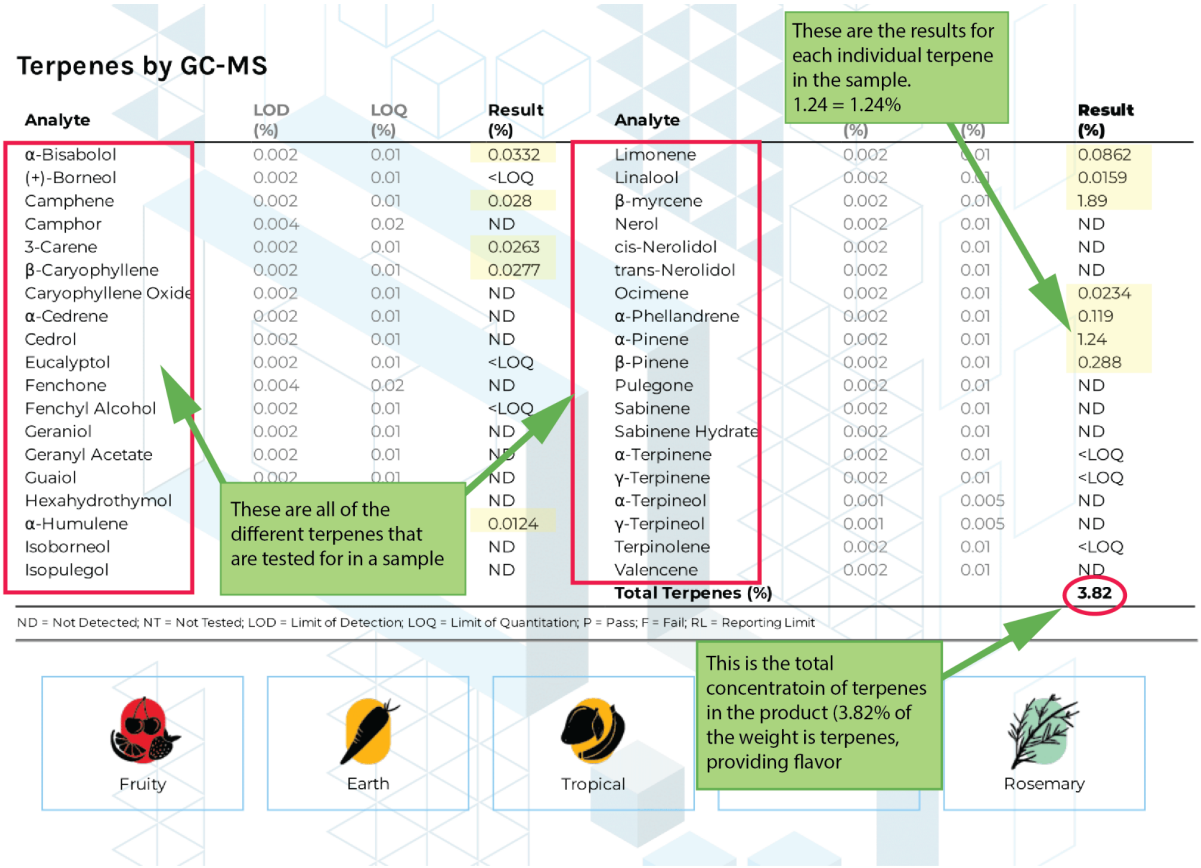
ND	62.5 %	95.1 %	Not Tested	Not Tested	Yes
Total Δ9-THC	(6aR,9R,10aR)-HHC	Total Cannabinoids	Moisture Content	Foreign Matter	Internal Standard Normalization

Cannabinoids by HPLC-PDA and/or GC-MS/MS

Analyte	LOD (%)	LOQ (%)	Result (%)	Result (mg/g)
CBC	0.0095	0.0284	ND	ND
CBCA	0.0181	0.0543	ND	ND
CBCV	0.006	0.018	ND	ND
CBD	0.0081	0.0242	ND	ND
CBDA	0.0043	0.013	ND	ND
CBDV	0.0061	0.0183	ND	ND
CBDVA	0.0021	0.0064	ND	ND
CBG	0.0057	0.0171	ND	ND
CBGA	0.0049	0.0148	ND	ND
CBL	0.0112	0.0337	ND	ND
CBLA	0.0124	0.0371	ND	ND
CBN	0.0056	0.0169	0.199	1.99
CBNA	0.006	0.0181	ND	ND
CBT	0.018	0.054	ND	ND
Δ8-THC	0.0104	0.0312	ND	ND
Δ9-THC	0.0076	0.0227	ND	ND
Δ9-THCA	0.0084	0.0251	ND	ND
Δ9-THCV	0.0069	0.0206	ND	ND
Δ9-THCVA	0.0062	0.0186	ND	ND
(6aR,9R,10aR)-HHC	0.0067	0.02	62.5	625
(6aR,9S,10aR)-HHC	0.0067	0.02	27.5	275
9R-HHCP	0.0067	0.02	2.45	24.5
9S-HHCP	0.0067	0.02	2.46	24.6
Total Δ9-THC			**ND**	**ND**
Total			**95.1**	**951**

ND = Not Detected; NT = Not Tested; LOD = Limit of Detection; LOQ = Limit of Q... Total Δ9-THC = Δ9-THCA * 0.877 + Δ9-THC; Total CBD = CBDA * 0.877 + CBD;

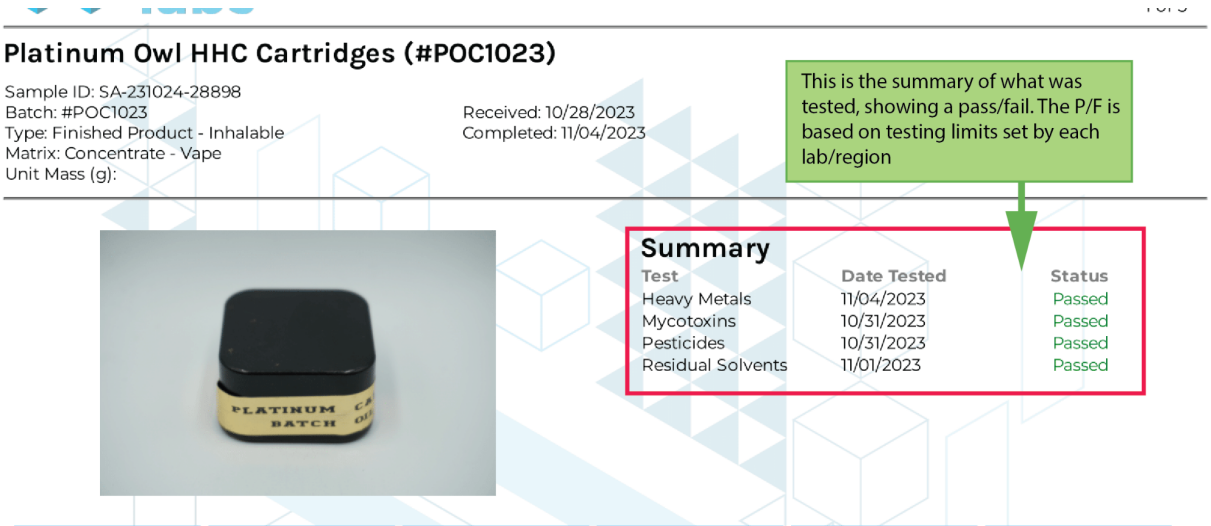
Terpene Testing: Next we test for what individual terpenes make up the overall flavor profile in the product. In this result, we can see that there is a total of 3.82% terpenes in the cartridge on the whole, made up of over 10 different distinct terpenes. When we combine the terpene content with the potency, we can see that of the entire cartridge that is tested, 98.92% (95.1% + 3.82%) is either active cannabinoids, or terpenes. It makes sense, because the only ingredients in our vape cartridges are high-potency oil, and pure terpenes!



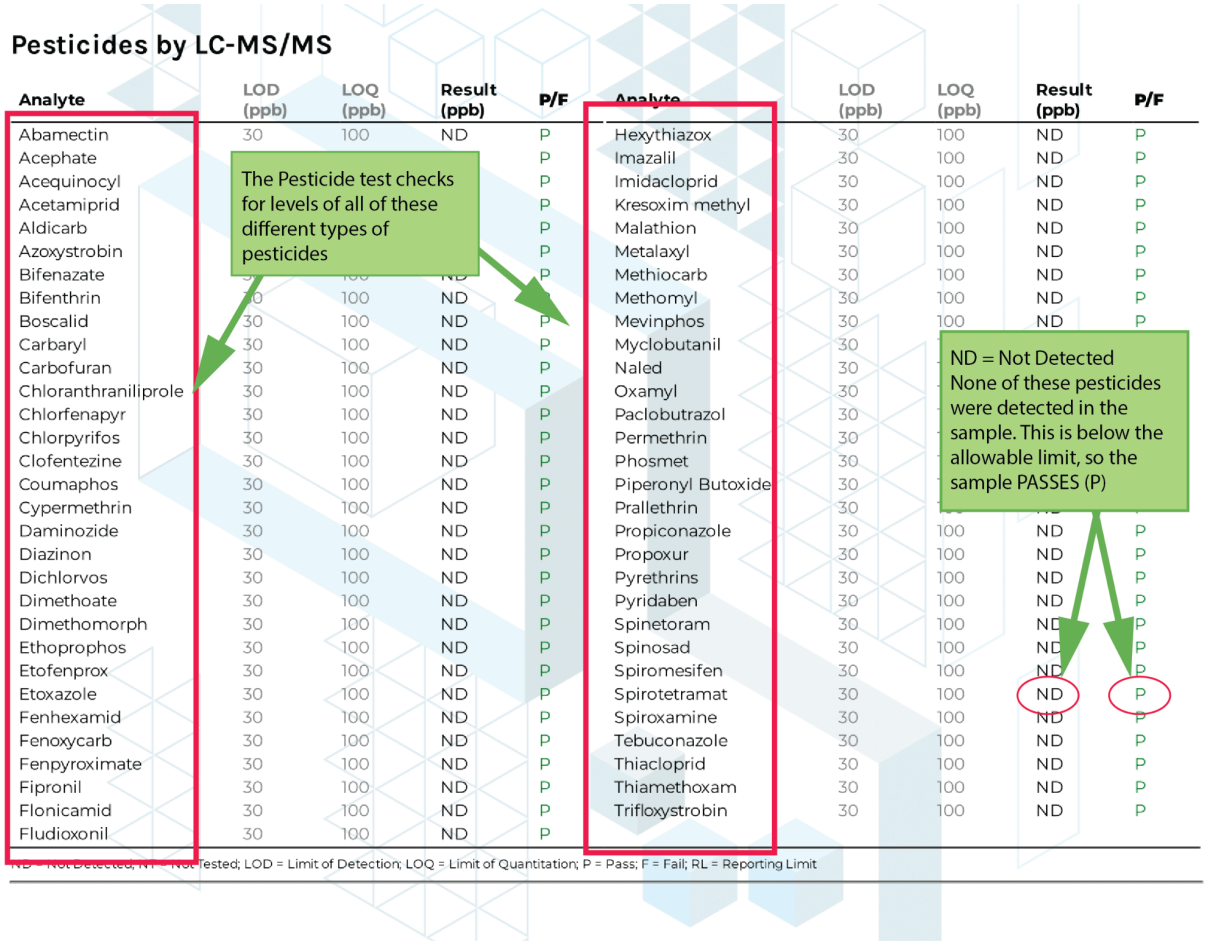
Analyte	LOD (%)	LOQ (%)	Result (%)
α-Bisabolol	0.002	0.01	0.0332
(+)-Borneol	0.002	0.01	<LOQ
Camphene	0.002	0.01	0.028
Camphor	0.004	0.02	ND
3-Carene	0.002	0.01	0.0263
β-Caryophyllene	0.002	0.01	0.0277
Caryophyllene Oxide	0.002	0.01	ND
α-Cedrene	0.002	0.01	ND
Cedrol	0.002	0.01	ND
Eucalyptol	0.002	0.01	<LOQ
Fenchone	0.004	0.02	ND
Fenchyl Alcohol	0.002	0.01	<LOQ
Geraniol	0.002	0.01	ND
Geranyl Acetate	0.002	0.01	ND
Guaiol	0.002	0.01	ND
Hexahydrothymol			ND
α-Humulene			0.0124
Isoborneol			ND
Isopulegol			ND

Analyte	(%)	(%)	Result (%)
Limonene	0.002	0.01	0.0862
Linalool	0.002	0.01	0.0159
β-myrcene	0.002	0.01	1.89
Nerol	0.002	0.01	ND
cis-Nerolidol	0.002	0.01	ND
trans-Nerolidol	0.002	0.01	ND
Ocimene	0.002	0.01	0.0234
α-Phellandrene	0.002	0.01	0.119
α-Pinene	0.002	0.01	1.24
β-Pinene	0.002	0.01	0.288
Pulegone	0.002	0.01	ND
Sabinene	0.002	0.01	ND
Sabinene Hydrate	0.002	0.01	ND
α-Terpinene	0.002	0.01	<LOQ
γ-Terpinene	0.002	0.01	<LOQ
α-Terpineol	0.001	0.005	ND
γ-Terpineol	0.001	0.005	ND
Terpinolene	0.002	0.01	<LOQ
Valencene	0.002	0.01	ND
Total Terpenes (%)			**3.82**

Front page of a full panel: When a batch is tested for contaminants, you will see a summary section at the top of the result that gives you a quick look at the results. In the example below, this batch sample passed all threshold limits for heavy metals, mycotoxins, pesticides, and residual solvents.



Pesticide Testing: The pesticide tests comb the sample looking for traces of many different harmful pesticides. We love to see ND here, as this means that there were no traces detected and the sample is clean and clear. This type of format will be similar to other pages you might see, like residual solvents, mycotoxins, etc.



Analyte	LOD (ppb)	LOQ (ppb)	Result (ppb)	P/F	Analyte	LOD (ppb)	LOQ (ppb)	Result (ppb)	P/F
Abamectin	30	100	ND	P	Hexythiazox	30	100	ND	P
Acephate				P	Imazalil	30	100	ND	P
Acequinocyl				P	Imidacloprid	30	100	ND	P
Acetamiprid				P	Kresoxim methyl	30	100	ND	P
Aldicarb				P	Malathion	30	100	ND	P
Azoxystrobin				P	Metalaxyl	30	100	ND	P
Bifenazate				P	Methiocarb	30	100	ND	P
Bifenthrin		100	ND		Methomyl	30	100	ND	P
Boscalid	30	100	ND	P	Mevinphos	30	100	ND	P
Carbaryl	30	100	ND	P	Myclobutanil	30			
Carbofuran	30	100	ND	P	Naled	30			
Chloranthraniliprole	30	100	ND	P	Oxamyl	30			
Chlorfenapyr	30	100	ND	P	Paclobutrazol	30			
Chlorpyrifos	30	100	ND	P	Permethrin	30			
Clofentezine	30	100	ND	P	Phosmet	30			
Coumaphos	30	100	ND	P	Piperonyl Butoxide	30			
Cypermethrin	30	100	ND	P	Prallethrin	30			
Daminozide	30	100	ND	P	Propiconazole	30	100	ND	P
Diazinon	30	100	ND	P	Propoxur	30	100	ND	P
Dichlorvos	30	100	ND	P	Pyrethrins	30	100	ND	P
Dimethoate	30	100	ND	P	Pyridaben	30	100	ND	P
Dimethomorph	30	100	ND	P	Spinetoram	30	100	ND	P
Ethoprophos	30	100	ND	P	Spinosad	30	100	ND	P
Etofenprox	30	100	ND	P	Spiromesifen	30	100	ND	P
Etoxazole	30	100	ND	P	Spirotetramat	30	100	ND	P
Fenhexamid	30	100	ND	P	Spiroxamine	30	100	ND	P
Fenoxycarb	30	100	ND	P	Tebuconazole	30	100	ND	P
Fenpyroximate	30	100	ND	P	Thiacloprid	30	100	ND	P
Fipronil	30	100	ND	P	Thiamethoxam	30	100	ND	P
Flonicamid	30	100	ND	P	Trifloxystrobin	30	100	ND	P
Fludioxonil	30	100	ND	P					

Conclusion:

Knowing how to read a Certificate of Analysis (COA) equips you to make informed decisions about the hemp products you use. Transparency is at the heart of our ethos, and by demystifying COAs, we aim to empower you with the confidence to understand exactly what you're consuming. A COA might look complex, but it's your tool for ensuring the quality and safety of your products. With this understanding, you become an informed consumer in the hemp marketplace.