

# Endoca Certificate of Analysis: Organic Hemp CO<sub>2</sub> Extract Cannabinoid Profile

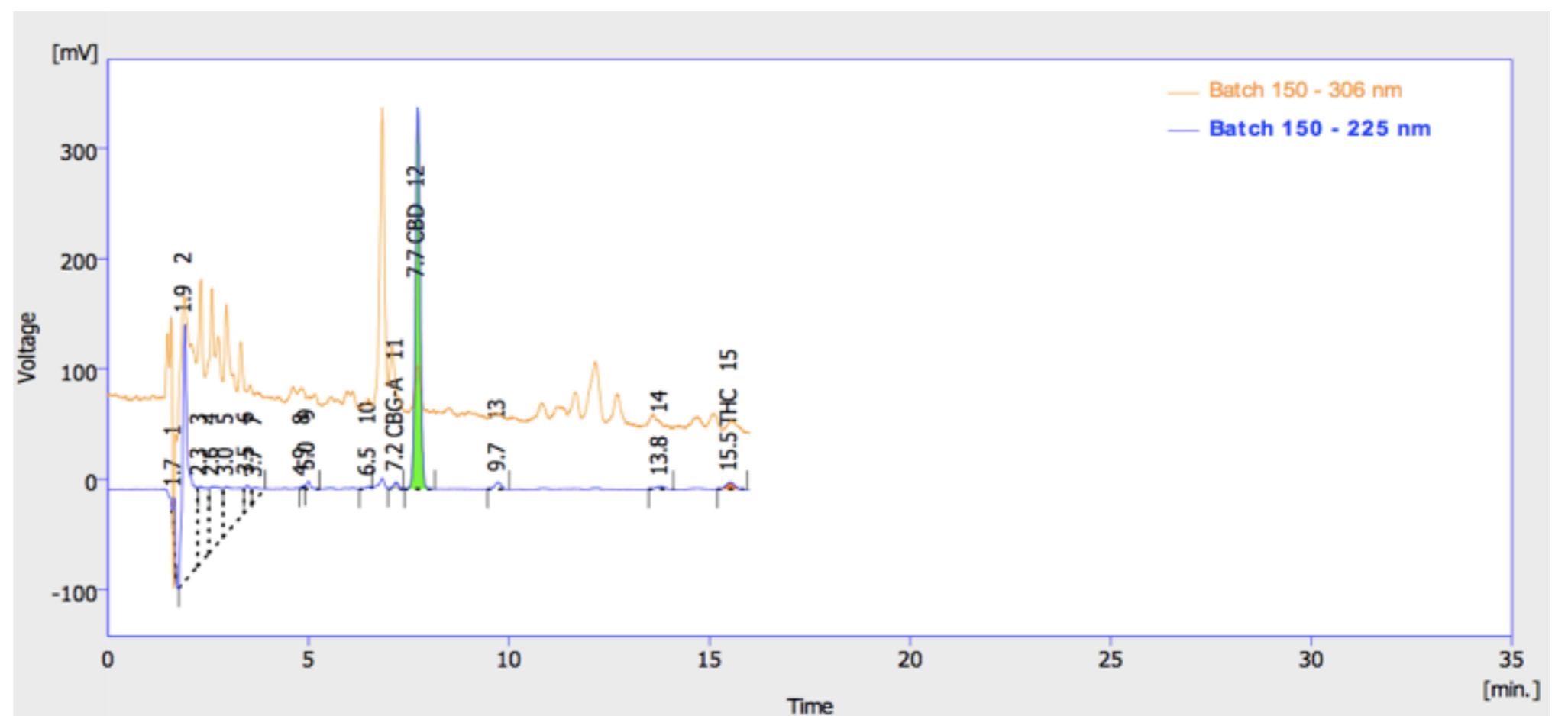
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www.endoca.com  
ISO 14001: 2004 certified; ISO 9001: 2008 certified  
HACCP certified; GMP certified

Responsible Supervisor:	Martin Vangkilde
Responsible Technician:	Paul K.
Sample	Batch# 150
Date samples received:	15-May-2015
Date analysis began:	15-May-2015
Date sample report produced:	15-May-2015
ID Number when available:	
Sample Mass	10 uL

## Endoca 10.72% Total CBD: Cannabinoid Profile

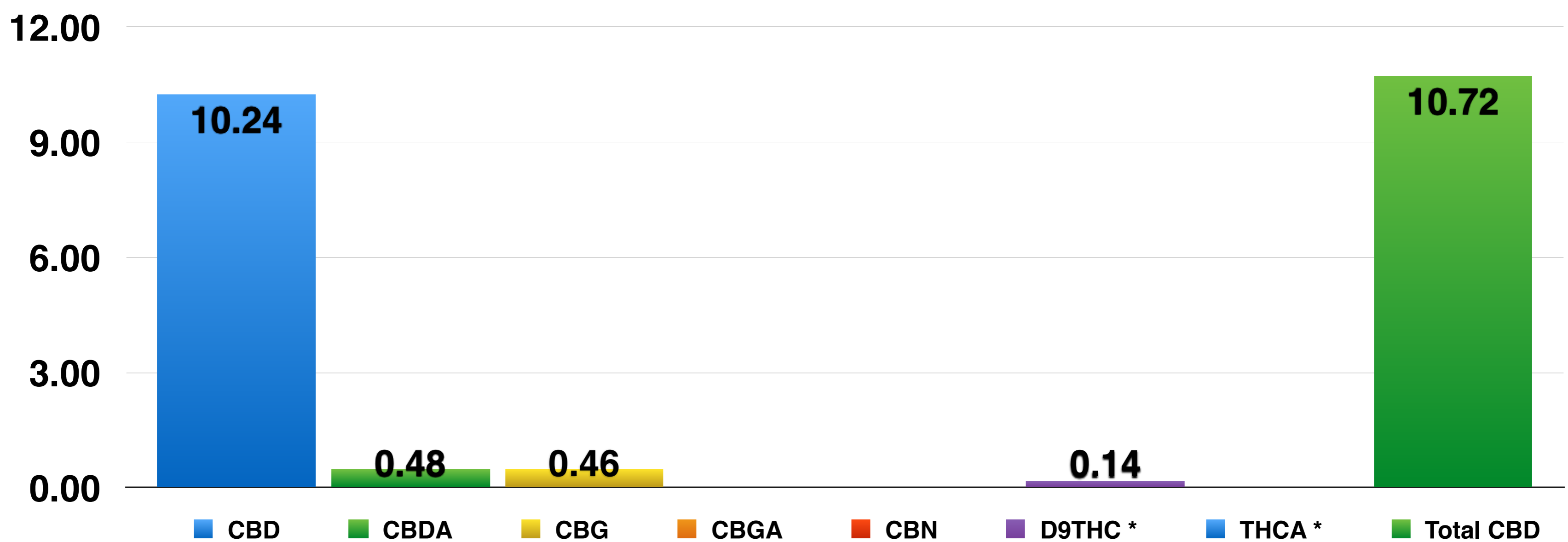
Component	Mass (%)	Amount (mg/g)	Limit
CBD	10.24	102.40	N/A
CBDA	0.48	4.80	N/A
CBG	0.46	4.60	N/A
CBGA	<0,20	<2,00	N/A
CBN	<0,20	<2,00	N/A
D9THC *	0.14	1.40	N/A
THCA *	<0,20	<2,00	N/A
<b>Total CBD</b>	<b>10.72</b>	<b>107.20</b>	<b>N/A</b>

## HPLC Chromatograph Raw Data



\* D9THC and THCA under detectable thresholds \*

## Cannabinoids as Percent of Total Mass



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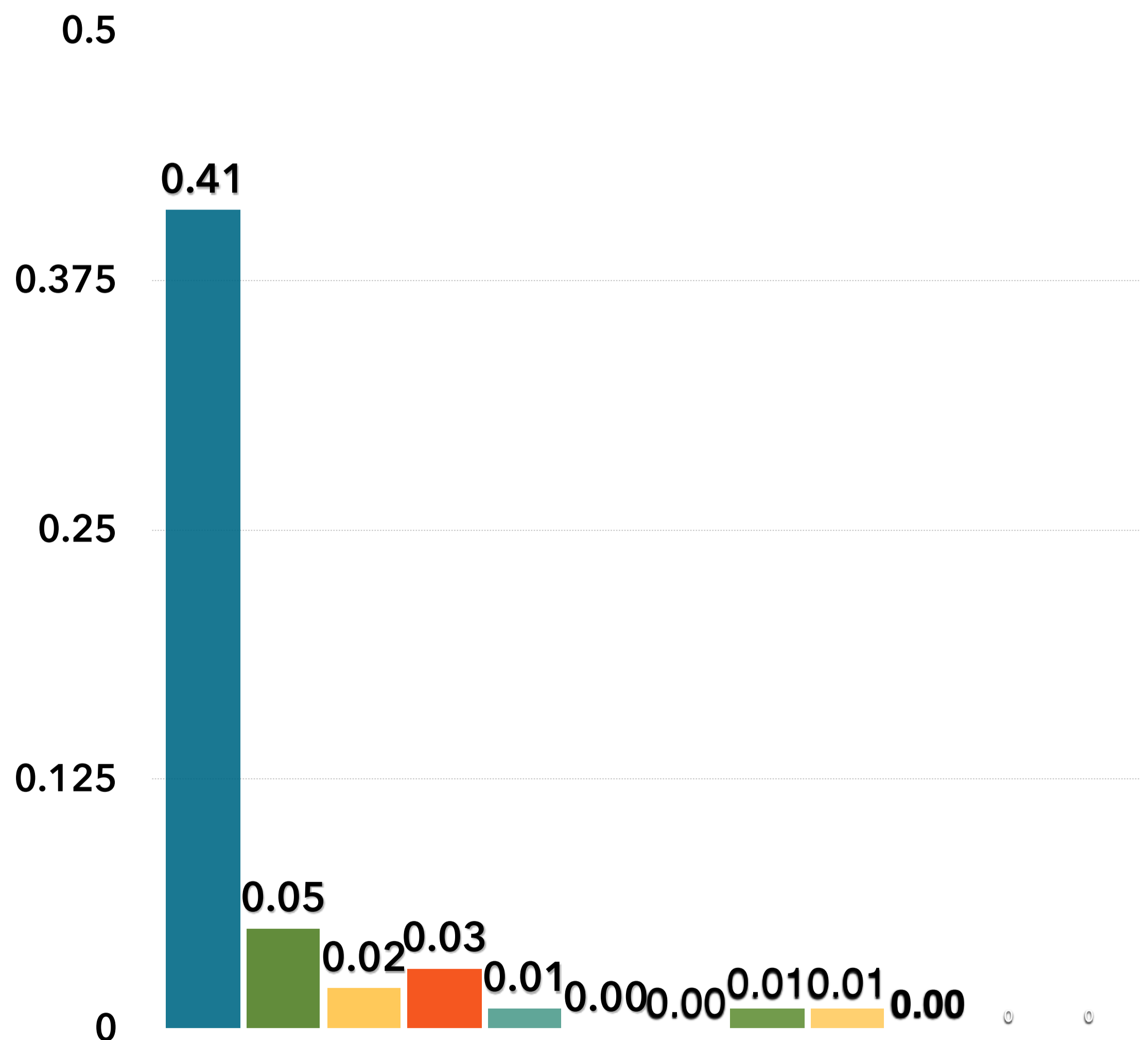
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## Endoca 10.72% Total CBD: Terpenoid Profile:

Component	Amount %
β-Caryophyllene	0.41
α-Humulene	0.05
Caryophyllene oxide	0.02
Myrcene	0.03
α-Pinene	0.01
Terpinolene	0.00
Humulene epoxide II	0.00
Other	0.01
β-Pinene	0.01
E-β-Ocimene	0.00
Sabinene	0.00
Linalool	0.00

## Terpenoid Distribution



EO from CO<sub>2</sub> extract, 60 MPa,  
Terpenoid yield 1,10% (W/V)

- β-Caryophyllene
- Caryophyllene oxide
- Myrcene
- α-Pinene
- Terpinolene
- Other
- β-Pinene
- E-β-Ocimene
- Sabinene
- Linalool
- Humulene epoxide II
- α-Humulene

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## Endoca 10.72% Total CBD: Microbial Profile:

Component	Mass (%)	Amount (mg/g)	Limit
Listeria Monocytogenes	0.00	ND	ND
E-Coli	0.00	ND	ND
Fungi	< 0.01	ND	ND
Salmonella	0.00	ND	ND
Molds	0.00	ND	ND

## All Mycotoxins at Non Detectable (ND) levels



## Conclusions:

**All microbial residues including Listeria, Monocytogenes, E-Coli, Fungi, Salmonella and Molds are all below detectable thresholds**

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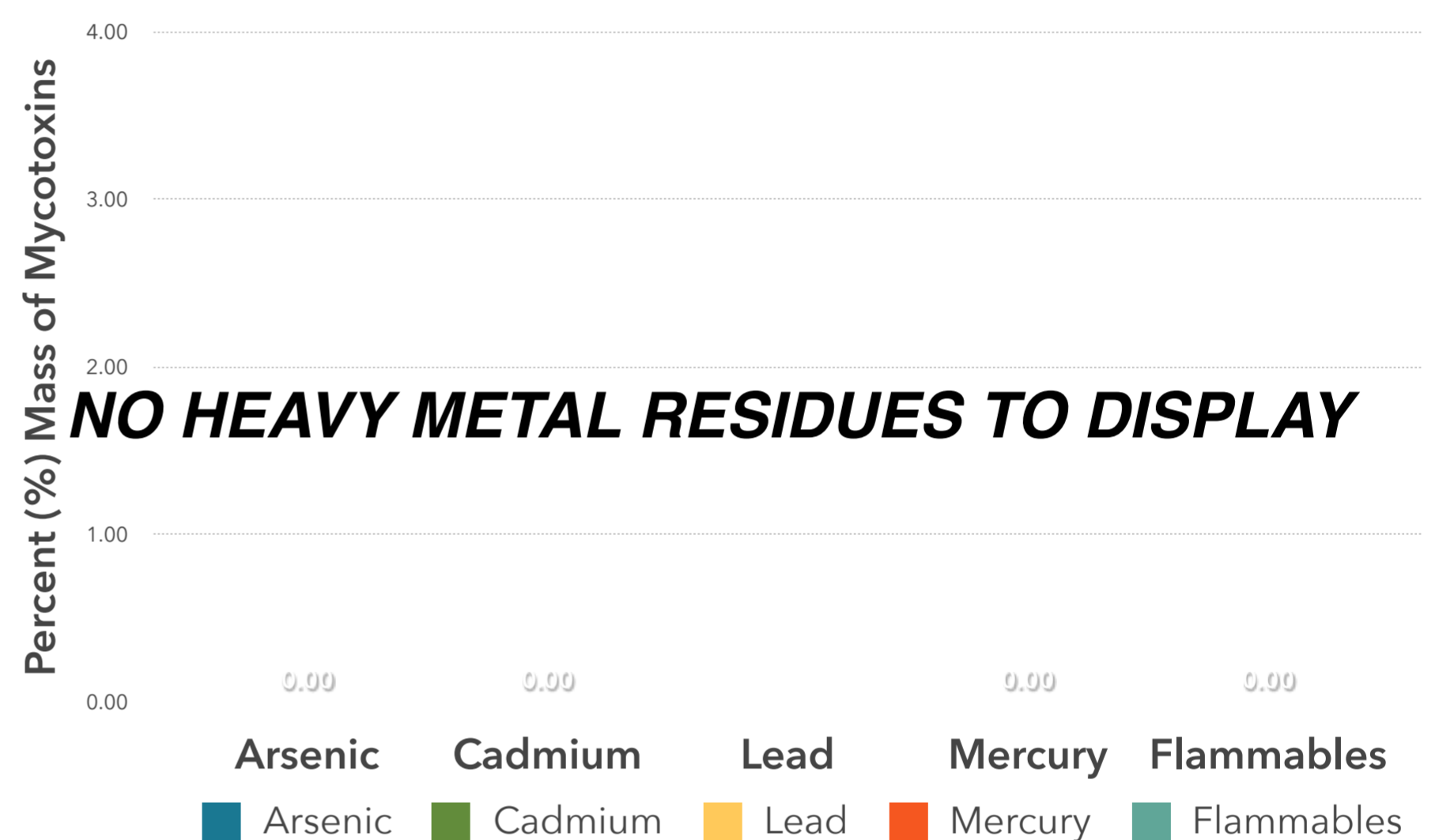
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## Endoca 10.72% Total CBD: Heavy Metals Profile:

Component	Mass (%)	Amount (mg/g)	Limit
Arsenic	0.00	ND	ND
Cadmium	0.00	ND	ND
Lead	< 0.01	ND	ND
Mercury	0.00	ND	ND
Flammables	0.00	ND	ND

## All Heavy Metals at Non Detectable (ND) levels



## Conclusions:

**No heavy metal residues detected.**

**No flammable residues detected.**

**No chemical residues detected.**

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**Pesticide Analysis: Our tests looked for residue of nearly 300 known pesticides finding no evidence of any over detectable limits.**

Endoca Labs tests our products thoroughly. Nearly 300 of the below pesticides concentrations were measured and we are proud to say that all tests measured below our detectable limits. Most tests have a threshold of 0.01 mg/k, while only a handful of tests have a threshold value of <0.05 mg/kg. Not a single test of Endoca products went over detectable threshold limits.

## PESTICIDES MEASURED

Acrinathrin Azoxystrobin Biphenhin Bitertanol Biphenyl Bromopropylate Bromuconazole Bupirimate Cadusafos Captafol Captan Chlorphenson Chlorfenapyr Chlorfenvinphos Chlorothalonil Chlorprophame 3,5-Dichloraniline Chlorpyrifos Chlorpyrifos-methyl Chlothral-dimethyl Cyfluthrin Cypermethrin Cyproconazole Cyprodinil Clomazone o,p-DDE P,P-DDE o,p-DDD P,P-DDD o,p-DDT p,p-DDT Deltamethri Diazinon Diclofop-methyl Dieldrin Dichlobenil Dichlofluanid Dichlorvos Dicloran Dicofof Dicotophos Diethofencarb Diflubenzuron Dimetachlor Diniconazole Dodemorph Diphenylamine Alpha-Endosulfan Beta-Endosulfan Endosulfan-sulphate Ethion Etofumesate Ethoprophos Ehtoxyquin Etoxazole Etridiazole Etrimphos Famoxadone Fenarimol Fenazaquin Fenchlorphos Fenhexamid Fenithion Fenpropidin Fenpropimorph Fenvalerate Formothion Fipronil Fipronil-sulfone Fludioxonil Flusilazole Flutriafol Folpet Fuberidazole Furathiocarb Hexaconazole HCB Alpha-HCH Beta-HCH Delta-HCH Heptachlor Heptachlor-epoxidceis Heptachlor-epoxidtreans Iprodione Iprovalicarb Lambda- cyhalothrin Lindane Mecarbam Metalaxv Metazachlor Methidathion Metribuzin Mevinphos Myclobutanil Nuarimol Orthophenylphenol Oxadixyl Paclbutrazol Parathion Parathion-methyl Paraoxon-methyl Paraoxon-ethyl Penconazole Pendimethaline Permethrin Phenthoate Phorate Procymidone Profenofos Propiconazole Propyzamide Pyrazophos Pyrethrins Pyridaben Pyrimethanil Pyriproxyfen Quinoxifen Quitozene Pentachloraniline Phosphamidon PyrifenoX Prometryn Propanil Propoxur Proquinazid Prothiofos Simazine Spiroxamine T au-fluvalinate T ebuconazole T ebufenpyrad T ecnazene T efluthrin T erbuthylazine T etraconazole T etradifon T etramethrine T olclofos-methyl T oylfluanid Transfluthrin Triadimephon Triadimenol Trialate Trifloxystrobin Triflumizole Vinclozolin DDT isomersum Heptachlor (heptachloarnd heptachloer poxidsum) Trifluraline Chlorobenzilate 3-Chloraniline Abamectin (AvermectinBla and AvermectinBlb sum) Acetamiprid Aldicarb Aldikarbsulphone Aldicarb-sulphoxide Azinphos-ethyl Azinphos-methyl Benalaxyl Benfuracarb Boscalid Buprofezin Carbaryl Carbendazim Carbofuran 3-hydroksicarbofuran Carbosulfan Chloridazon Cymoxanil Clofentezin Clothianidin Demeton-S-methyl Demeton-S-methylsulfoxid Diafenthion Difenconazole Dimethoate Dimethomorph Diuron EPN Epoxiconazole Ethirimol Etofenprox Fenamidone Fenbuconazole Fenbutatinoxid Fenoxycarb Fenpyroximate Fenpropathrin Fensulfothion Fenthion Fenthionsulphone Fenthionsulphoxide Fluazinam Flufenoxuron Fluquinconazole Fonofos Formetanate Fosthiazate Hexythiazox Imazalil Imidacloprid Indoxacarb Isofenphos Methacrifos Isofenphos-methyl Krezoxim-methyl Linuron Lufenuron Malaoxon Malathion Mepanipirim Mepronil Metamitron Metconazole Methamidophos Methiocarb Methiocarb-sulphone Methiocarb-sulphoxide Methomyl Methoxyfenozide Metobromuron Monocrotophos Monolinuron Omethoate Oxamyl Pencycuron Phenmedipham Phosalone Phosmet Phosmeot xon Phoxim Pymetrozine Piperonylbutoxide Pyraclostrobin Pyridaphenthion Pyridate PyrifenoX Pirimicarb Pirimicarbdesmethyl Pirimiphos-methyl Primisulfuron-methyl Prochloraz Propamocarb Propargite Prothioconazole Prothioconazole-desthio Quinalphos SpinosynA SpinosynD Sulfotep T ebufenozide T eflubenzuron Thiabendazole Thiacloprid Thiamethoxam Thiodicar Thiophanate-methyl Tralkoxydim Triazophos Trichlorfon Triflumuron Triforine Triticonazole Zoxamide Acephate Amitraz Fenamiphos Fenamiphosulphone Fenamiphosulfoxid Nitempiram Fenthionoxonsulphone Fenthionoxonsulfoxid Kumapho Piriphenox Mehibuzine DEET

**Our laboratory analysis is standardized after following protocols:**

LST EN ISO 6579:2003 / AC:2006 / P:2007

LST EN ISO 11290-1:2003 / A1:2004 / P:2005

LST ISO 16649-2:2002 / P:2009

LST ISO 21527-2:2008

Method PLM 486G

## Note on Cannabinoid Testing:

All cannabinoids in their acid forms (ending in "-A") are convertible to their non-acid forms via a decarboxylation process (heating). The components lose mass through this process. To find the total theoretical active cannabinoids, one multiplies the acid forms by 87.7%. For example, THC-A can be converted to active THC using the formula:  $\text{THC-A} \times 0.877 = \text{THC}$ . In this case, the Max THC for the sample is:  $\text{Max THC} = (\text{THC-A} \times 0.877) + \text{THC}$ . This method has been validated according to the principles of the International Conference on Harmonisation.

## Chromatographic Analysis:

Analysis of cannabinoids content was performed using Shimadzu HPLC system equipped with a SIL 30AC autoinjector with sample cooler, vacuum degassing unit DGU 20A5, pump LC-30AD. Separation of all cannabinoids was accomplished on a Supelco Discovery HS C18 (25 x 4.6 mm, 5  $\mu\text{m}$ ) RP column coupled with C18 pre column maintained at 30 °C by a CTO-20AC column oven.

Isocratic elution consisted of acetonitrile:water (FA 0.5%) (4:1) was done in 30 min. The flow rate was maintained at 0.8 ml/min. The cannabinoids CBD and CBDA were monitored at 225 and 306 nm respectively using SPD-M20A diode array detector. The injection volume of 1 mg/ml sample was 20  $\mu\text{l}$ . Data evaluation was performed using Lab Solutions software.

Quantification of cannabinoids was obtained from linear regression equation of calibration curve of individual reference standard by plotting concentration versus the area ratio.

The calibration range for CBD was linear from 5 to 500  $\mu\text{g/ml}$  and for CBDA from 5 to 500  $\mu\text{g/ml}$ .

Elution order CBD-A (RT 9.5 min), CBD (RT 11.1 min).

Sample preparation for HPLC analysis

0.01 g ( $\pm 0.0001$ ) of homogeneous cannabis extract was diluted with 1 ml of methanol (HPLC grade). Solution was sonicated for 5 min and vortexing for 10 sec. Samples before HPLC analysis were centrifuged at 4800 rpm and further diluted with methanol to the final concentration of 1 mg/ml.

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