

# PHYTO+ Certificate of Analysis:

Organic Hemp CO2 Extract

## Cannabinoid Profile

Sunshine Trading | PHYTO Plus  
Zwanebloemlaan 222  
1087GD Amsterdam NH  
The Netherlands

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info@phytoplus.nl  
www.phytoplus.nl

Responsible Supervisor: Martin Vangkilde  
Responsible Technician: Paul K.  
Sample Batch #1301  
Date samples received: 17-November 2016  
Date analysis began: 17-November 2016  
Date sample report produced: 17-November 2016  
ID Number when available:  
Sample Mass 1g

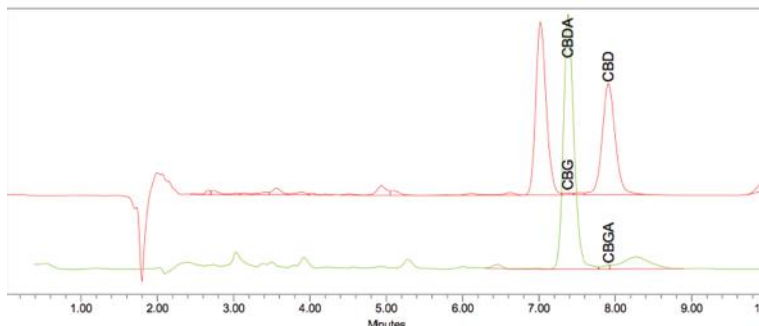


SKAL:100364, ISO 14001: 2004 certified; ISO 9001: 2008 certified, Organic certified: NL-BIO-01, HACCP certified; GMP certified

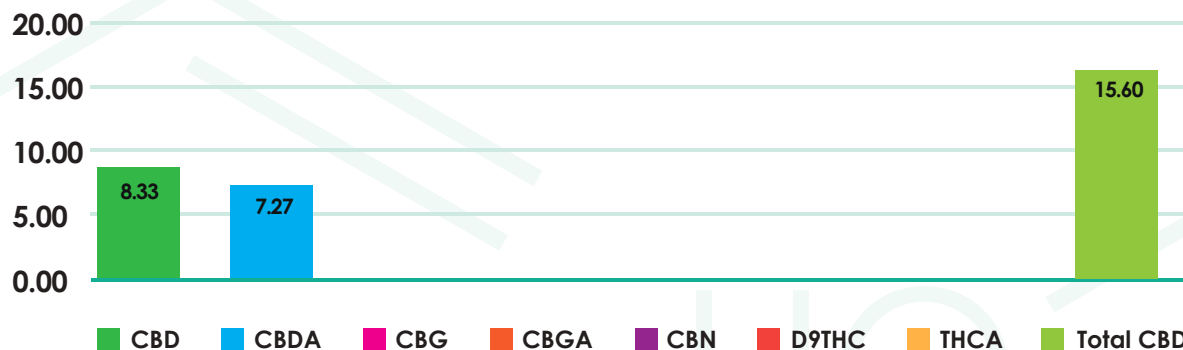
### PHYTO Plus 15.60% Total CBD: Cannabinoid Profile

Component	Mass (%)	Amount (mg/g)	Limit
CBD	8.33	83.30	N/A
CBDA	7.27	72.70	N/A
CBG	0.15	1.50	N/A
CBGA	<0.01	<0.10	N/A
CBN	<0.01	<0.10	N/A
D9THC	<0.01	<0.10	N/A
THCA	<0.01	<0.10	N/A
Total CBD	15.60	<0.10	N/A

### HPLC Chromatograph Raw Data



### Cannabinoids as Percent of Total Mass



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# PHYTO+ Certificate of Analysis:

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## Terpenoid Profile



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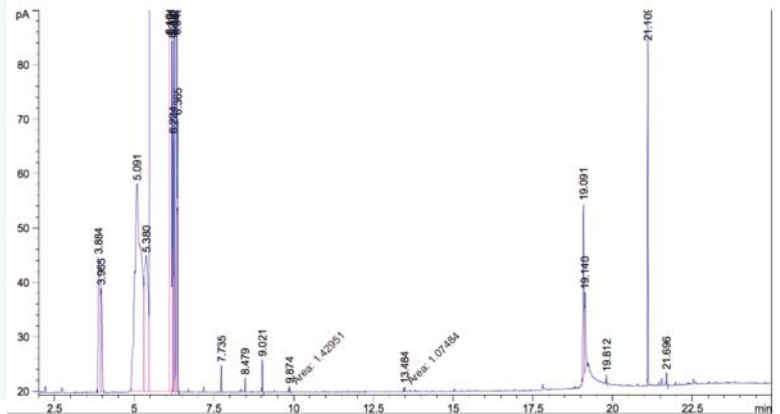
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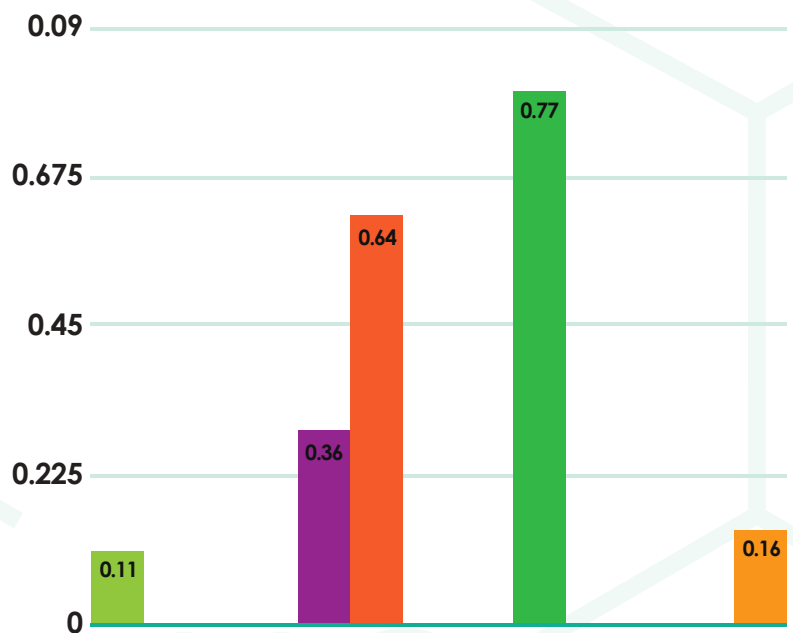
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### PHYTO Plus 15.60% Total CBD: Terpenoid Profile

Component	Amount (%)
<b>β-Caryophyllene</b>	<b>0.11</b>
<b>α-Humulene</b>	<b>&lt;0.01</b>
<b>Caryophyllene oxide</b>	<b>&lt;0.01</b>
<b>Myrcene</b>	<b>0.36</b>
<b>α-Pinene</b>	<b>0.64</b>
<b>Terpinolene</b>	<b>&lt;0.01</b>
<b>Humulene epoxide II</b>	<b>&lt;0.01</b>
<b>Limonene</b>	<b>0.77</b>
<b>β-Pinene</b>	<b>&lt;0.01</b>
<b>E-β-Ocimene</b>	<b>&lt;0.01</b>
<b>Sabinene</b>	<b>&lt;0.01</b>
<b>Linalool</b>	<b>0.16</b>



### Terpenoid Distribution



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

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# PHYTO+ Certificate of Analysis:

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## Microbial Profile

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### PHYTO Plus 15.60% Total CBD: Microbial Profile

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

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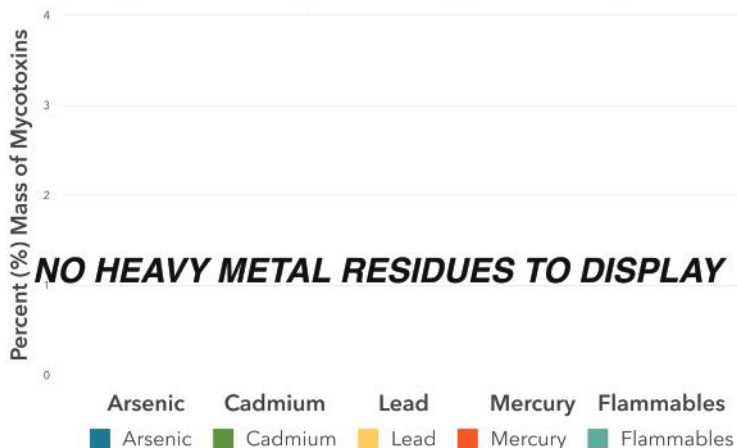


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### PHYTO Plus 15.60% Total CBD: Heavy Metals Profile

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



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

The Lab 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 PHYTO Plus 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 Chlorthal-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 Dieltrin Dichlobenil Dichlofluaniid Dichlorvos Dicloran Dicofof  
Dicrotophos Diethofencarb Diflubenazuron Dimetachlor Diniconazole  
Dodemorph Diphenylamine Alpha-Endosulfan Beta-Endosulfan  
Endosulfan-sulphate Ethion Etofumesate Ethoprophos Ehtoxyquin  
Etoxazole Etridiazole Etrimpfos Famoxadone Fenarimol Fenazaquin  
Fenchlorphos Fenhexamid Fenithoath Fenpropidin Fenpropimorph  
Fenvalerate Formothion Fipronil Fipronil-sulfone Fludioxonil Fusilazole  
Flutriafol Falpet Fuberidazole Furathiocarb Hexaconazole HCB Alpha-HCH  
Beta-HCH Delta-HCH Heptachlor Heptachlor-epoxidceis Heptachlor-  
epoxidtreans Iprodione Iprovalicarb Lambda- cyhalothrin Lindane Mecarbam  
Metalax Metazachlor Methidathion Metribuzin Mevinphos Myclobutanil  
Nuairimol 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  
Pyrifenoxy Prometryn Propanil Propoxur Proquinazid Prothiofos Simazine  
Spiroxamine T au-fluvalinate T ebuconazole T ebufenpyrad T ecnazene T  
efluthrin T erbutylazine T etraconazole T etradifon T etramethrine  
T olclofos-methyl T otyfluaniid Transfluthrin Triadimephon Triadimenol  
Trialate Trifloxystrobin Triflumizole Vinclozolin DDT isomersum Heptachlor  
(heptachlorand heptachloer poxidsum) Trifluraline Chlorobenzilate 3-Chloraniline  
Abamectin (AvermectinBla and AvermectinBlb sum) Acetamiprid Aldicarb  
Aldikarbsulphone Aldikarbsulphoxide Azinphos-ethyl Azinphos-methyl  
Benalaxyl Benfuracarb Boscalid Buprofezin Carbaryl Carbendazim Carbofuran  
3-hydroxycarbofuran Carbosulfan Chloridazone Cymoxanil Clofentezin Clothianidin  
Demeton-S-methyl Demeton-S-methylsulfoxid Diafenthiuron Difenconazole  
Dimethoate Dimethomorph Diuron EPN Epoxiconazole Ethirimol Etofenprox  
Fenamiprone Fenbuconazole Fenbutatinoxid Fenoxycarb Fenpyroximate  
Fenprothion Fenprothion Fenfenthion Fenthionsulphoxide  
Fluazinam Flufenoxuron Fluquinconazole Fonofos Formetanate Fosthiatate  
Hexythiazox Imazalil Imidacloprid Indoxacarb Isofenphos Methacrifos Isofenphos-  
methyl Krezoxim-methyl Linuron Lufenuron Malaoxon Malathion Mepanipirim  
Meprothion Metamitron Metconazole Methamidophos Methiocarb  
Methiocarbsulphone Methiocarbsulfoxide Methomyl Methoxyfenozide  
Metobromuron Monocrotophos Monolinuron Omethoate Oxamyl Pencycuron  
Phenmedipham Phosalone Phosmet Phosmeot xon Phoxim Pymetrozine  
Piperonylbutoxide Pyraclostrobin Pyridaphenthion Pyridate Pyrifenoxy 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 Nifentpiram 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 Waters 2695 (Milford, MA, USA) separation module equipped with auto injector, sample cooler, vacuum degasser and column heater units. Separation of all cannabinoids was accomplished on YMC PRO C18 (150 x 4 mm I.D., 5-µm) RP column coupled with C18 precolumn maintained at 30 °C by a CTO-20AC column oven. Isocratic elution consisted of acetonitrile:water (FA 0.5%) (4:1) was done in 30min. The flow rate was maintained at 0.8 ml/min. The cannabinoids CBD, CBG, CBN and THC were monitored at 225 and CBDA, CBGA were monitored at 306 nm respectively using dual absorbance detector Waters 2487 (Milford, MA, USA). The injection volume of 0.1 mg/ml sample was 10 µl. Data evaluation was performed using Clarity 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, CBG-A, CBG, CBD-A and CBN was linear from 5 to 500 µg/ml. The calibration range for THC was linear from 5 to 100 µg/ml. Elution order CBD-A (RT 6.9 min), CBG-A (RT 7.3 min), CBG (RT 7.3 min) CBD (RT 7.8 min), CBN (RT 12.1), THC (RT 15.5 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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