APRC
Aromatic Plant Research Center

LABORATORY REPORT

SAMPLE NAME: Patchouli Pogostemon Cablin

BOTANICAL NAME: *Pogostemon cablin*

COMPANY NAME: ACHS

COMPANY LOT #: 19134R

Column: ZB5 (60 m length × 0.25 mm inner diameter × 0.25 µm film thickness)

Instrument: Shimadzu GCMS-QP2010 Ultra

Carrier gas: Helium 80 psi

Temperature ramp: 2 degrees Celsius per minute up to 260-degree Celsius

Split ratio: 30:1

Sample preparation: 5% w/v solution with Dichloromethane

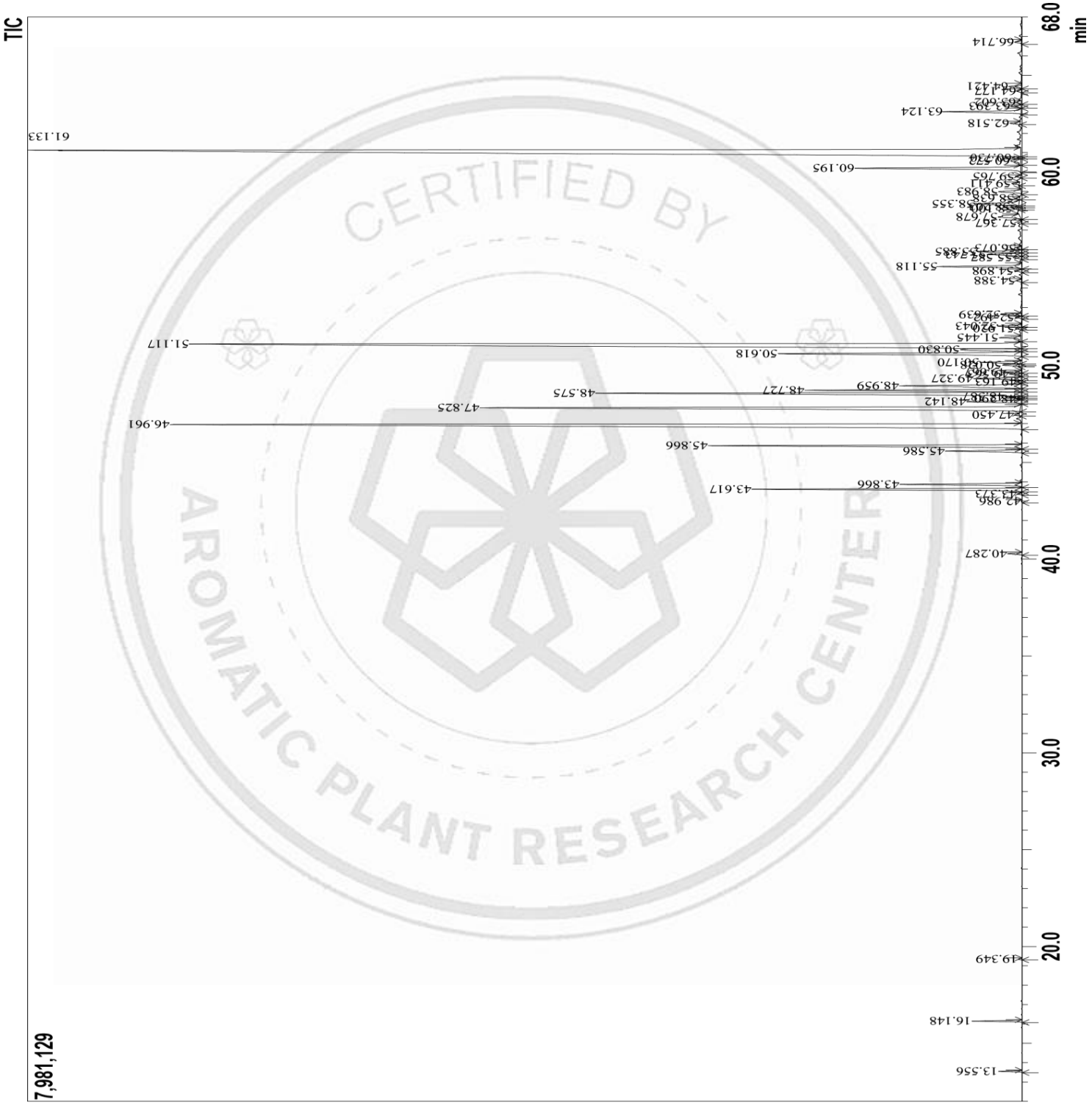
Interpretation on sample:

Patchouli Pogostemon Cablin 19134R meets the expected profile of *Pogostemon cablin*.

Analyzed by: Dr. Prabodh Satyal

Reviewed by: Ambika Poudel

Issued Date: 6/28/2019



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RT (min)	Compound	Area %
13.556	Pinene <alpha>	0.16
16.148	Pinene <beta>	0.38
19.349	Limonene	0.02
40.287	Elemene <delta->	0.13
42.986	Copaene <alpha>	0.01
43.373	Elemene<beta->	0.04
43.617	Patchoulene <beta>	2.92
43.866	Elemene <beta>	1.28
45.586	Cycloseychellene	0.78
45.866	Caryophyllene <beta>	3.63
46.961	Guaiene <alpha>	15.16
47.45	Myltayl-4(12)-ene	0.05
47.825	Seychellene	7.89
48.142	Humulene <alpha>	0.65
48.29	Patchoulene <isomer>	0.04
48.387	Aromanderene dehydro isomer	0.17
48.575	Patchoulene <alpha>	5.47
48.727	Caryophyllene<9-epi> isomer	2.14
48.959	Caryophyllene<9-epi> isomer	1.64
49.163	Chamigrene<beta.>	0.04
49.327	Gurjunene gamma	0.52
49.563	Unidentified	0.13
49.667	Germacrene D	0.15
50.028	Selinene <delta>	0.16
50.17	Selinene <beta->	0.41
50.618	Aciphyllene	3.28
50.83	Unidentified	0.92
51.117	Bulnesene <alpha>	16.9
51.445	Nootkatene	0.25
51.92	Vetivenene<gamma>	0.06
52.043	Panasinsen <(-)-.alpha>	0.24
52.492	Vetivenene	0.06
52.639	Nootkatene isomer	0.2
54.388	Germacrene B	0.06
54.898	Unidentified	0.08
55.118	D Norpatchoulenol	0.91
55.587	Unidentified	0.1

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RT (min)	Compound	Area %
55.743	Caryophyllene oxide	0.41
55.885	Spathulenol	0.5
56.073	Unidentified	0.07
57.367	Humulene epoxide II	0.04
57.678	Sesquiterpene epoxide	0.42
58.1	Unidentified	0.06
58.203	Unidentified	0.08
58.355	Unidentified	0.63
58.638	Caryophylla-4(12),8(13)-dien-5-alpha-ol	0.05
58.983	Unidentified	0.31
59.411	trans-Guai-11-en-10-ol	0.09
59.765	Unidentified	0.06
60.195	Pogostol	2.09
60.572	Unidentified	0.22
60.73	Unidentified	0.1
61.133	Patchouli alcohol	26.35
62.518	Thujopsenol <cis>	0.12
63.124	Pogostone	0.89
63.393	Atlantone isomer	0.12
63.602	Unidentified	0.08
64.177	Zizanone	0.05
64.421	Unidentified	0.15
66.714	Squamulosone	0.08
		100.00

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PHYSICAL CONSTANTS REPORT

Organoleptic Information	
Appearance	Clear, thin liquid
Color	Yellow
Odour	Earthly, grassy, slightly pungent

Physical Constants Information (at 20 °C)	
Tests	**Observed**
Specific Gravity	0.95383
Refractive Index	1.50798
Optical Rotation	-47.24°

Prepared by: Sujan Timsina **Date: 6/28/2019**

Reviewed by: Ambika Poudel **Date: 6/28/2019**

PAL
PACIFIC AGRICULTURAL LABORATORY
A MATRIX SCIENCES COMPANY
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American College Of Healthcare Sciences
5940 SW Hood Ave
Portland, OR 97239

Report Number: P191528
Report Date: July 16, 2019
Client Project ID:

Client Sample ID: Patchouli essential oil 19134R
PAL Sample ID: P191528-01

Sample Date: 07/01/2019
Received Date: 07/03/2019
Extraction Date: 07/09/2019

Certificate of Analysis

Analysis Date	Analyte	Amount Detected	LOQ (mg/kg)	Notes	Analysis Date	Analyte	Amount Detected	LOQ (mg/kg)	Notes
Modified EPA 8270D (GC-MS/MS)									
07/09/2019	2,6-Dichlorobenzamide	ND	0.50		07/09/2019	a-BHC	ND	0.50	
07/09/2019	Acetochlor	ND	0.50		07/09/2019	Alachlor	ND	0.50	
07/09/2019	Aldrin	ND	0.50		07/09/2019	Ametryn	ND	0.50	
07/09/2019	b-BHC	ND	0.50		07/09/2019	Benfluralin	ND	0.50	
07/09/2019	Bifenthrin	ND	0.50		07/09/2019	Bromopropylate	ND	0.50	
07/09/2019	Buprofezin	ND	0.50		07/09/2019	Captan	ND	10	
07/09/2019	Chlordane	ND	0.50		07/09/2019	Chloroneb	ND	0.50	
07/09/2019	Chlorothalonil	ND	0.50		07/09/2019	Chlorpropham	ND	0.50	
07/09/2019	Chlorpyrifos	ND	0.50		07/09/2019	Chlorpyrifos-methyl	ND	0.50	
07/09/2019	cis-Nonachlor	ND	0.50		07/09/2019	Cyfluthrin	ND	2.5	
07/09/2019	Cypermethrin	ND	2.5		07/09/2019	Dacthal	ND	0.50	
07/09/2019	d-BHC	ND	0.50		07/09/2019	Deltamethrin	ND	2.5	
07/09/2019	Diazinon	ND	0.50		07/09/2019	Dichlobenil	ND	0.50	
07/09/2019	Dichlorofenthion	ND	0.50		07/09/2019	Dichlorvos	ND	0.50	
07/09/2019	Diclofop-methyl	ND	0.50		07/09/2019	Dicloran	ND	2.5	
07/09/2019	Dicofol	ND	0.50		07/09/2019	Dieldrin	ND	0.50	
07/09/2019	Dimethenamid	ND	0.50		07/09/2019	Diphenamid	ND	0.50	
07/09/2019	Diphenylamine	ND	0.50		07/09/2019	Disulfoton	ND	0.50	
07/09/2019	Dithiopyr	ND	0.50		07/09/2019	Endosulfan I	ND	1.0	
07/09/2019	Endosulfan II	ND	1.0		07/09/2019	Endosulfan sulfate	ND	1.0	
07/09/2019	Endrin	ND	0.50		07/09/2019	Endrin aldehyde	ND	0.50	
07/09/2019	Endrin ketone	ND	0.50		07/09/2019	Esfenvalerate	ND	0.50	
07/09/2019	Ethalfluralin	ND	0.50		07/09/2019	Ethofumesate	ND	0.50	
07/09/2019	Ethoprop	ND	0.50		07/09/2019	Ethoxyquin	ND	0.50	
07/09/2019	Etoxazole	ND	0.50		07/09/2019	Etridiazole	ND	0.50	
07/09/2019	Fenarimol	ND	0.50		07/09/2019	Fenoxaprop-ethyl	ND	0.50	
07/09/2019	Fenvalerate	ND	0.50		07/09/2019	Fipronil	ND	0.50	
07/09/2019	Fluazifop-p-butyl	ND	0.50		07/09/2019	Fludioxonil	ND	0.50	
07/09/2019	Fluroxypyr-meptyl	ND	0.50		07/09/2019	Flutolanil	ND	0.50	
07/09/2019	g-BHC	ND	0.50		07/09/2019	Heptachlor	ND	0.50	
07/09/2019	Heptachlor epoxide	ND	0.50		07/09/2019	Hexachlorobenzene	ND	0.50	
07/09/2019	Kresoxim-methyl	ND	0.50		07/09/2019	lambda-Cyhalothrin	ND	1.0	
07/09/2019	Malathion	ND	0.50		07/09/2019	Mefenoxam	ND	0.50	
07/09/2019	Methoxychlor	ND	0.50		07/09/2019	Metolachlor	ND	0.50	
07/09/2019	MGK-264	ND	0.50		07/09/2019	Myclobutanil	ND	0.50	
07/09/2019	Napropamide	ND	0.50		07/09/2019	o-Phenylphenol	ND	0.50	
07/09/2019	Oxadiazon	ND	0.50		07/09/2019	Oxyfluorfen	ND	0.50	

Rick Jordan, Laboratory Manager

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Certificate of Analysis
(Continued)

Analysis Date	Analyte	Amount Detected	LOQ (mg/kg)	Notes	Analysis Date	Analyte	Amount Detected	LOQ (mg/kg)	Notes
Modified EPA 8270D (GC-MS/MS) (Continued)									
07/09/2019	p,p'-DDD	ND	0.50		07/09/2019	p,p'-DDE	ND	0.50	
07/09/2019	p,p'-DDT	ND	0.50		07/09/2019	Parathion-methyl	ND	0.50	
07/09/2019	PCA	ND	0.50		07/09/2019	PCB	ND	0.50	
07/09/2019	PCNB	ND	0.50		07/09/2019	Pendimethalin	ND	0.50	
07/09/2019	Pentachlorophenyl methyl sulfide	ND	0.50		07/09/2019	Permethrin	ND	2.5	
07/09/2019	Procymidone	ND	0.50		07/09/2019	Prodiamine	ND	0.50	
07/09/2019	Pronamide	ND	0.50		07/09/2019	Propachlor	ND	0.50	
07/09/2019	Pyriproxyfen	ND	0.50		07/09/2019	Quinoxyfen	ND	0.50	
07/09/2019	Spirodiclofen	ND	0.50		07/09/2019	Tetraconazole	ND	0.50	
07/09/2019	Tetradifon	ND	0.50		07/09/2019	trans-Nonachlor	ND	0.50	
07/09/2019	Trifluralin	ND	0.50		07/09/2019	Vinclozalin	ND	0.50	
Modified EPA 8321B (HPLC MS-MS)									
07/09/2019	3-Hydroxycarbofuran	ND	0.50		07/09/2019	Abamectin	ND	0.50	
07/09/2019	Acephate	ND	0.50		07/09/2019	Acetamiprid	ND	0.50	
07/09/2019	Acibenzolar-S-methyl	ND	1.0		07/09/2019	Aldicarb	ND	0.50	
07/09/2019	Aldicarb Sulfone	ND	0.50		07/09/2019	Aldicarb Sulfoxide	ND	0.50	
07/09/2019	Allethrin	ND	0.50		07/09/2019	Ametoctradin	ND	0.50	
07/09/2019	Atrazine	ND	0.50		07/09/2019	Azinphos-ethyl	ND	0.50	
07/09/2019	Azinphos-methyl	ND	1.0		07/09/2019	Azoxystrobin	ND	0.50	
07/09/2019	Bendiocarb	ND	0.50		07/09/2019	Bensulide	ND	0.50	
07/09/2019	Bifenazate	ND	0.50		07/09/2019	Bitertanol	ND	0.50	
07/09/2019	Boscalid	ND	0.50		07/09/2019	Bromacil	ND	0.50	
07/09/2019	Carbaryl	ND	0.50		07/09/2019	Carbendazim	ND	0.50	
07/09/2019	Carbofuran	ND	0.50		07/09/2019	Carfentrazone-ethyl	ND	0.50	
07/09/2019	Chlorantraniliprole	ND	0.50		07/09/2019	Clethodim	ND	1.0	
07/09/2019	Clofentezine	ND	0.50		07/09/2019	Clothianidin	ND	0.50	
07/09/2019	Cyanazine	ND	0.50		07/09/2019	Cyantraniliprole	ND	0.50	
07/09/2019	Cyazofamid	ND	0.50		07/09/2019	Cycloate	ND	1.0	
07/09/2019	Cyflufenamid	ND	0.50		07/09/2019	Cyflumetofen	ND	0.50	
07/09/2019	Cymoxanil	ND	0.50		07/09/2019	Cyprodinil	ND	0.50	
07/09/2019	Cyromazine	ND	0.50		07/09/2019	DCPMU	ND	0.50	
07/09/2019	Diazoxon	ND	0.50		07/09/2019	Difenoconazole	ND	0.50	
07/09/2019	Diflubenzuron	ND	0.50		07/09/2019	Dimethoate	ND	0.50	
07/09/2019	Dimethomorph	ND	0.50		07/09/2019	Dinotefuran	ND	0.50	
07/09/2019	Disulfoton sulfone	ND	0.50		07/09/2019	Diuron	ND	0.50	

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Certificate of Analysis
(Continued)

Modified EPA 8321B (HPLC MS-MS) (Continued)

Analysis Date	Analyte	Amount Detected	LOQ (mg/kg)	Notes
07/09/2019	Dodine	ND	0.50	
07/09/2019	Emamectin Benzoate	ND	0.50	
07/09/2019	Famoxadone	ND	0.50	
07/09/2019	Fenamidone	ND	0.50	
07/09/2019	Fenamiphos sulfoxide	ND	0.50	
07/09/2019	Fenbuconazole	ND	0.50	
07/09/2019	Fenhexamid	ND	0.50	
07/09/2019	Fenpropathrin	ND	0.50	
07/09/2019	Fenuron	ND	0.50	
07/09/2019	Fluazinam	ND	0.50	
07/09/2019	Flumioxazin	ND	0.50	
07/09/2019	Fluopicolide	ND	0.50	
07/09/2019	Fluoxastrobin	ND	0.50	
07/09/2019	Fluridone	ND	0.50	
07/09/2019	Fluvalinate	ND	0.50	
07/09/2019	Fonofos	ND	1.0	
07/09/2019	Hexaconazole	ND	0.50	
07/09/2019	Hexythiazox	ND	0.50	
07/09/2019	Imidacloprid	ND	0.50	
07/09/2019	Indoxacarb	ND	0.50	
07/09/2019	Isoxaben	ND	0.50	
07/09/2019	Malaoxon	ND	0.50	
07/09/2019	Metconazole	ND	0.50	
07/09/2019	Methidathion	ND	0.50	
07/09/2019	Methomyl	ND	0.50	
07/09/2019	Metrafenone	ND	0.50	
07/09/2019	Mevinphos	ND	0.50	
07/09/2019	Novaluron	ND	0.50	
07/09/2019	Oryzalin	ND	0.50	
07/09/2019	Oxamyl	ND	0.50	
07/09/2019	Penthiopyrad	ND	0.50	
07/09/2019	Phorate Sulfoxide	ND	0.50	
07/09/2019	Phosmet	ND	0.50	
07/09/2019	Piperonyl Butoxide	ND	0.50	
07/09/2019	Pirimiphos-methyl	ND	0.50	
07/09/2019	Prometryn	ND	0.50	
07/09/2019	Propazine	ND	0.50	
07/09/2019	d-Phenothrin	ND	0.50	
07/09/2019	Ethion	ND	0.50	
07/09/2019	Famphur	ND	0.50	
07/09/2019	Fenamiphos sulfone	ND	0.50	
07/09/2019	Fenazaquin	ND	0.50	
07/09/2019	Fenbutatin oxide	ND	0.50	
07/09/2019	Fenobucarb	ND	0.50	
07/09/2019	Fenpyroximate	ND	0.50	
07/09/2019	Flonicamid	ND	0.50	
07/09/2019	Flubendiamide	ND	1.0	
07/09/2019	Fluometuron	ND	0.50	
07/09/2019	Fluopyram	ND	0.50	
07/09/2019	Flupyradifurone	ND	0.50	
07/09/2019	Flutriafol	ND	0.50	
07/09/2019	Fluxapyroxad	ND	0.50	
07/09/2019	Formetanate HCl	ND	0.50	
07/09/2019	Hexazinone	ND	0.50	
07/09/2019	Imazalil	ND	0.50	
07/09/2019	Indaziflam	ND	0.50	
07/09/2019	Iprodione	ND	2.5	
07/09/2019	Linuron	ND	0.50	
07/09/2019	Mandipropamid	ND	0.50	
07/09/2019	Methamidophos	ND	1.0	
07/09/2019	Methiocarb	ND	0.50	
07/09/2019	Methoxyfenozide	ND	0.50	
07/09/2019	Metribuzin	ND	0.50	
07/09/2019	Norflurazon	ND	0.50	
07/09/2019	Omethoate	ND	0.50	
07/09/2019	Oxadixyl	ND	0.50	
07/09/2019	Oxydemeton-Methyl	ND	0.50	
07/09/2019	Phorate Sulfone	ND	0.50	
07/09/2019	Phosalone	ND	0.50	
07/09/2019	Phosphamidon	ND	0.50	
07/09/2019	Pirimicarb	ND	0.50	
07/09/2019	Prometon	ND	0.50	
07/09/2019	Propargite	ND	0.50	
07/09/2019	Propiconazole	ND	1.0	

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Certificate of Analysis
(Continued)

Analysis Date	Analyte	Amount Detected	LOQ (mg/kg)	Notes
Modified EPA 8321B (HPLC MS-MS) (Continued)				
07/09/2019	Prothioconazole	ND	1.0	
07/09/2019	Pyraclostrobin	ND	0.50	
07/09/2019	Pyrethrin	ND	2.5	
07/09/2019	Pyrimethanil	ND	0.50	
07/09/2019	Saflufenacil	ND	0.50	
07/09/2019	Siduron	ND	0.50	
07/09/2019	Simetryn	ND	0.50	
07/09/2019	Spinosad	ND	0.50	
07/09/2019	Spirotetramat	ND	0.50	
07/09/2019	Sulfentrazone	ND	0.50	
07/09/2019	Tebuconazole	ND	0.50	
07/09/2019	Tebuthiuron	ND	0.50	
07/09/2019	Terbuthylazine	ND	0.50	
07/09/2019	Thiabendazole	ND	0.50	
07/09/2019	Thiamethoxam	ND	0.50	
07/09/2019	Thiodicarb	ND	0.50	
07/09/2019	Tolfenpyrad	ND	0.50	
07/09/2019	Triadimenol	ND	1.0	
07/09/2019	Triflumizole	ND	0.50	
07/09/2019	Pymetrozine	ND	0.50	
07/09/2019	Pyraflufen-ethyl	ND	0.50	
07/09/2019	Pyridaben	ND	0.50	
07/09/2019	Rotenone	ND	0.50	
07/09/2019	Sethoxydim	ND	1.0	
07/09/2019	Simazine	ND	0.50	
07/09/2019	Spinetoram	ND	0.50	
07/09/2019	Spiromesifen	ND	1.0	
07/09/2019	Spiroxamine	ND	0.50	
07/09/2019	Sulfoxaflor	ND	0.50	
07/09/2019	Tebufenozide	ND	0.50	
07/09/2019	Terbacil	ND	0.50	
07/09/2019	Terbutryn	ND	0.50	
07/09/2019	Thiacloprid	ND	0.50	
07/09/2019	Thiobencarb	ND	0.50	
07/09/2019	Thiophanate methyl	ND	0.50	
07/09/2019	Triadimefon	ND	0.50	
07/09/2019	Trifloxystrobin	ND	0.50	

Notes and Definitions

Notes	Definition
LOQ	Limit of Quantitation
ND	Not Detected
*	Not included under current scope of accreditation

The results contained in this report relate only to the items tested.
The results reflect the condition of the samples as received by PAL.
Samples will be stored for a minimum of 60 days after the final report is issued, as described in our Quality Manual.
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Rick Jordan, Laboratory Manager