

GC/MS BATCH NUMBER: V30105

ESSENTIAL OIL: VETIVER
BOTANICAL NAME: VETIVERIA ZIZANOIDES
ORIGIN: HAITI

KEY CONSTITUENTS PRESENT IN THIS BATCH OF VETIVER OIL	%
KHUSIMOL	14.5
ISOVALENCENOL	10.3
α -VETIVONE	4.1
VETISELINENOL	4.1
β -VETIVONE	2.9
ISOVALENCENOL ISOMER	2.1
β -VETIVENENE	2.4
β -VETISPIRENE	1.7
(E)-ISOVALENCENAL	1.5
α -AMORPHENE	1.5
KHUSIOL	1.5
EREMOPHILA-1(10),7(11)- DIENE	1.4
CYCLOCOPACAMPHAN-12-OL (EPIMER A)	1.3
SELIN-7(11)-EN-4 α -OL	1.3
ZIZANOL	1.3
α -VETIVOL	1.2
ZIZANAL	1.2
CYCLOCOPACAMPHAN-12-OL (EPIMER B)	1.2

ZIZANOIC ACID	1.1
(Z)-ISOVALENCENAL	1.0

Comments from Robert Tisserand: Very fine, green-woody odor quality, with no smokiness. Four of five key ISO constituents are within range for Haitian Vetiver oil, with a-vetivone marginally high - not a concern.

Date : December 22, 2017

SAMPLE IDENTIFICATION

Internal code : 17L21-PTH5-1-CC

Customer identification : Vetiver - Haiti - V3010574R

Type : Essential oil

Source : *Vetiveria zizanoides*

Customer : Plant Therapy

ANALYSIS

Method : PC-PA-001-15E06, "Analysis of the composition of a liquid essential oil by GC-FID" (in French).

Identifications double-checked by GC-MS

Analyst : Alexis St-Gelais, M. Sc., chimiste

Analysis date : 2017-12-21

Checked and approved by :

Alexis St-Gelais, M. Sc., chimiste 2013-174

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IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
α -Cubebene	16.04	1332	0.04	0.02	1407	6.74	Sesquiterpene
12-Norisoziza-5-ene	17.07	1348	0.07	0.08	1433	7.36	Norsesquiterpene
α -Ylangene	17.29*	1351	0.20	0.11	1422	7.10	Sesquiterpene
Unknown (m/z = 119, 147 (97), 91 (87), 105 (76), 161 (74), 134 (61), 175 (58), 190 (55))	17.29*	1351	[0.20]				Norsesquiterpene
6-epi-Nigritene	18.30	1366	0.09	0.14	1480	8.48	Norsesquiterpene
Nigritene	19.01	1377	0.06	0.20	1494	8.79	Norsesquiterpene
Acora-3,7(14)-diene	20.24	1395	0.24				Sesquiterpene
β -Cedrene	20.72	1402	0.06	0.14	1521	9.59	Sesquiterpene
6,9-Guaiadiene	22.67	1425	0.15	0.19	1527	9.82	Sesquiterpene
Prezizaene	22.91	1428	0.51	0.66	1612	12.95	Sesquiterpene
Khusimene	23.24	1432	0.59	0.49	1628	13.82	Sesquiterpene
allo-Aromadendrene	23.82	1439	0.38	0.53	1556	10.88	Sesquiterpene
Unknown (m/z = 145, 159 (66), 202 (64), 187 (43), 91 (34), 128 (31))	25.05	1453	0.30				Sesquiterpene
α -Amorphene	25.94	1464	1.48	1.23	1608	12.80	Sesquiterpene
β -Vetispirene	26.47*	1470	2.19	1.66	1644	14.62	Sesquiterpene
<i>cis</i> -Eudesma-6,11-diene?	26.47*	1470	[2.19]				Sesquiterpene
γ -Amorphene	27.03	1477	0.41	0.77	1670	15.99	Sesquiterpene
δ -Amorphene	27.93	1488	0.85	1.52	1637	14.26	Sesquiterpene
Eremophila-1(10),7(11)-diene	28.78	1498	1.36				Sesquiterpene
δ -Cadinene	29.47	1507	0.38	0.36	1662	15.61	Sesquiterpene
γ -Vetivenene	30.33	1519	0.27	0.47	1721	18.79	Sesquiterpene
α -Calacorene	31.53	1536	0.35	0.32	1806	24.37	Sesquiterpene
β -Vetivenene	31.93	1542	2.43	2.06	1739	19.93	Sesquiterpene
α -Elemol	32.86	1555	0.40	0.36	1992	35.93	Sesquiterp. alcohol
<i>cis</i> -Eudesmen-6-ol?	33.31	1561	1.41				Sesquiterp. alcohol
Unknown (m/z = 202, 187 (75), 145 (56), 159 (41), 131 (48), 91 (38))	33.67	1566	0.45				Sesquiterpene
Unknown (m/z = 59, 205 (63), 43 (59), 91 (54), 220 (44))	33.80	1568	0.40				Oxygenated sesquiterp.
Khusimone	34.50	1578	0.93	1.05	2094	39.50	Norsesquiterp. ketone
Unknown (m/z = 187, 202 (69), 145 (28), 131 (23), 91 (20), 105 (20))	36.09	1602	0.84				Sesquiterpene

Selin-6-en-4 α -ol?	37.10	1627	1.69	1.67	2043	37.89	Sesquiterp. alcohol
Unknown (m/z = 95, 121 (84), 161 (77), 43 (63), 79 (61), 91 (61), 105 (54), 93 (54), 204 (47)... 220 (8))	38.09	1651	2.64				Oxygeanted sesquiterp.
Cyclocopacamphan-12-ol (epimer A)	38.22	1654	1.34				Sesquiterp. alcohol
Cyclocopacamphan-12-ol (epimer B)	38.34	1658	1.15				Sesquiterp. alcohol
Zizanol	38.64	1665	1.26				Sesquiterp. alcohol
Khusiol	38.96	1673	1.47				Sesquiterp. alcohol
Zizanal	39.26	1680	1.16				Sesquiterp. aldehyde
Selin-7(11)-en-4 α -ol	39.71	1691	1.26	2.27	2165	41.50	Sesquiterp. alcohol
Vetiselinenol	40.66	1719	4.05	4.18	2273	44.16	Sesquiterp. alcohol
α -Vetivol	41.04	1731	1.18	13.73	2345	45.79*	Sesquiterp. alcohol
Khusimol	41.52	1746	14.54	[13.73]	2345	45.79*	Sesquiterp. alcohol
Isovalencenol	42.73	1784	10.30	11.23	2389	46.71	Sesquiterp. alcohol
Isovalencenol isomer	42.95	1791	2.09	3.07	2408	47.11	Sesquiterp. alcohol
(<i>E</i>)-Isovalencenal	43.20	1800	1.54				Sesquiterp. aldehyde
β -Vetivone	43.46	1809	2.85	3.14	2315	45.13	Sesquiterp. ketone
(<i>Z</i>)-Isovalencenal	43.67	1817	1.04				Sesquiterp. aldehyde
α -Vetivone	44.12*	1833	5.41	4.09	2326	45.38	Sesquiterp. ketone
Zizanoic acid	44.12*	1833	[5.41]	1.10	2431	47.59	Sesquiterp. acid
Total identified			67.58%	56.84%			

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

Note: no correction factor was applied

OTHER DATA

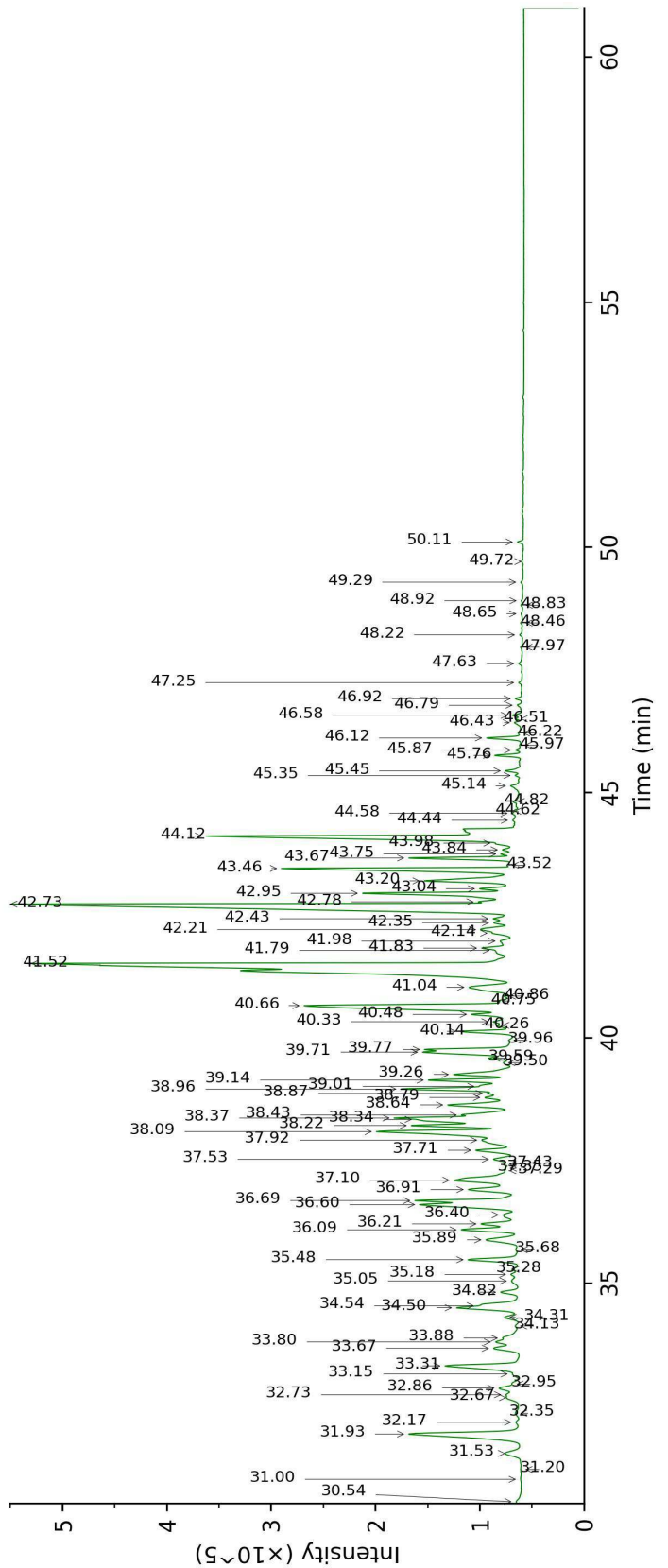
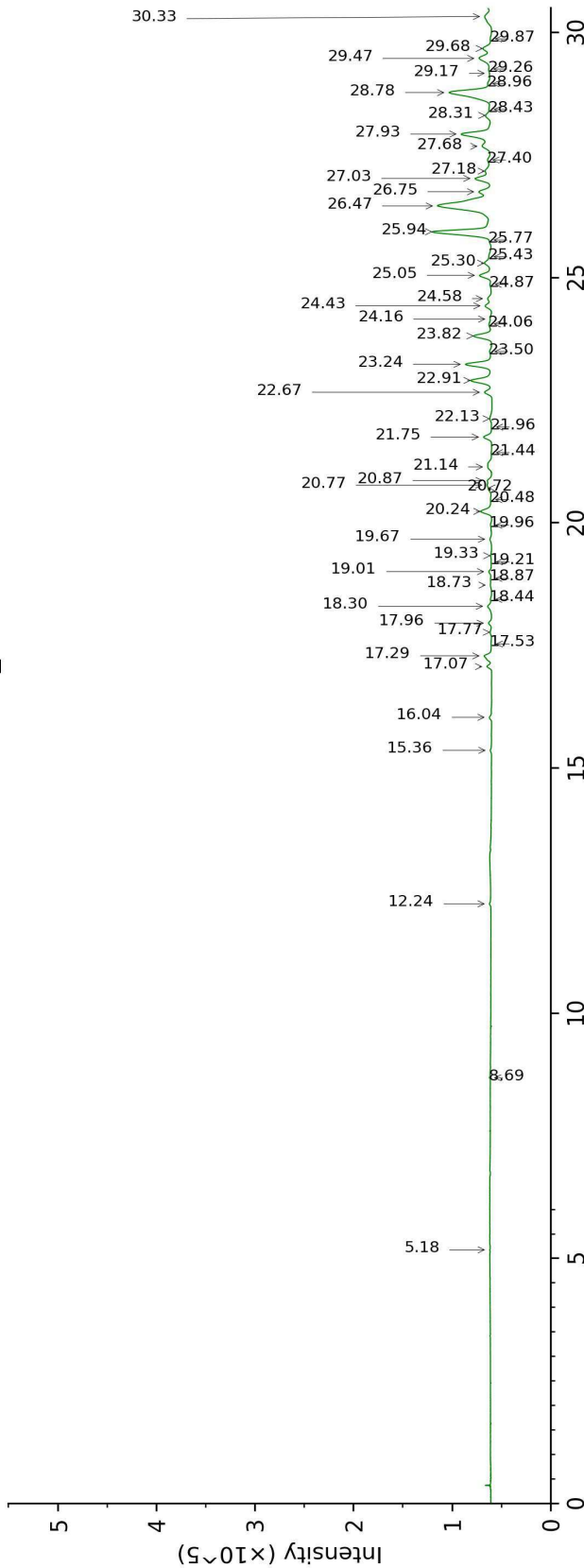
Physical aspect : Yellow viscous liquid

Refractive index : 1.5245 \pm 0.0003 (20 °C)

CONCLUSION

No adulterant, contaminant or diluent were detected using this method.

17L21-PTH5-1-CC_BP5



17L21-PTH5-1-CC_WAX

