

Chemical Composition of *Lantana camara* Fruit Essential Oil†

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Lantana camara fruit essential oil was extracted by hydro distillation and compositional analysis carried out by GC and GCMS. It identified 37 constituents representing 74.31 % oil, of which components were *trans*- β -caryophyllene (21.42), sabinene (1.13 %), eucalyptol (1.25 %), α -humulene (9.97 %), bicyclogermacrene (2.18 %), germacrene D (2.19 %) and *trans*-nerolidol (18.85 %).

Key Words: *Lantana camara*, Verbenaceae, Nerolidol, Caryophyllene.

INTRODUCTION

Lantana camara belongs to family verbenaceae. It is evergreen, hardy shrubs with characteristic odour. In India, the plant is found in Himachal Pradesh, Uttarakhand, Uttar Pradesh and North-Eastern states^{1,2}. It grows up to 3 m with square stem; prickles may be present on stem. The leaves are 2-10 cm long with toothed edges and hairy. They grow opposite one another along the stems. The flowers are arranged in clusters of 20-40 individual flowers. Single-seeded hard green fruit grow in clusters. It becomes black or purple when ripe. Crushing the stems and leaves produces a strong characteristic smell. Due to this, it is also used in perfumery blending. The leaf extracts of *Lantana camara* is also useful in burn wound healing³. All parts of this plant have been used traditionally for several diseases throughout the world. The leaves of this plant were used as an antitumoral, antibacterial and antihypertensive agent⁴, roots for the treatment of malaria, rheumatism and skin rashes⁵.

EXPERIMENTAL

Extraction of fruit oil: Green fruits were collected in November from Ghaziabad (India) and oil extraction was carried out by hydro distillation in Clevenger type apparatus in four batches for 4-5 h, in which each batch contains 150 grams fruits and 450 mL water. The distillate collected from total batches was 0.21 mL, which was extracted with hexane (4 \times 5 mL each batch). The oil obtained was dried over

anhydrous sodium and hexane distilled off in rotary vacuum evaporator at 35 °C. The yield of oil obtained was found to be 0.032 % (w/w).

GC-MS analysis of the oil was performed using an Agilent 7890A series GC connected with 5975C MSD and FID connected with following parameters.

Oven - Initial temp. 70 °C, Rate 2 °C/min up to final temp. 270 °C; Inlet-split (50:1), temp.: 270 °C, Carrier gas-helium, Column-DB5-MS column (60.0 m \times 0.25 mm \times 0.25 μ m), Detector (FID)-Temp. - 270 °C, MSD transfer line temp.- 280 °C, MS Acquisition mode-scan, MS Zones-MS quad: 150 °C, MS source: 230 °C.

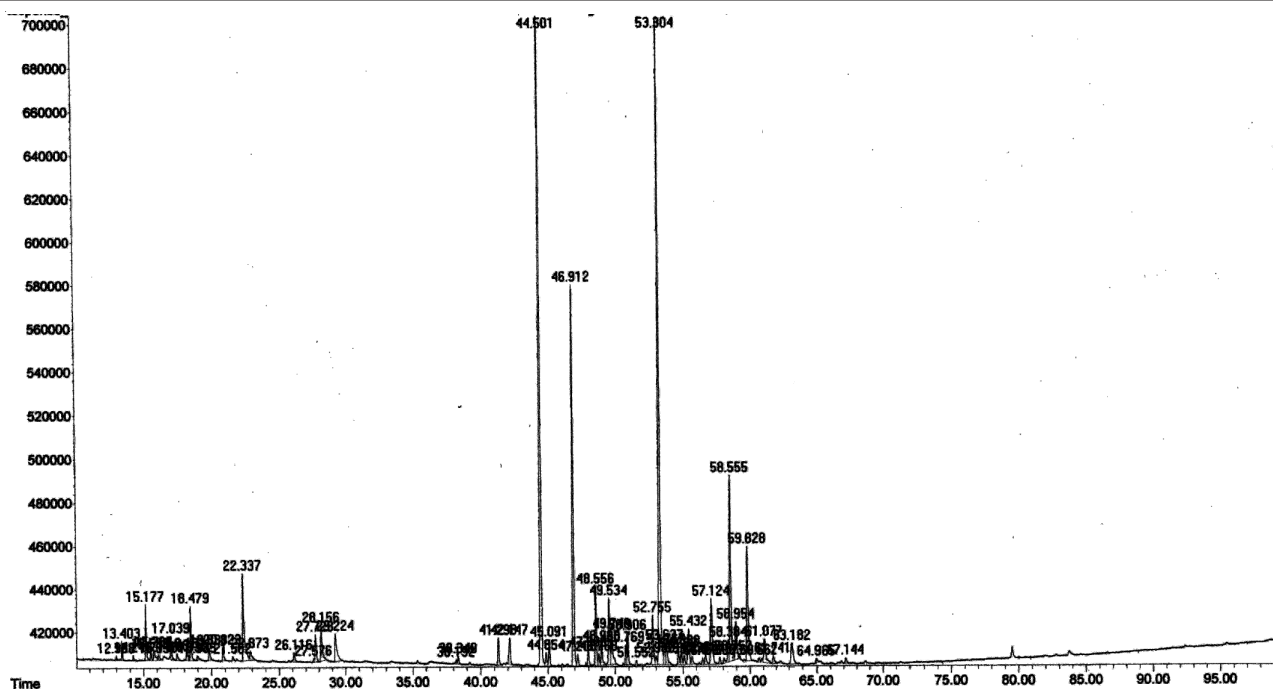
The identification has been carried out by GCMS with matching mass fragmentation pattern with NIST, Willey and Adam's library and KI while quantification was done by FID.

RESULTS AND DISCUSSION

The *Lantana camara* fruit was collected after hydro distillation from above process gave 0.032 % yields, in which the total numbers of identified peaks were 37 components representing 74.31 % of the oil.

The earlier investigation of leaf oil from India shows *trans*- β -caryophyllene (9.40 %), α -copaene (5.0 %), β -elemene (7.3 %), Germacrene D (20.5 %) ⁶. The major component of oil from Bangladesh is *trans*- β -caryophyllene (13.57 %), a humulene (11.76 %), Germacrene D (10.88 %) ⁷. Sundufu and co-workers⁸ have identified germacrene-D (15.85%), β -caryophyllene (12.35%), α -humulene (9.31 %) and germacrene

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Fig.1. GC Graph of *Lantana camara* fruit essential oil

(6.19 %) as major composition of leaves essential oil of *Lantana camara* in South China. In the present study we have identified sabinene (1.13 %), eucalyptol (1.25 %), Linalool (2.96), β -caryophyllene (21.42 %), a humulene (9.97 %), bicyclogermacrene (2.18 %), germacrene D (2.19 %), β elemene (0.94 %), *trans* nerolidol (18.85) and davanone B (1.52 %) as major constituents in *Lantana camara* fruit oil.

Chemical variations in the composition of the essential oil of *Lantana camara* has been also reported earlier from different region⁹.

TABLE-1
CHEMICAL COMPOSITION OF *Lantana Camara* FRUIT OIL

R.T	Composition	Component	KI	Mode of identification
12.99	0.08	α -Thujene	930	a,b
13.40	0.33	α -Pinene	939	a,b
14.25	0.11	Camphene	954	a,b
15.18	1.13	Sabinene	975	a,b
15.56	0.18	β -Pinene	979	a,b
15.77	0.39	β -Myrcene	990	a,b
16.15	0.14	3-Octanol	991	a,b
17.04	0.54	δ -3-Carene	1011	a,b
17.48	0.19	α -Terpinene	1017	a,b
18.19	0.29	Limonene	1029	a,b
18.33	0.04	α -phellandrene	1029	a,b
18.48	1.25	Eucalyptol	1031	a,b
18.99	0.14	<i>trans</i> - β -ocimene	1050	a,b
19.83	0.33	γ -Terpinene	1059	a,b
20.82	0.43	<i>cis</i> -Sabinene hydrate	1070	a,b
21.56	0.11	α -terpinolene	1088	a,b
22.34	2.96	Linalool	1096	a,b
22.87	0.42	<i>Trans</i> -Sabinene hydrate	1098	a,b
26.12	0.26	Camphor	1146	a,b
27.72	0.84	Borneol	1169	a,b
28.16	1.26	Terpin-4-ol	1177	a,b

R.T	Composition	Component	KI	Mode of identification
29.22	1.29	α -Terpineol	1188	a,b
41.30	0.76	α -Copaene	1376	a,b
42.15	0.94	β -Elemene	1390	a,b
44.50	21.42	<i>trans</i> - β -caryophyllene	1419	a,b
44.85	0.44	γ -Elemene	1436	a,b
46.91	9.97	α -Humulene	1454	a,b
47.21	0.37	Alloaromadendrene	1460	a,b
47.99	0.47	γ -muurolene	1479	a,b
48.56	2.19	Germacrene D	1485	a,b
49.53	2.18	Bicyclogermacrene	1500	a,b
50.77	0.52	δ -Cadinene	1523	a,b
52.75	1.52	Davanone B	1566	b
53.30	18.85	<i>trans</i> -Nerolidol	1563	a,b
54.66	0.42	Davanone	1587	b
55.09	0.29	Spathulinol	1578	a,b
55.43	1.29	Caryophyllene oxide	1583	a,b

Note: RT = retention time, a = Kovats index on DB-5, b = GC/MS

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