

# Composition of seed oil of *Cardiospermum halicacabum* L. var. *luridum* Blume (Adelb)

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## Abstract

The chemical composition of the oil extracted from the seeds of *Cardiospermum halicacabum* var *luridum* Blume (Adelb) was investigated. GC-MS analysis showed that the oil extract has more than 27 compounds. The major constituents are Erucic acid (43%), Oleic acid (30%), Eicosanic acid (12%), Octanoic acid (4.57%) and n-Hexadecanoic acid (4.15%).

**Keywords :** GC-MS, anti-inflammatory, *Cardiospermum*, erucic acid, oleic acid, physicochemical properties

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## INTRODUCTION

*Cardiospermum halicacabum* L. (Sapindaceae) is called as Balloon vine in English, 'Indravalli' or 'Tejavatti' in Sanskrit, 'Kanphuti' in Hindi and 'Mudokotran' in Tamil. The shoot system is commonly used in Indian systems of medicine for arthritis, inflammation, sprains, fever, asthma and nervous disorders and has laxative, diuretic and diaphoretic properties (Chopra *et al.*, 1956; Iyer *et al.*, 1963; Kritikar and Basu, 1980; Chatterjee and Pakrashi, 1997; Nair and Mohanan, 1998; Yoganarasimhan, 2000). This species has two varieties, viz. var. *microcarpum* and var. *luridum* (Matthew, 1983). Phytochemical investigations and assessment of diuretic, anti-arthritic, anti-stickling, anti allergic and anti-inflammatory properties have been carried out earlier of *C. halicacabum* (Afaq *et al.*, 1990; Khan *et al.* 1990).

Results of GC-MS analysis of the essential oil of seeds of *C. halicacabum* L. var. *luridum* are presented in this paper.

## METHODS

The seeds of the study plant was collected from Thirumalairayan Pattinam, Karaikal, Pondicherry State, The Union Territory of India, during January to July 2005. Voucher specimen (No.TUH51B) is kept at the Herbarium of Tamil University, Thanjavur, South India. The plant material was identified with the help of Flora described in Gamble (1957) and Matthew (1983). The seeds were shade dried, powdered and subjected to hot extraction method using petroleum ether (60-80°C) 6 hrs through Soxhlet apparatus. The extract was concentrated distilling off the solvent. The oil was stored in sealed vials in a refrigerator (5-8°C) for further analysis. The oil obtained was examined for physico-chemical properties and their chemical composition by using GC-MS engine model GC Clarus

500, Perkin Elmer and Computer Mass Spectral Library (Wiely 138 L) of 80,000 compounds. The capillary column was Elite-1 (100% methyl polysiloxane). The extracts were diluted in hexane (1 ml/ml) and the injection volume for samples was 1 ml injected in the split mode with 10:1 ratio.

Electron Ionization (EI) mass spectra were measured at 70 eV over the mass range 25-400. The chromatographic conditions are helium was used as carrier gas; injector temperature 250°C. The column oven temperature was maintained at 40°C for 3 min., then increased to 270°C at a rate of 5°C/min and maintained for 9 min, MS total time was 44 min.

The constituents were identified after comparison with data available in the computer library attached to the GC-MS instruments and reported in literature (Anonymous, 1962; Jennings and Shibamoto, 1980).

## RESULTS AND DISCUSSION

Physico-chemical properties and chemical composition of seed oil are given in Table 1 and 2. The oil is yellow in colour and clear with a characteristic odour. The extractive value of the oil from seed is 28.84 percent. Twenty seven constituents belonging to different categories were identified by GC-MS. Identification of the compounds was done by comparing the relative retention indices of the peaks with literature data of the mass spectra of the compounds with those reported in the literature (Admas, 1989). From the data it is inferred that the seed oil contains Erucic acid (43 percent), Oleic acid (30 percent), Eicosonic acid (12 percent), Octanoic acid (4.57 percent) and n-Hexadecanoic acid (4.15 percent).

Srivastava *et al.* (1998) analysed the seeds of *C. halicacabum*; the lipidic fraction of the both cortical and inner part of the seeds analysed by TLC and GC-MS spectrometry showed different chemical constituents with rich triterpenoids. In earlier studies, the presence

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**Table 1.** Constituents of the oil of *C. halicacabum* L. var. *luridum*

S. No.	Parameters	Magnetite
1.	Description	Greenish-yellow coloured and characteristic odour
2.	Refractive index at 25°C	1.4870
3.	Weight / ml at 25°C	0.9011 g
4.	Acid value	27.4014
5.	Saponification value	158.6257
6.	Iodine value	78.1886

**Table 2.** Chemical constituents in the essential oil of the seeds of *Cardiospermum halicacabum* L. var. *luridum*

S.No.	Components	R.T <sup>a</sup>	Molecular formula	Molecular weight	Area <sup>b</sup> %
1.	Glycerin	4.40	C <sub>3</sub> H <sub>8</sub> O <sub>3</sub>	92	T
2.	2,4-Heptadienal, (E,E)-	5.25	C <sub>7</sub> H <sub>10</sub> O	110	T
3.	1-Pentene,5-nitro-	7.50	C <sub>5</sub> H <sub>9</sub> NO <sub>2</sub>	115	T
4.	Octanoic Acid	8.87	C <sub>8</sub> H <sub>16</sub> O <sub>2</sub>	144	T
5.	Carbonic acid, phenyl propyl ester	10.12	C <sub>10</sub> H <sub>12</sub> O <sub>3</sub>	180	T
6.	Hydroquinone	11.05	C <sub>6</sub> H <sub>6</sub> O <sub>2</sub>	110	T
7.	2-Decenal,(E)-	11.28	C <sub>10</sub> H <sub>18</sub> O	154	T
8.	2,4-Decadienal	12.08	C <sub>10</sub> H <sub>16</sub> O	152	T
9.	Z-1,9-Dodecadiene	12.63	C <sub>12</sub> H <sub>22</sub>	166	T
10.	1H-Imidazole, 2-ethenyl-	14.02	C <sub>5</sub> H <sub>6</sub> N <sub>2</sub>	94	T
11.	Cyclopropane, 1,1-dimethyl-2-(2-propenyl)-	14.59	C <sub>8</sub> H <sub>14</sub>	11	T
12.	Dihydromyrcene	17.98	C <sub>10</sub> H <sub>18</sub>	138	T
13.	Dodecanoic acid	18.71	C <sub>12</sub> H <sub>24</sub> O <sub>2</sub>	200	T
14.	5-Eicosene,(E)-	22.274	C <sub>20</sub> H <sub>40</sub>	280	T
15.	Tetradecanoic acid	23.25	C <sub>14</sub> H <sub>28</sub> O <sub>2</sub>	228	T
16.	pentadecanoic acid	25.36	C <sub>15</sub> H <sub>30</sub> O <sub>2</sub>	242	T
17.	9-Nonadecene	26.01	C <sub>19</sub> H <sub>38</sub>	266	T
18.	Piperidinone, N-[4-bromo-n-butyl]-	26.51	C <sub>9</sub> H <sub>16</sub> BrNO	233	T
19.	n-Hexadecanoic acid	27.51	C <sub>16</sub> H <sub>32</sub> O <sub>2</sub>	256	4.15
20.	Oleic acid	31.34	C <sub>18</sub> H <sub>34</sub> O <sub>2</sub>	282	30.59
21.	Octadecanoic acid	31.57	C <sub>18</sub> H <sub>36</sub> O <sub>2</sub>	284	4.57
22.	1-Tridecene	33.40	C <sub>13</sub> H <sub>26</sub>	182	0.75
23.	1-Hexyl-2-nitrocyclohexane	33.73	C <sub>12</sub> H <sub>23</sub> NO <sub>2</sub>	213	T
24.	Erucic acid	35.09	C <sub>22</sub> H <sub>42</sub> O <sub>2</sub>	338	43.05
25.	Eicosanoic acid	35.44	C <sub>20</sub> H <sub>40</sub> O <sub>2</sub>	312	12.67
26.	1,2-Benzenedicarboxylic acid, diisooctyl ester	38.56	C <sub>24</sub> H <sub>38</sub> O <sub>4</sub>	390	3.56
27.	9-Octadecenamide, (Z)-	39.16	C <sub>18</sub> H <sub>35</sub> NO	281	T

a- retention time (sec.) b-trace

of two crystalline compounds beta-sitosterol, beta-D-glycoside in the entire shrub of *C. halicacabum* were reported (Ferrari *et al.*, 1996). All the previous reports as the phytochemical properties of seeds of *C. halicacabum* might be that of another variety *viz.* var. *microcarpum* though it was not mentioned. The presence of octanoic acid, dodecanoic acid, tetradecanoic acid, pentadecanoic acid and arachidic acids suggest that this seed oil *C. halicacabum* might have anti-inflammatory activity.

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