



# Investigations on important secondary metabolites in *Dolichandrone falcata* Seem. Leaves Using GC-MS

Ekade P. P.

Manik S. R.\*

Department of Botany, Sant Gadge Baba Amravati University, Amravati – 444 602, Maharashtra, India

## Corresponding Authors:

Dr. S. R. Manik, Professor & Head, Department of Botany Sant Gadge Baba Amravati University, Amravati – 444 602, Maharashtra, India  
Tel: +91-9850341510  
E-mail: [pravinekade005@gmail.com](mailto:pravinekade005@gmail.com)

**Abstract: Objective:** To find out important secondary metabolites that gives much medicinal importance to *Dolichandrone falcata* in traditional tribal practices. **Methods:** The preliminary phytochemical screening is performed using the methods of Harborne and Raman. The preliminary screening reveals the presence of steroids, flavonoids, tannins and saponins. Gas Chromatography – Mass Spectroscopy analysis of *Dolichandrone falcata* leaves is performed on three extracts namely methanol, chloroform and dichloromethane solvents. **Results:** The methanol extract analysis shows the presence of many biologically important compounds like phytol, octadecanoic acid etc. The chloroform extract exhibit the presence of vitamin E, n-hexadecanoic acid etc. While dichloromethane extract analysis shows the highest amount of vitamin E and its derivatives. **Conclusion:** The compounds responsible for antimicrobial, anti inflammatory and anti-oxidant activity were found in the present analysis. Apart from this the leaves of *Dolichandrone falcata* is a good source of vitamin E and its derivatives.

**Keywords:** *Dolichandrone falcata*, GC – MS, Phytochemical, Vitamin E.

## Introduction

*Dolichandrone falcata* Seem. belonging to family Bignoniaceae is a small to medium size tree distributed in the central and southern parts of India<sup>[1]</sup>. The plant is used by the tribal of Northeast Maharashtra to cure stomach problems<sup>[2]</sup>. It is a traditional medicinal plant of Ayurveda used for the purpose of abortion and fish poisoning<sup>[3]</sup>. The plant leaves are reported to have anxiolytic effect on rats<sup>[4]</sup>. The bark paste of *Dolichandrone falcata* is applied in case of fractures<sup>[5]</sup>. The bark juice is used for menorrhagia and leucorrhoea<sup>[6]</sup>. The leaves of this plant are used as antioxidant, antiestrogenic and antidiabetic<sup>[7, 8]</sup>. Despite of these applications this plant is yet to be worked out for its chemical composition. The present study aims at the identification of maximum metabolites from *Dolichandrone falcata* leaves.

## Material and Methods

**A. Collection of Plant Material:** The leaves of *Dolichandrone falcata* were collected from Melghat forest of Amravati district, Maharashtra, India. The collected leaves were carefully examined for too old, etiolated, infected parts and were removed accordingly. Only fresh leaves were taken for the analysis. These leaves were dried in the shade till all its moisture gets evaporated. These dried leaves then converted to the powder form for further analysis.

**B. Extraction:** 10 gram of powder was extracted using Soxhlet apparatus for 24 hours in methanol. The extract then evaporated to dryness. At the time of analysis dried extract was dissolved in same solvent and this sample taken for GC – MS analysis. In the same way other two samples one in chloroform solvent and other in

dichloromethane solvent were prepared. These three samples were then taken for GC – MS analysis.

**C. GC – MS analysis:** The analysis was carried out using gas chromatography – high resolution mass spectrophotometer. Dried extract were dissolved in the 5 ml of chloroform solvent. 2  $\mu$ l of this solution was employed for GC – MS analysis. The GC-MS analysis was carried out using Alegant Hp 7880 with column of 30 meter length, 0.25 mm ID, 0.32 thickness. Helium gas was used as carrier gas at constant flow rate of 1ml/ minute. Injector temperature was set at 100°C. The oven temperature were programmed from 50°C to 280°C at 10°C/ minute to 200°C then 10°C/3 minutes to 250°C ending with a 5 minutes isothermal at 280°C. The sample was injected in split mode as 50:1. Identification of the compounds was done by comparing the spectral data of sample compound with the compound spectra present in spectral libraries (NIST).

## Results

The extraction of *Dolichandrone falcata* leaves in three different solvents gives valuable information about its chemical constituents. The GC – MS data reveals the presence of eight compounds in methanol extract, nine compounds in chloroform extract and three compounds in dichloromethane extract. The compounds obtained with different solvent shows the 80% of metabolite different from each other. The most important metabolite identified in chloroform and dichloromethane extract is vitamin E, which shows its highest concentration in dichloromethane extract.  $\beta$  - tocopherol, the other derivative of vitamin E is found in dichloromethane extract. Identified

metabolites and their relative concentrations are given in Table 1, 2 and 3.

## Discussion

*Dolichandrone falcata* plant is known to be medicinal in traditional practices as well as proven by the latest research also. In the present study the attempts were made to find the chemical constituents of plant leaves to know its medicinal importance by using gas chromatography-mass spectroscopy approach. The results obtained in present study authenticate the earlier reports of therapeutic importance of the plant. The leaves are shown to have antioxidant property [7]. This property must be due to the presence of natural antioxidant vitamin E and its derivative  $\beta$  - tocopherol in leaves. Vitamin E found in chloroform extract with 52.57% concentration and in dichloromethane extract with 72.87% and its derivative tocopherol with 11.89% concentration. The leaves are shown to have the anti-inflammatory effect [7] the compound responsible for this property is n- hexadecanoic acid as this compound is known to have anti-inflammatory properties [9]. n - hexadecanoic acid found in 24% and 9.24% in methanol and chloroform extract respectively. The antibacterial activity of long-chain unsaturated fatty acids is well known. Fatty acids play the key role in antimicrobial food additives also [10], in present investigation we have find the octadecanoic acid i.e. stearic acid, which may be responsible for antimicrobial activity of plant leaves. Octadecanoic acid found in methanol with 3.08% concentration. Phytol which is found in methanol extract used as a precursor for the manufacture of synthetic forms of vitamin E [12], this compound may be used as precursor in natural biosynthesis of vitamin E in this plant. The analysis of *Dolichandrone falcata*

definitely proves its potential as alternative medicinal plant in pharmaceuticals and drug formulations.

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**Table 1:** Compounds Identified in Methanol Extract

Sr. No.	RT	Name of Compound	Peak area (%)	MW	MF
1	9.908	Cycloheptasiloxane, tetradecamethyl	16.41	518.08	C14H42O7Si7
2	10.417	Benzyl .beta.-d-glucoside	2.79	270.28	C13H18O6
3	11.725	Cyclooctasiloxane, hexadecamethyl	2.43	593.23	C16H48O8Si8
4	13.975	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	6.48	296.53	C20H40O
5	16.100	n-Hexadecanoic acid	24.06	256.42	C16H32O2
6	19.833	Phytol	3.32	296.31	C20H40O
7	20.017	9,12,15-Octadecatrienoic acid	41.44	306.48	C20H34O2
8	20.592	Octadecanoic acid	3.08	284.48	C18H36O2

MW= Molecular Weight, MF= Molecular formula

**Table 2:** Compounds identified in Chloroform extract

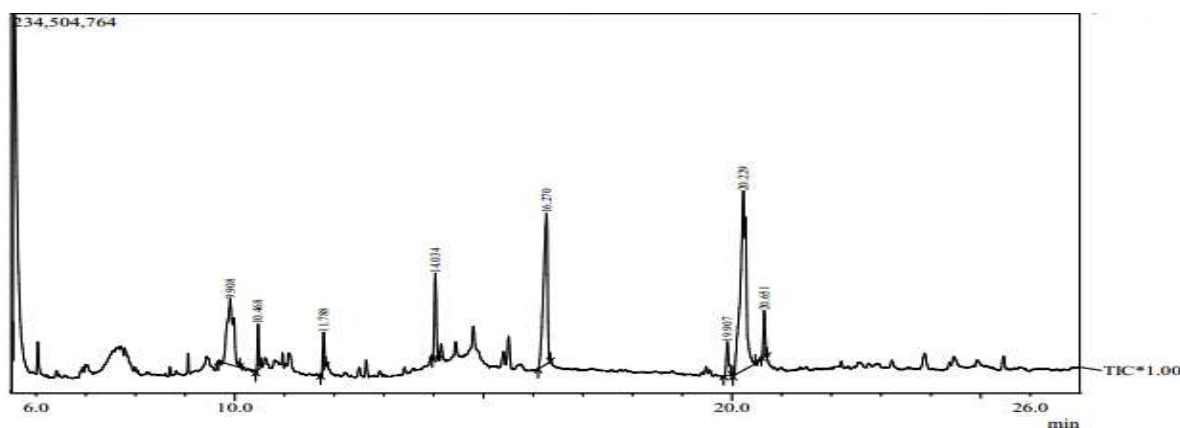
Sr. No.	RT	Name of Compound	Peak area (%)	MW	MF
1	7.925	Cyclohexasiloxane, dodecamethyl- \$\$ Dodecamethylcyclohexasiloxane	14.08	444	C12H36O6Si6
2	10.001	Cycloheptasiloxane, tetradecamethyl-	1.65	518	C14H42O7Si7
3	14.015	1,4-Eicosadiene	3.43	278	C20H38
4	14.425	9-Eicosyne	1.82	278	C20H38
5	14.775	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	2.64	296	C20H40O
6	16.172	n-Hexadecanoic acid	9.24	256	C16H32O2
7	20.144	9,12,15-Octadecatrien-1-ol	11.09	264	C18H32O
8	24.083	Vitamin e	52.57	430	C29H50O2
9	25.212	Tetratetracontane	3.49	618	C44H90

MW= Molecular Weight, MF= Molecular formula

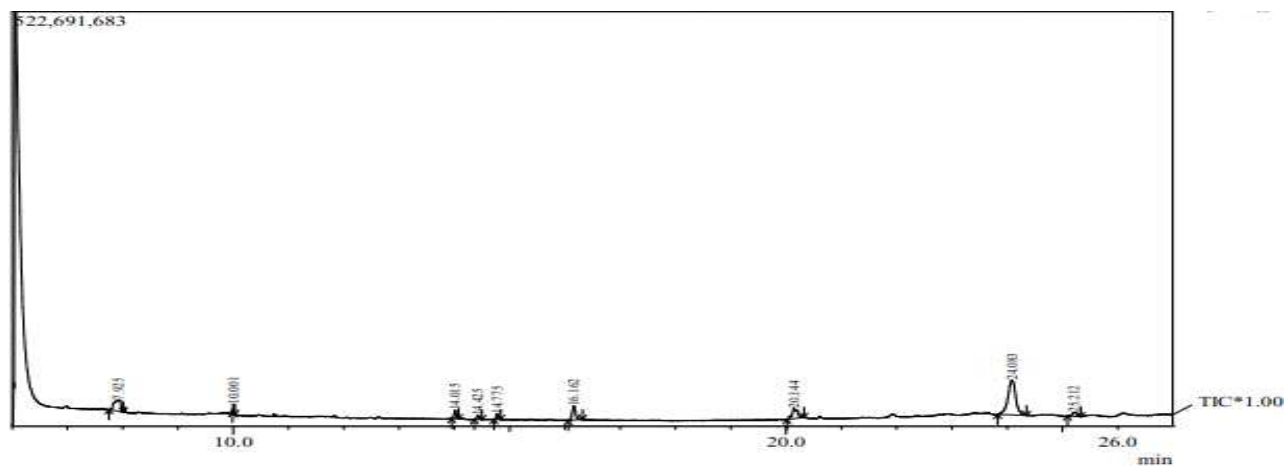
**Table 3:** Compounds identified in Dichloromethane extract

Sr. No.	RT	Name of Compound	Peak area (%)	MW	MF
1	25.6	$\beta$ -Tocopherol	11.89	416	C28H48O2
2	28.4	Vitamin-E	72.87	430	C29H50O2
3	28.7	Tricontane 1-Bromo	15.22	420	C30H61Br

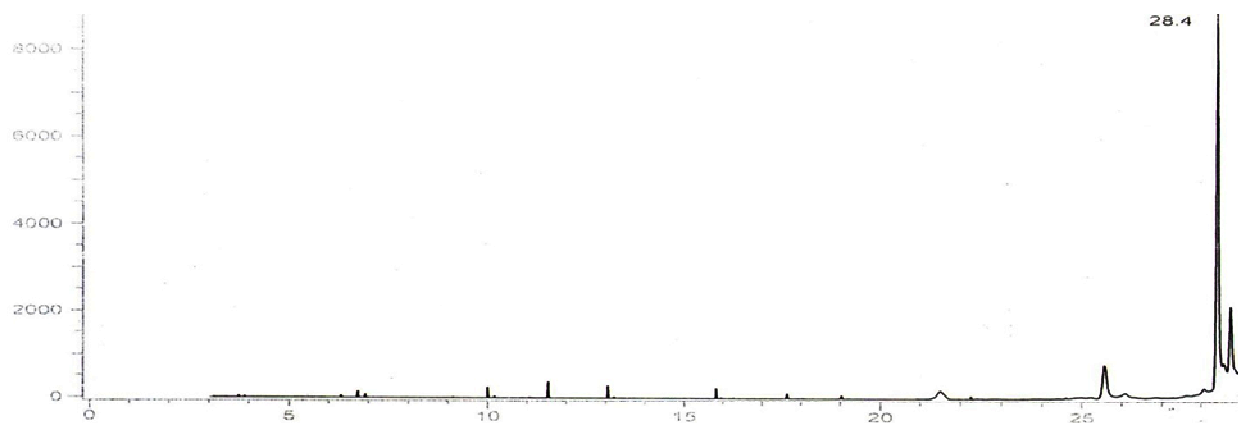
MW= Molecular Weight, MF= Molecular formula



**Fig. 1:** Chromatogram of Methanol Extract



**Fig.2:** Chromatogram of Chloroform extract



**Fig.3:** Chromatogram of Dichloromethane extract

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