

Evaluation of TLC and GCMS activity of *Dolichandrone falcata* (Seem).

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Abstract

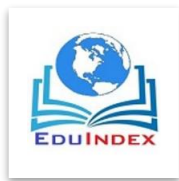
In present investigation thin layer chromatography proved presence of different biomolecules. The Methanol extract showed most potent activity among all, so it is tested by using GCMS analysis. Ten major compounds found in methanol extract. In our GCMS analysis observed that 1'-Hydroxy-4,3'-dimethyl-bicyclohexyl-3,3'-dien-2-one(C₁₄H₂₀O₂), showed 18.68 % peak area which was highest in all identified ten compounds. The p-Cresol, 2-ethyl (C₉H₁₂O) showed least concentration having peak area 1.45 and retention time was 17.3. The 1'-Hydroxy-4,3'-dimethyl-bicyclohexyl-3,3'-dien-2-one(C₁₄H₂₀O₂) might responsible for effective antibacterial activity.

Keywords: *Dolichandrone falcata*, TLC, GCMS analysis.

Introduction

Dolichandrone falcata plant is used by the tribal of Northeast Maharashtra to cure stomach problems. (Kamble *et al.*,2006). It is a traditional medicinal plant of Ayurveda used for the purpose of abortion and fish poisoning (Kirtikar B. 2001). The plant leaves are reported to have anxiolytic effect on rats (Khalid S, *et. al.*, 2010). The bark paste of *Dolichandrone falcata* is applied in case of fractures, menorrhagia and leucorrhoea. The leaves of this plant are used as antioxidant, antiestrogenic and antidiabetic (Shin J.S, *et.al.*,1999; Mungle AN, *et.al.*,2012). Instead of these applications *D. falcata* plant is yet to be worked out for its chemical composition. Although many medicinal plants studied but very less work is done on antibacterial activity of *Dolichandrone falcata* Seem.pods.

Herbal drugs are sources of bioactive compounds used mainly for medicinal purposes. (Dorobat, *et.al.*, 2007., Madhu *et.al.*,2014). Now a day's human pathogenic multidrug resistance pathogens developing resistance against commercially available drugs, by changing their genetic makeup. This situation force scientist to discover new herbal drugs which shows fewer side effects and more effective against pathogenic diseases.



Material and methods: *Dolichandrone falcata* is a small or medium height or some time tall deciduous tree, having grayish coloured bark. Leaves are compound, Oval or round or elliptical in shape. Flowers are white in colour. Shows appearance like sheep horns so it is called as Medshingi.

Thin Layer Chromatography:

TLC plates were prepared for different extracts using silica gel. The plates were placed in developing chamber containing different mixture of solvents. The R_f Values of some selected constituents like alkaloids, flavonoids, terpenoids, saponin and phenols were determined.

Gas Chromatography Mass Spectroscopy:

GCMS is very effective tool for qualitative and quantitative information of compounds and its molecular weight. Methanol extract of *Dolichandrone falcata* Seem, was subjected to GCMS analysis. GC analysis was performed on GC Clarus 500 Perkin Elmer systems under the following conditions. Injector temperature 260°C, using a capillary column Elite 5 (100% Dimethyl poly siloxane). Oven temperature maintained about 120-280°C at 10°C / min. with initial hold of two min. The Detector volt 2200V, the ionizing volt about 70 to 72V. The software used was Turbo mass. The detector was mass detector turbo mass Gold Perkin Elmer. 2ml of Methanol extract was injected into GC-MS. The spectrum components of unknown compound compared with the spectrum of NIST and MS libraries, with sure and ascertain the name, structure and molecular weight of components. The gas used as Helium gas for mobile phase. The fragmentation patterns of the mass spectra were compared with those of the known compounds stored in the National Institute of Standards and Technology (NIST) research library. In the GC-MS analysis 10 active components were detected.

Result and Discussion

Thin Layer Chromatography

In the present investigation pods of *Dolichandrone falcata* were extracted using methanol, ethanol, chloroform, pet. Ether and aqueous solvents. The extraction done by using Soxhlet extraction and maceration method for aqueous solvent. The Methanol extract showed most potent against selected seven different gram-positive and gram-negative pathogens.

The Retardation factor (Rf) values of the methanol, ethanol, chloroform, petroleum Ether and aqueous extracts were found to be in the range of extracts of plant leaves were found in the range of 0.41-0.90 cm. The highest value (0.90 cm) recorded for phenols in methanol extract of *D. falcata* plant pods and lowest value (0.41cm) for terpenoids in ethanol extract of *D. falcata* pods.

Table. 1. Rf. values of some chemical constituents from the pods of *Dolichandrone falcata*

Sr. Nos.	Constituents	Ethanol cm	Methanol cm	Pet. Ether cm	Chloroform cm	Aqueous cm
1	Alkaloids	0.67	0.66	0.60	0.65	0.60
2	Flavenoids	0.61	0.59	0.60	0.64	0.63
3	Terpenoids	0.41	0.62	0.50	0.62	0.57
4	Saponin	0.88	0.81	0.82	0.77	0.79
5	Phenols	0.76	0.90	0.72	0.74	0.73

Table.2 . Solvent system used in Thin Layer Chromatography.

Constituent	Solvent system	Spraying Agent	Color developed
Alkaloids	NH ₄ OH:CH ₃ OH 1:4	Mayer's reagent	Yellowish
Flavonoids	CHCl ₃ :CH ₃ OH 4:1	Iodine vapors	Reddish
Terpenoids	C ₆ H ₆ :CH ₃ COOC ₂ H ₅ 1:1	10% HS ₂ O ₄	Greenish
Saponin	CHCl ₃ :CH ₃ COOH: CH ₃ OH:H ₂ O 4:2:1:1	Iodine vapors	Brown
Phenols	C ₆ H ₆ : CH ₃ OH 9:1	Iodine vapors	Brownish

Gas Chromatography Mass Spectroscopy

The GCMS analysis which authenticates the ten different compounds in methanol sample. Methanol extract observed the presence of 4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl- which was proved to be antioxidant capacity. It was also exhibited antifungal activity. It inhibits spore germination growth. 2-Furancarboxaldehyde, 5-(hydroxymethyl)- It was used as in heat treatment and to deteriorate honey, tomato paste and fruit juices. It indicates adulteration of conversion of acid into sugar. 2,3 Pinanediol, it is bicyclic monoterpene it was used in cosmetics.

Propanal, 2,3-dihydroxy showed antimicrobial potential. 1'-Hydroxy-4,3'-dimethyl-bicyclohexyl-3,3'-dien-2-one does not reported any medicinal value. Dodecanoic acid, 3-Hydroxy it is medium chain fatty acid It is used in chronic inflammation and studies of insulin resistance. Coumarine, 3,4,5,6-tetrahydro-6,8a-epidioxy-4a-methyl is one of the compound found in GCMS analysis of *D. falcata* which is very effective in blood clots as an anticoagulant. Decane, 1,1'-oxybis p-Cresol, 2-ethyl is anthelmintic. The 10-Undecenic acid, octyl ester is applicable in skin infections and other infections of *Candida albicans*.

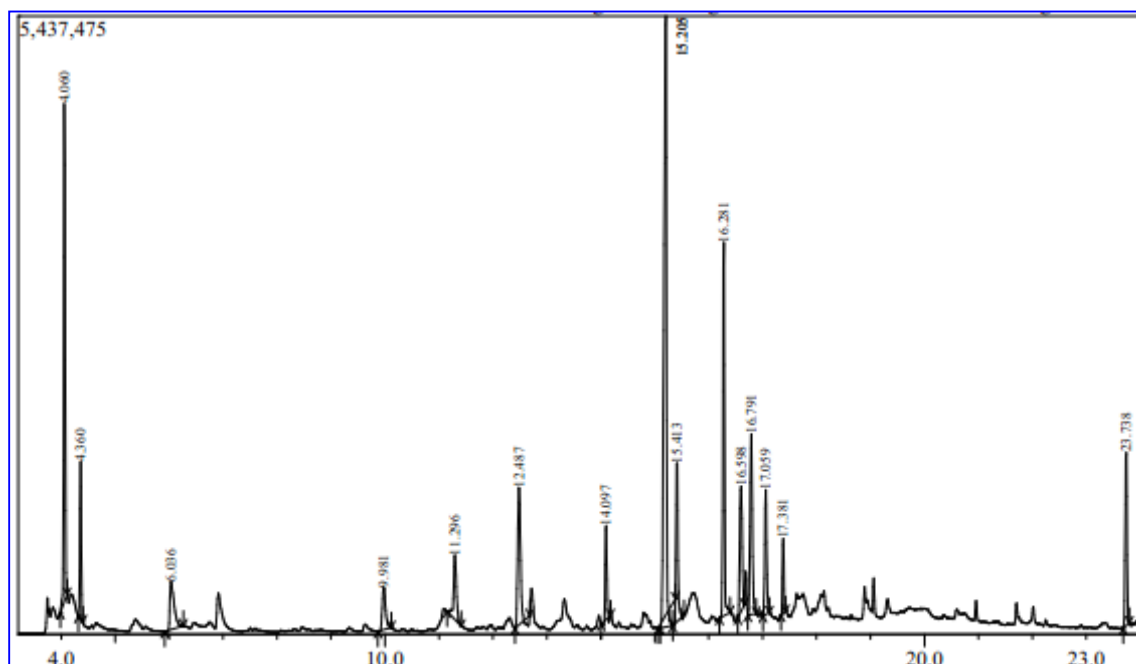
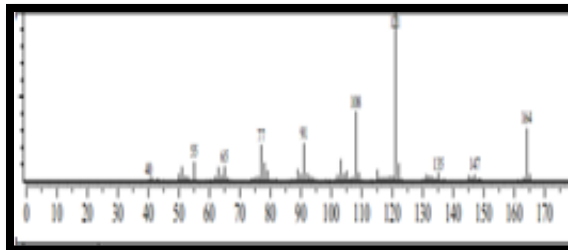
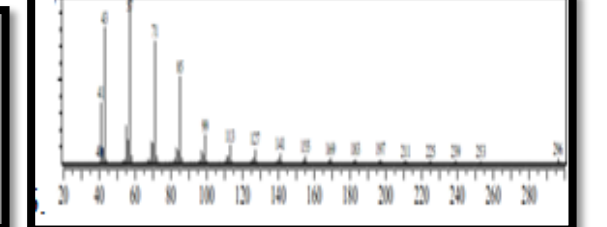
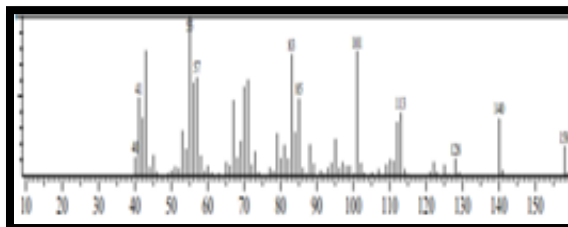
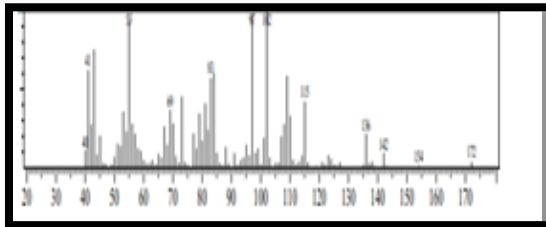
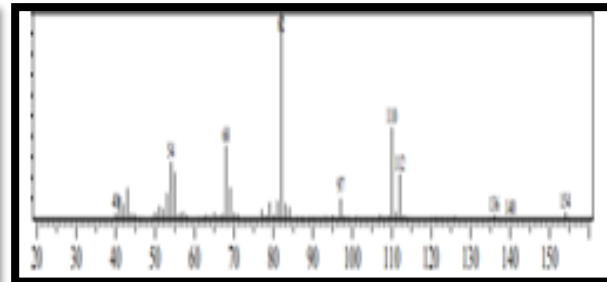
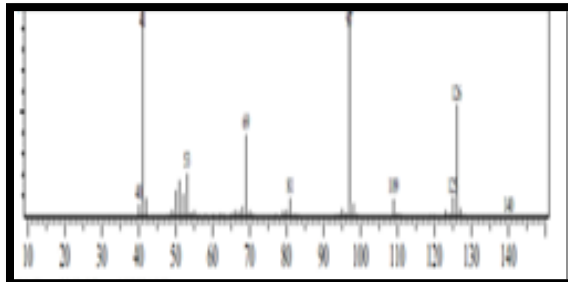
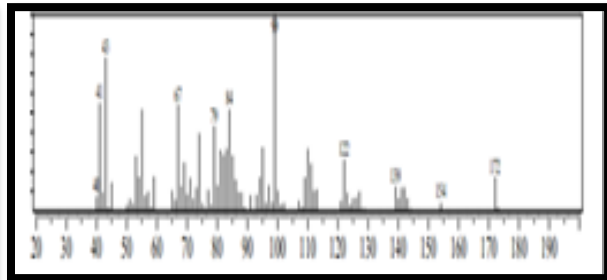
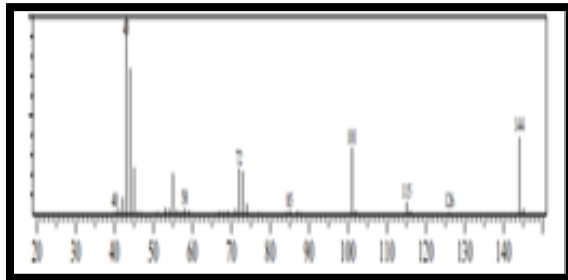


Image:-1.Total Ion Chromatograph of Methanol Extract of *Dolichandrone fulcata* Seem.



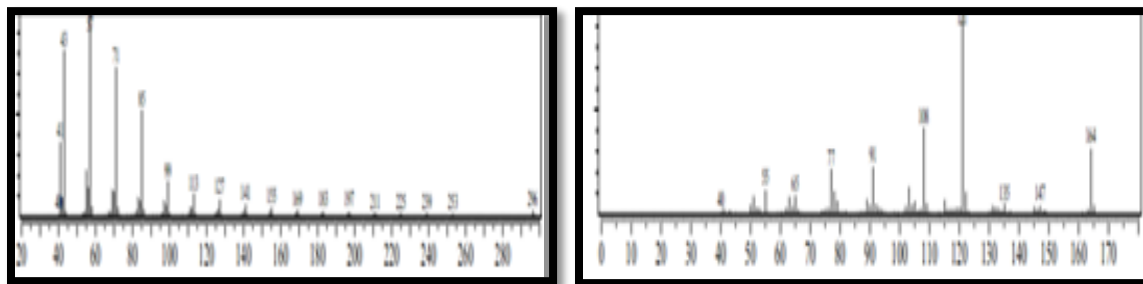
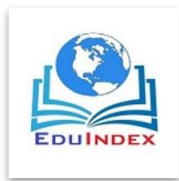


Image. 2. :- Fragmentation pattern of identified compounds of *Dolichandrone falcata*.

Sr. No.	RT	Name of compounds	MF	MW	Peak area %
1	11.3	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-	C ₆ H ₈ O ₄	144.13	2.76
2	12.4	2-Furancarboxaldehyde, 5-(hydroxymethyl)-	C ₆ H ₆ O ₃	126.11	4.95
3	14.1	2,3 Pinanediol	C ₁₀ H ₁₈ O ₂	170.25	1.92
4	6.0	Propanal, 2,3-dihydroxy	C ₃ H ₆ O ₃	90.08	2.76
5	15.2	1'-Hydroxy-4,3'-dimethyl-bicyclohexyl-3,3'-dien-2-one	C ₁₄ H ₂₀ O ₂	220.31	18.68
6	15.4	Dodecanoic acid, 3-Hydroxy	C ₁₂ H ₂₄ O ₃	216.32	4.13
7	16.6	Coumarine, 3,4,5,6-tetrahydro-6,8a-epidioxy-4a-methyl-	C ₁₀ H ₁₂ O ₄	196.20	4.26
8	Decane, 1,1'-oxybis	C ₂₀ H ₄₂ O ₂	314.52	3.29 (14)	
9	17.3	p-Cresol, 2-ethyl	C ₉ H ₁₂ O	136.19	1.45
10	23.7	10-Undecenic acid, octyl ester	C ₁₉ H ₃₆ O ₂	296.47	3.28

Table. 3. Analysis of chemical compounds by GCMS in pods of *Dolichandrone falcata*



Conclusion:-The methanol extract proved to be most potent against many pathogens. It showed ten major components in the extract. Further studies are needed for *D. falcata* species to identify, isolate, characterize and elucidate the structure of all bio-active molecules present in methanol extract.

References :-

1. Dorobat, O.M., Moiso, A., Talapan, D. (2007). Incidence and resistance patterns of pathogens from lower respiratory tract infections (LRTI). *Pneumologia*; **56**(1):7-15
2. Madhu Babu Kasimala, Merih Tukue, and Robiel Ermias. (2014). Phytochemical Screening and Antibacterial Activity of two *common* Terrestrial Medicinal Plants *Ruta chalepensis* and *Rumex nervosus*. *Bali Medical Journal (Bali Med. J.)*. Volume 3, Number 3: 116-121 P-ISSN.2089-1180, E-ISSN.2302-2914.
3. Kamble S Y, More TN, Patil SR, Pawar SG, Bindurani R and Bodhankar S. L. (2006.) Plants used by the tribes of Northwest Maharashtra for the treatment of gastrointestinal disorders: *Indian Journal of Traditional Knowledge*; **7**(2), p. 321-325.
4. Kirtikar B. (2001). *Indian Medicinal Plants with illustration*. Sri Sadguru Publication; 8.p. 25-32.
5. Khalid S, Kature D, Suresh DK, Shaikh KB, CH Gopalakrishna and Loya PJ. (2010) An anxiolytic effect of *Dolichandrone Falcata* Leaves extract In experimental animals. *Research Journal of Pharmaceutical, Biological and Chemical Sciences* .**1**(3): 524-534.
6. Shin JS, Kim KS, Kim MB, Jeong JH, Kim BK. (1999) Synthesis and hypoglycemic effects of chrysin derivatives: *Bioorg Med Chem*; p. 869-874.
7. Mungle A. N., Bodhankar M. M. and Chandak K. K. (2012) Antidiabetic potential of *Dolichandrone falcata* leaves in alloxan induced diabetic rats: *International Journal of Research in Pharmaceutical and Biomedical Sciences* **3**(1).p. 319-324.