

## Gas chromatography and Mass spectroscopy studies in stem bark of *Ficus glomerata* Roxb.

<sup>1</sup>Dr. Shital Surve & <sup>2</sup>Dr. Prabhakar Wanjare

Department of Botany, Gopikabai Sitaram Gawande Mahavidyalay, Umarched, Dist Yavatmal (M.S.)

### ABSTRACT

*Ficus glomerata* Roxb. is an evergreen tree belongs to family Moraceae. Stem bark of it is astringent, anti-diabetic, refrigerant, and useful for washing wounds (Anju et al; 2018). The GC-MS analysis of benzene extract of stem bark of *Ficus glomerata* Roxb. shows presence of seventeen phytochemical compounds. The major phytochemical compounds are Phenol,2,4-bis (1,1-dimethylethyl) (11.35), Lup-20(29)-en-3-ol,acetate,(3a) (3.77), Aspidospermidin-17-ol, 1-acetyl-19,21-epoxy-15,16-dimethoxy-(3.08), 1-Acetoxy-p-menth-3-one (2.94), 7-Methyl-Z-tetradecan-1ol-acetane(2.02), Glycine, N-(3a,5a,7a,12a,-)24-oxo-3,7,12-tris (trimethylsilyl) oxy (cholan-24-yl), methyl ester (1.59). The results of present investigation revealed that potential phytochemical compounds present in extract of stem bark of *Ficus glomerata* Roxb. might be used to treat various skin related diseases.

Key words – Astringent, Galactogogue, Anthelmintic.

### INTRODUCTION

Plant medicines are of great value in modern era as peoples are preferring natural drugs. The plant based drugs have various chemical diversity which can be studied with the help of advanced techniques and modern instruments like Gas Chromatography (GC) and Mass Spectroscopy (MS). *glomerata* also called as *Ficus racemosa* Roxb. is a species of plant in the family Moraceae. Popularly known as the Audumbar, cluster fig tree, Indian fig tree or goolar (gular). Different parts of plant shows Antibacterial, Antitussive, Anthelmintic, Antidiarrhoeal, Anti- cancer, Anti-inflammatory activities etc. The bark is galactogogue in action. Root, root barks, leaves, fruit, milky-juice latex and galls. In present investigation GC-MS analysis of benzene extract of stem bark of *Ficus glomerata* Roxb was studied to isolate different chemical compounds.

### MATERIAL AND METHODS

**Collection of plant material:** The stem bark of *Ficus glomerata* was collected in and dried in shade and mechanically grinded to prepare a powder.

**Extraction:** The grinded plant material of 25 gms was taken in Whatman filter paper No.1. The extraction was done by using Soxhlet's extraction method with analytical grade refluxing solvents like benzene. These extract was then evaporated for dryness. The dried extract was dissolved in same solvent and samples was taken for of GC-MS analysis.

**GC-MS analysis:** The sample obtained was subjected to Gas Chromatography and Mass Spectroscopy for the determination of bioactive volatile compounds from Central Instrumentation Laboratory (CIL), Punjab University Chandigarh and results were obtained.

GC-MS analysis of the samples were carried out using Perkin Elmerclarus 680 with mass spectrometer clarus 600 (EI) using TurboMass ver 5.4.2 Software with NIST – 2008 Library ver. Helium was used as the carrier gas and the temperature of programming were set with initial oven temperature at 60<sup>0</sup>C and held for 2 min and final temperature of the oven was 300<sup>0</sup>C with the rate at 10<sup>0</sup>C per min. A 2- $\mu$ L sample were injected with split 50:1. Mass spectra were recorded over 35-650 amu range with electron impact ionization energy 70 eV; a scan interval of 2 min and fragments from 50 to 600 Da. The chemical components form the different extracts of plants were identified by comparing the retention times of chromatographic peaks using Quadra pole detector with NIST Library to relative retention indices. Quantitative determinations were made by relating respective peak areas to TIC areas from the GC-MS.

### RESULTS AND DISCUSSION:

GC-MS was carried out to study and to determine the possible chemical components from stem bark of *Ficus glomerata* Roxb. Benzene extract of stem bark clearly shows the presence of seventeen peaks indicating presence of seventeen phytochemical compounds. The seventeen phytoconstituents were characterized and identified on comparison of the mass spectra of the constituents provided by NIST library. The Benzene extract of *Ficus glomerata* Roxb. stem bark analyzed by GC-MS shows the presence of compounds like Cyclopentasiloxane, decamethyl, 4-Methanoazulen-7-oldecahydro-1,5,5.8a-tetramethyl-, Cyclopentane, 2-(1-methylpropyl)- 4-Chloro-3-n-hexyltetrahydropyran, Phenol,2,4-bis (1,1-dimethylethyl), Aspidospermidin-17-ol, 1-acetyl-19,21-epoxy-15,16-dimethoxy-,1-Acetoxy-p-menth-3-one, 7-Methyl-Z-tetradecan-1ol-acetane, 7,8-Epoxy lanostan-11-ol, 3-acetoxy, Glycine, N-(3a,5a,7a,12a,)-24-oxo-3,7,12-tris(trimethylsilyl) oxy (cholan-24-yl),methyl ester, Card-20(22)-enolide, 3-(6-deoxy-3,4-O-methylenehexopyranose-2-ulos-1-yl)oxy-5,11,14-trihydroxy-12-oxo-(3a,5a,11a) Lup-20(29)-en-3-ol,acetate,(3a)-, (5a) Pregnane-3.20a-diol, 14a,18a-(4-methyl-3-oxo-(1-oxa-4-azabutane-1,4-diy)-diacetate Milbemycin b, Androst-8-en-3-ol, 4,4,14a-trimethyl-17-(2-bromo-1-methylethyl), 3,9a,14,15-Diepoxy pregn-16-en-20-one-3.11a.18-triacetoxy, Pis.,pis,-Carotene.

The chromatogram of Benzene extract clearly shows the presence of seventeen peaks of seventeen phytochemical compounds detected was shown in Fig. 1.1. The active compound with their retention time (RT), % peak area, Compound analyzed, probable structural formula are presented in Table- 1.1. Table 1.2 display activity reported of the compound.

**Table 1.1 : Phytochemical compounds identified in benzene extract of *Ficus glomerata* Roxb.**

Sr. No.	Retention Time	Peak area (%)	Compound Analyzed	Molecular formula
1	8.46	1.36	Cyclopentasiloxane, decamethyl	C <sub>16</sub> H <sub>30</sub> O <sub>5</sub> Si <sub>5</sub>

2	9.35	0.62	1,4-Methanoazulen-7-oldecahydro-1,5,5.8a-tetramethyl-	C <sub>15</sub> H <sub>26</sub> O
3	9.81	0.94	Cyclopentane, 2-(1-methylpropyl)-	C <sub>9</sub> H <sub>16</sub> O
4	11.58	1.95	4-Chloro-3-n-hexyltetrahydropyran	C <sub>11</sub> H <sub>21</sub> ClO
5	13.57	11.35	Phenol,2,4-bis(1,1-dimethylethyl)	C <sub>14</sub> H <sub>22</sub> O
6	14.73	3.08	Aspidospermidin-17-ol, 1-acetyl-19,21-epoxy-15,16-dimethoxy-	C <sub>23</sub> H <sub>30</sub> N <sub>2</sub> O <sub>5</sub>
7	15.76	2.94	1-Acetoxy-p-menth-3-one	C <sub>12</sub> H <sub>20</sub> O <sub>3</sub>
8	16.70	2.02	7-Methyl-Z-tetradecan-1ol-acetane	C <sub>17</sub> H <sub>32</sub> O <sub>2</sub>
9	23.07	0.93	7,8-Epoxylanostan-11-ol, 3-acetoxy	C <sub>32</sub> H <sub>54</sub> O <sub>4</sub>
10	24.89	1.59	Glycine, N-(3a,5a,7a,12a,-)24-oxo-3,7,12-tris(trimethylsilyloxy(cholan-24-yl),methyl ester	C <sub>36</sub> H <sub>69</sub> NO <sub>6</sub> Si <sub>3</sub>
11	26.17	1.19	Card-20(22)-enolide, 3-(6-deoxy-3,4-O-methylenehexopyranose-2-ulos-1-yl)oxy-5,11,14-trihydroxy-12-oxo-(3a,5a,11a)	C <sub>30</sub> H <sub>40</sub> O <sub>11</sub>
12	27.68	3.77	Lup-20(29)-en-3-ol,acetate,(3a)-	C <sub>32</sub> H <sub>52</sub> O <sub>2</sub>
13	29.27	0.97	(5a) Pregnane-3.20a-diol, 14a,18a-(4-methyl-3-oxo-(1-oxa-4-azabutane-1,4-diyl)-diacetate	C <sub>28</sub> H <sub>43</sub> NO <sub>6</sub>
14	29.41	0.89	Milbemycin b,	C <sub>33</sub> H <sub>46</sub> ClNO <sub>7</sub>
15	29.73	0.89	Androst-8-en-3-ol, 4,4,14a-trimethyl-17-(2-bromo-1-methylethyl)	C <sub>25</sub> H <sub>41</sub> BrO
16	31.79	0.71	3,9a,14,15-Diepoxypregn-16-en-20-one-3.11a.18-triacetoxy	C <sub>27</sub> H <sub>34</sub> O <sub>9</sub>
17	33.27	0.51	Pis.,pis,-Carotene	C <sub>42</sub> H <sub>64</sub> O <sub>2</sub>

**Table 1. 2 : Activity of important phytochemical compound identified in benzene extract of *Ficus glomerata* Roxb.**

Sr. No.	Compound Analyzed	Activity reported
1	Cyclopentasiloxane, decamethyl	Skin softner, glows skin and conditioner
2	1,4-Methanoazulen-7-oldecahydro-1,5,5.8a-	Oligosaccaride provider

	tetramethyl-	
3	Cyclopentane, 2-(1-methylpropyl)-	Antiacne, Antipsorlac, Keratolglc, Antidermatic
4	4-Chloro-3-n-hexyltetrahydropyran	Antiseptic, Disinfectant, Germicidal
5	Phenol,2,4-bis(1,1-dimethylethyl)	Antibacterial, Antifungal
6	Aspidospermidin-17-ol, 1-acetyl-19,21-epoxy-15,16-dimethoxy-	Oligosaccaride provider
7	1-Acetoxy-p-menth-3-one	Antidermatic, Antisporiac, Antiezemc, Antikeratotic, Anti-inflammatory, Antiedemic
8	7-Methyl-Z-tetradecan-1ol-acetane	Increase Zinc bioavailability
9	7,8-Epoxy lanostan-11-ol, 3-acetoxy	Oligosaccaride provider
10	Glycine, N-(3a,5a,7a,12a,)-24-oxo-3,7,12-tris(trimethylsilyloxy(cholan-24-yl),methyl ester	Anti-inflammatory
11	Card-20(22)-enolide, 3-(6-deoxy-3,4-O-methylenehexopyranose-2-ulos-1-yl)oxy-5,11,14-trihydroxy-12-oxo-(3a,5a,11a)	Antidermatic, Antioxidant
12	Lup-20(29)-en-3-ol,acetate,(3a)-	Lupas generating
13	(5a) Pregnane-3.20a-diol, 14a,18a-(4-methyl-3-oxo-(1-oxa-4-azabutane-1,4-diyl)-diacetate	Antiaging, Antivertigo, Acnegenic, Absorbent, Antibiotic, Antimycotic, Anticandidoses, Anti-inflammatory
14	Milbemycin b,	Antiallergic, Antidemaitic, Antiitching, Anti-inflammatory, Antihistaminic
15	Androst-8-en-3-ol, 4,4,14a-trimethyl-17-(2-bromo-1-methylethyl)	Endocrin tonic, Energizer
16	3,9a,14,15-Diepoxy pregn-16-en-20-one-3.11a.18-triacetoxy	Endocrin tonic, Energizer
17	Pis.,pis,-Carotene	Anticancer

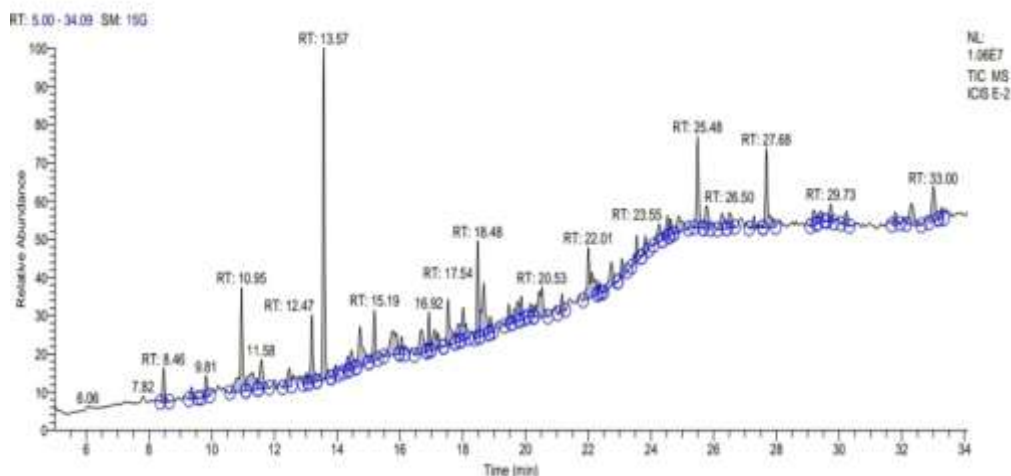


Fig. 1.1 : GC-MS chromatogram of *Ficus glomerata* Roxb.

## CONCLUSIONS :

The present investigation revealed that seventeen phytochemical compounds obtained from benzene extract of *Ficus glomerata* Roxb. showed Antiaging, Antivertigo, Acnegenic, Absorbent, Antibiotic, Antimycotic, Anticandidoses, Anti-inflammatory etc. activity. Some of the compound act as Skin softner, glows skin and conditioner. Thus it may help in formulation of new drugs which can be used to treat various skin related diseases.

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