

# PHYTOCHEMICAL CHARACTERIZATION OF THE LEAF EXTRACT OF *CLERODENDRUM PANICULATUM* LINN.

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**Abstract :** *Clerodendrum paniculatum* Linn. is traditionally used in India, Japan and China for the treatment of numerous ailments like inflammation, neuralgia, ulcer, rheumatism and wounds. Objective of the present study is to investigate the phytochemical constituents by performing GC MS analysis. Qualitative phytochemical screening showed the presence of alkaloids, flavanoids, phenolics, tannins, glycosides and carbohydrates. Chromatogram of GC MS analysis of ethanolic extract showed the presence of Pentadecanoic acid, Oleic acid, Dodecanal, 1,1-Dodecanediol diacetate, 7- hydroxyl-3-(1,1-dimethylprop-2-enyl)coumarin. This study will help in the detection of active constituents responsible for the different biological activity of *Clerodendrum paniculatum* Linn.

**Key words**– GC MS analysis, phytocomponents, herbal medicine.

## I. INTRODUCTION

India is one of the world's substantial biodiversity centers that consist of exceeding 45,000 various plant species. This helped the traditional healers and herbal health practitioners a great pool of natural pharmacy to select the herbal ingredients to prepare remedies and phytomedicines for the treatment, control and management of human diseases. <sup>1</sup> In the genus *Clerodendrum* (Family Lamiaceae) more than 550 species are reported to be identified. In various indigenous medicines and also in folk medicines ethnomedical importance of the genus are identified. In Indian, Chinese, Korean, Japanese, Thai systems of medicines the genus is widely used for the treatment of several ailments such as cancer, syphilis, thyroid, malaria, inflammation, diseases of lung, skin and blood. <sup>2</sup>

*Clerodendrum paniculatum* Linn. ( Family Lamiaceae) is a semi woody shrub of 1 to 2 m height. It is an annual or biennial plant. It is also called Pagoda plant as the flower resembles a Japanese Pagoda. It consist of bright red odourless flowers arranged as massive terminal panicle up to 30 cm or more in height. It is native of India, Sri Lanka and Malaysia that is widely cultivated in world's tropical gardens. <sup>3, 4</sup> The plant is traditionally used in India, Japan and China for the treatment of different ailments like inflammation, neuralgia, ulcer, rheumatism and wounds. Traditionally it is used in Thai medicine as anti-pyretic and anti-inflammatory. <sup>5</sup>

## 2. MATERIALS AND METHODS

### Collection and authentication of Plant materials

The fresh leaves of *Clerodendrum paniculatum* Linn. were collected from Mallappally, Pathanamthitta District on may 2018. The plant's identification and authentication was confirmed by the botanist Dr. Thomas, Herbarium Curator, PG and Research Department of Botany Mar Thoma College, Tiruvalla. Voucher specimens was deposited in the Herbarium of PG and Research Department of Botany (No: MTCHT 1051) on 07/06/2018.

### Preparation of the Extract

The leaves were dried in shade and made into coarse powder using an electric blender. Then the powder was extracted by continuous hot percolation method in a Soxhlet Extractor using ethanol as solvent. Ethanolic extract was used for the GC-MS analysis to discover the phytoconstituents

### Phytochemical analysis

Phytochemical analysis of the ethanolic extract to find out the presence and absence of phytoconstituents were done using standard procedures. <sup>6</sup> Phytochemical screening were performed for the evaluation of terpenoids, steroids, alkaloids, flavonoids, phenolics, tannins, glycosides, carbohydrates, proteins, amino acids and saponins.

### GC MS Analysis

GC-MS analysis of the ethanolic extract was performed at the Sophisticated Instrumentation Facility (SIF) laboratory, Chemistry Division, School of Advanced science, VIT University, Vellore.

### Instrument Details

GC-MS analysis of the ethanolic extract of the leaves was performed by the Perkin Elmer make Clarus 680 GC model and gas chromatograph is interfaced using clarus 600 (EI) mass spectrometer . Clarus 680 GC used in the analysis employed a fused silica column, packed with Elite-5MS (5% biphenyl 95% dimethylpolysiloxane, 30 m × 0.25 mm ID × 250µm df.

**GC MS operating Condition**

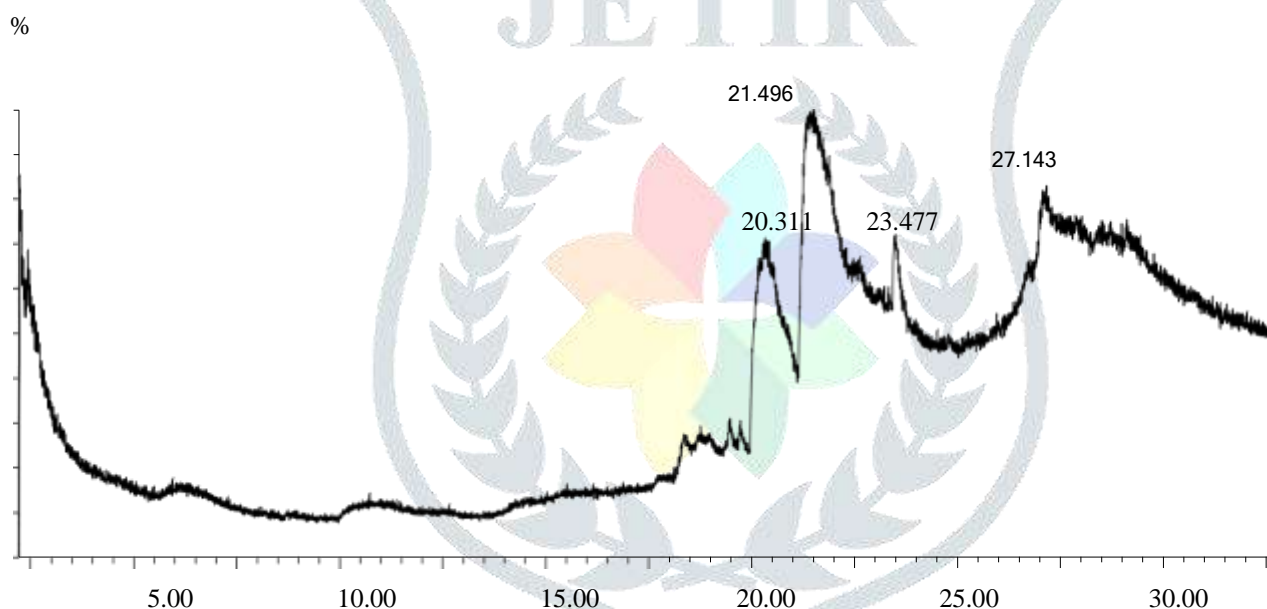
The initial oven temperature was 60 °C with a hold time of 6 minutes. The temperature was programmed to rise by 10°C min<sup>-1</sup> with a final temperature of 300°C. The injector temperature was set at 260°C during the chromatographic run. The components were separated using Helium as carrier gas at a constant flow of 1 ml/min. The split sampling technique was used to inject the sample in the ratio of 10:1.

The 1µL of extract sample injected into the instrument and immediately vapourized and moved down the column. The mass detector conditions were transfer line temperature of 230 °C and ion source temperature 230 °C. For detection electron ionization with ionization mode electron impact at 70 eV, was used having a scan time 0.2 sec and scan interval of 0.1 sec. The mass scan range of fragments were from 40 to 600 Da. Total run time of GC was 35 minutes. GC-MS chromatogram and mass spectra were handled using software Turbomass ver 5.4.2.

The identification and interpretation of components were done by comparing the spectrums of the unknown components with the database of spectrum of known components stored in the GC-MS NIST (2008) library which contain 220,460 spectra of 192,108 different chemical compounds. Name, molecular formula, molecular weight and chemical structure of the components of test materials were ascertained.

**RESULTS AND DISCUSSION**

Qualitative phytochemical screening revealed the presence of alkaloids, flavanoids, phenolics, tannins, glycosides and carbohydrates in the ethanolic extract. The peaks obtained from the GC-MS analysis of ethanolic extract of *Clerodendrum paniculatum* help to identify the constituents like terpenoids, long chain fatty acids, long chain, branched and cyclic chain hydrocarbons, esters, alcohols. The retention time, molecular formula, molecular weight, peak area % were obtained. Figure 1 shows Chromatogram of GC MS analysis of ethanolic extract of *Clerodendrum paniculatum* Linn.. It revealed the presence of Pentadecanoic acid, Oleic acid, Dodecanal, 1,1-Dodecanediol diacetate, 7- hydroxyl-3-(1,1-dimethylprop-2-enyl)coumarin. Major components of the extract were found to be oleic acid and pentadecanoic acid (Table 1).



**Fig.1 Chromatogram of GC-MS analysis of *Clerodendrum paniculatum* linn.**

**Table 1 Phytocomponents identified in the ethanolic extracts of *Clerodendrum paniculatum* Linn.by GC-MS.**

No	RT	Name of the Compound	Molecular Formula	MW	Peak area %
1.	20.311	Pentadecanoic acid	C <sub>15</sub> H <sub>30</sub> O <sub>2</sub>	242	26.530
2.	21.496	Oleic acid	C <sub>18</sub> H <sub>34</sub> O <sub>2</sub>	282	57.48
3.	23.207	Dodecanal	C <sub>12</sub> H <sub>24</sub> O	184	2.486
4.	23.477	1,1-Dodecane diol diacetate	C <sub>18</sub> H <sub>34</sub> O <sub>2</sub>	286	4.749
5.	27.143	7-hydroxy-3-(1,1-dimethyl prop-2-enyl) coumarin	C <sub>14</sub> H <sub>14</sub> O <sub>3</sub>	230	7.603

Oleic acid is a monounsaturated omega -9-fatty acid that can improve heart conditions by decreasing cholesterol, anti inflammatory, anti androgenic, anticancer, antibacterial, hepatoprotective, dermatitogenic, 5-alpha reductase inhibitor. <sup>7,8,9</sup> Pentadecanoic acid is a saturated fatty acid that can improve insulin sensitivity, reduce risk of cardiovascular diseases, decrease cholesterol, anaemia and liver fibrosis. It also has anti inflammatory, antibiotic and RBC cell stabilizing property. <sup>10</sup> 7-hydroxy-3-(1,1-dimethyl prop-2-enyl) coumarin is a Coumarin that is a phenolic group that has anti oxidant, anti bacterial, antifungal,

anticancer, anti inflammatory, Alzheimer's disease inhibitor and antithrombic properties.<sup>11,12</sup> Dodecanal is an aldehyde and used as food flavour.<sup>13</sup>

## CONCLUSION

The GC Ms analysis of the ethanolic extract of leaves of *Clerodendrum paniculatum* Linn. discloses the presence of pharmacologically active components like coumarins, saturated and unsaturated fatty acids. The results obtained from this study would help to investigate and assess the therapeutic uses of *Clerodendrum paniculatum* Linn. more coherently. It opens the scope for further investigation to ascertain the various biological activities of the plant and illuminate the pharmacological profile of the plant.

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