ABSTRACT: The aim of the present study is to identify the volatile, bioactive phytoconstituents present in the ethanolic extract of the leaves of Glochidion ellipticum Wt. (Euphorbiaceae) was carried out by using GC-MS analysis, while mass spectra of the compounds found in the extract was matched with the National Institute of Standards and Technology and Wiley library. Twenty seven components from leaves of the above said plant were identified. The active principles with their retention time, molecular formula, molecular weight and concentration (%) in the ethanol extract of leaf of G. ellipticum are obtained. This is the first report of documentation of active constituents from leaves of Glochidion ellipticum. The research reveals the potential of G. ellipticum leaves as a good source of bioactive compounds such as esters, ethers, alkaloids, alkenes, fatty alcohols, terpenoids, amines, porphyrin and silicon compounds that justify the use of this plant for its various ailments by traditional practitioners.

INTRODUCTION: Nature is the best combinatorial chemist and possibly has answers to all diseases of humankind. Green plants represent a reservoir of effective chemotherapeutants as they are non-phytotoxic, more systemic and easily biodegradable. Till now, natural compounds discovered from medicinal plants have provided numerous clinically useful drugs. A knowledge of the chemical constituents of plants is desirable not only for the discovery of therapeutic agents, but also because such information may be of great value in disclosing new sources of economic phytochemicals for the synthesis of complex chemical substances and for discovering the actual significance of folkloric remedies.

In recent years GC-MS studies have been increasingly applied for the analysis of medicinal plants as this technique has proved to be a valuable method for the analysis of non-polar components and volatile essential oil, fatty acids, lipids and alkaloids.

The genus Glochidion of the family Euphorbiaceae has many representative species in India and most of them are chemically constituted with constituents like triterpenoid saponins, sesquiterpenoids, glycosides and alkaloids which vary from one plant to another. Therefore it can be considered that these plants may possess a lot of medicinal value which may be in one way or the other beneficial for the human well-being. Much attention can be given in complete exploration of the different species of this genus as they have not yet come in the limelight of the researchers.

MATERIALS AND METHODS: The leaves of Glochidion ellipticum Wt. were collected from the...
fringes of evergreen forests of Idukki district, Kerala, India and were authenticated and deposited at the PG and Research Department of Botany, Vellalar College for Women, Erode (Tamil Nadu), India. Fresh leaves were collected and air-dried at room temperature and then homogenized to obtain coarse powder. The powdered leaf was extracted with the solvent ethanol by hot extraction using soxhlet apparatus, collected and stored in a vial for further analysis.

**GC-MS Analysis:** Ethanolic extract of leaf of *G. ellipticum* was analyzed for the presence of different volatile compounds by Gas chromatography-Mass spectroscopy (GC-MS) technique. GC-MS analysis of some of the potent volatile constituents present in the extract was performed at The South India Textile Research Association (SITRA), Coimbatore (Tamil Nadu), India. GC analysis of the extracts was performed using a GC-MS (Model; Thermo Trace GC Ultra Ver.5.0) equipped with a DB-35MS fused silica capillary column (30m length X outside diameter 0.25 mm X internal diameter 0.25μm) and gas chromatograph interfaced to a Mass Selective Detector (MS-DSQ-II) with XCALIBUR software. For GC-MS detection, an electron ionization system with ionization energy of -70eV was used.

Helium gas was used as a carrier gas at a constant flow rate of 1ml/min and the sample injected was 1μl; Injector temperature 250°C; Ion source temperature 200°C.

The oven temperature was programmed from 70° to 200°C at the rate of 10°C/min, held isothermal for 1 minutes and finally raised to 250°C at 10°C/min. Interface temperature was kept at 250°C. Total GC run time was 37.50 min. The relative percentage of each extract constituent was expressed as percentage with peak area normalization.

**Identification of components:**
The identity of the components in the extract was assigned by the comparison of their retention indices and mass spectra fragmentation patterns with those stored on the computer library NIST (Mc Lafferly, 1989) and WILEY (Stein, 1990) and also with published literatures.

**RESULT:** The GC-MS analysis of the ethanolic extract of leaf of *G. ellipticum* revealed the presence of twenty seven bioactive phytochemical constituent that could contribute to the medicinal value of the plant. GC and MS running time was 37.50 minutes. The GC-MS chromatogram of the test plant is presented in Fig. 1. The active principles with their retention time (RT), molecular formula, molecular weight (MW) and peak area are presented in Table 1. The spectra of the compounds are matched with Wiley 9.0 and NIST libraries.

![FIG.1: GC-MS CHROMATOGRAM OF THE ETHANOLIC EXTRACT OF LEAF OF GLOCHIDION ELLIPTICUM](image-url)
The most prevailing major compounds were 3,5-Pentano-13,17-diethyl-2,7,8,12,18-pentamethyl porphyrin (18.63%), 3-Eicosane (12.69%), Silicone oil (11.26%), Glaucene (Rs)-(1) (Racemic) (9.54%), Phytol (5.27%), Neophytiadiene (3.65%), Cyclohexasiloxane, Dodecamethyl- (2.61%) and pharmacologically important components like Tetracosamethyl-cyclododecasiloxane (1.91%), Cyclodecasiloxane eicosamethyl - (1.65%), 9-Octadecenoic acid (Z), 9-octadecenyl ester, (Z)-(1.05%), Benzene, 1 – methoxy – 4 - (1-propenyl) (0.30%) were also detected in minor amounts in the leaf sample. Most of these compounds have not been reported from this plant so far. However, there may be variation in the chemical composition based on topography.

**DISCUSSION:** Most of the identified compounds possessed many biological properties. For instance, Phytol is one among the twenty seven identified compounds in the present study. Phytol is a 3,5-Pentano-13,17-diethyl-2,7,8,12,18-pentamethyl porphyrin (18.63%) is the major volatile constituent in the present study. Porphyrins occur widely in nature and play important roles in various biological processes. For example, they have found applications in virus destruction, cancer therapies as it selectively kill the tumor cells and their side effects are limited. It is also known to possess anti-microbial property. Glaucine is an alkaloid found in many species of the family Euphorbiaceae. It has bronchodilatory and anti-inflammatory effects and is used medically as an anti-tussive. Animal studies demonstrate the ability of glaucine to decrease heart rate and lower blood pressure, anticonvulsant and antinociceptive properties.
diterpene and is widely used as an anti-microbial, antioxidant, anti-tumor, anti-cancer, anti-arithmetic, immuno stimulatory, anti-diabetic, chemo preventive, pesticidal and diuretic agent and has sunscreen properties. Similarly, the presence of phytol was detected in the leaves of Mallotus philippensis, Mimosapudica, Mohan et al. and Sudha et al. reported the aerial parts of Kirganelia reticulata and Fluggea leucopyrus, respectively.

The compound 3-Eicosane is an alkane is noted for its potent anti-tumor activity against the human gastric SGC-7901 cell line. Likewise, Sivsubramanian and Brindha detected the aerial parts of Centratherum punctatum. Neophytadiene, a terpenoid compound has antipyretic, anti-inflammatory, anti-microbial and antioxidant activity. Correspondingly, Carretero et al. and Mendiola et al. identified Neophyadiene in Bursera simaruba and red alga Centroceras clavulatum which were used as an analgesic and vermifugic, including a topical application for sores and inflammation.

Tetracosamethyl-cyclododecasiloxane is one of the biologically active compound possessed hepato protective activity and antispasmodic, anti-rheumatic, anti-soporific baths, insecticides for mosquito control, appetizing agent, to combat indigestion, stomach pain, nausea and infection of the gall bladder. Venugopal et al. noticed the leaves of Hyptis suaveolens.

In the current research, the compound Cyclohexasiloxane, dodecamethyl- is widely used as a conditioning agent, emollient, in personal care products, lubricant and de-foaming agent. Silicone oil is a polymerized siloxane with organic side chains. Consumer products to control flatus (anti-flatulents) often contain silicone oil. Silicone oils have been used as a vitreous fluid substitute to treat difficult cases of retinal detachment, such as those complicated with proliferative vitre retinopathy, giant retinal tears, and penetrating ocular trauma. Mohan et al. and Anandhi et al. reported the presence of 9-octadecenoic acid (Z), in the aerial parts of Kirganelia reticulate and leaves of Tricalysia sphaerocarpa, respectively. 9-octadecenoic acid (Z)-, 9- octadecenyl ester, (Z)-, an fatty acid ester group has effective hypocholesterolemic, nematicide, anti-arthritic, hepatoprotective, anti-androgenic, hypocholesterolemic 5-alpha reductase inhibitor, anti-histaminic, anti-coronary, insectifuge, anti-eczemic, anti-acne. Benzene, 1-methoxy-4-(1-propenyl)-an ether compound has potent antimicrobial properties, anti-helmintic nematicidal activity, lowering of body temperature, hypnotic, analgesic, anticonvulsant effects and carcinogenicity but insufficient data.

In line with the present study, Geetha et al. and Santhosh Kumar et al. observed similar results in leaves of Elaeocarpus serratus and the whole plant of Adiantum capillus-veneris respectively. Therefore, the chemical standardization study revealed that Glochidion ellipticum is rich in secondary metabolites which possessed wide range of biological activities.

CONCLUSION: The greatest lacuna existing in herbal-based medicines are lack of standards and validation studies. Terpenoid compounds were the chief constituents in the leaves, followed by alkaloids, silicon compounds, and aromatic hydrocarbons like alkenes, alkanes and fatty acid esters. Terpenoids are vital for life of most organisms and are currently being explored as anticancer agents in clinical trials. Considering the immense bioactive potentials of Glochidion ellipticum in the present work, attempts can be made to scientifically validate and chemically standardize formulations for life threatening diseases.

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REFERENCES: