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GC-MS Analysis of Phytochemical Constituents and Nematicidal Activities of Leaf Extract of Magilam, *Mimusops elengi*

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Abstract: The aim of the study was to investigate the phytochemical analysis of methanolic leaf extract of *Mimusops elengi*. The phytochemical constituents screened by GC-MS method. In the GC-MS analysis, 9 bioactive phytochemical compounds were identified in the methanolic extract. The identification of phytochemical compounds in very high peak area Stearic acid, 3-(octadecyloxy) propyl ester with RT 12.27 has peak area 15% and Pregnane-3,11,12,14,20 – Phenol,3,12,20-triacetate 11-(hydroxyacetate), (3a,11a,12a,14a) with RT 14.32 has peak area 16.1 The main important compounds Hexadecanoic acid, methyl ester with RT 17.38 ranks with peak area 81.9%. and 10-Octadecenoic acid, methyl ester with RT 19.1 ranks with peak area 57.6 %. and Squalene with RT 28.37 ranks with peak area 100 % were analyzed.

Key words: *Mimusops elengi* · Stearic Acid · Hexadecanoic Acid · Methyl Ester · Squalene

INTRODUCTION

Plants are rich source of secondary metabolites with interesting biological activities. In general, these secondary metabolites are an important source with a variety of structural arrangements and properties. Distinguished examples of these compounds include flavonoids, phenols and phenolic glycosides, saponins and cyanogenic glycosides [1]. Natural products from microbial sources have been the primary source of antibiotics, but with the increasing recognition of herbal medicine as an alternative form of health care, the screening of medicinal plants for active compounds has become very significant because these may serve as talented sources of book antibiotic prototypes [2]. It has been shown that *in vitro* screening methods could provide the needed preliminary observations necessary to select crude plant extracts with potentially useful properties for further chemical and pharmacological investigations [3].

For past few decades compounds from natural sources have been gaining importance because of the vast chemical diversity that they offer. This had led to phenomenal increase in the demand for herbal medicines in the last two decades and or need has been felt for ensuring the quality, safety and efficacy of herbal drugs. The use of traditional plant extracts as well as other alternative forms of medical treatments has been getting momentum since the 1990s. Natural antioxidants, especially phenolic and flavonoids are safe and also bioactive. Therefore, as source of natural antioxidant much attention is being paid to plants and other organisms. Thus interested in antioxidants of plant origin has greatly increased in recent years. In recent years, there has been much interest in natural antioxidants, especially in plant polyphenols and numerous articles about their beneficial effects on health have been published. Therefore, antioxidants with free radical scavenging activities may have great relevance in the prevention and therapeutics of diseases in which oxidants or free radicals are implicated [4].

Plant kingdom represents an enormous reservoir of biologically active compounds and the knowledge of such constituents would further be valuable in discovering the actual value of folkloric remedies. *Mimusops elengi* is a medium tree growing in Southeast Asia. Leaves are glossy, dark green and wavy, oval shaped, 5-10 cm long and 2-5 cm wide [5].

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Mimusops elengi commonly known as Bakul (in India) belongs to the family Sapotaceae and is a small to large evergreen tree found all over the different parts of Bangladesh, Pakistan and India Different parts of this plant are used in the indigenous system of medicine for treatment of different ailments. In Ayurveda, the bark, flowers, fruit and seeds are of great value for treating various diseases such as cardiotonic, alexipharmic, stomachiac, astringent cooling, anthelmintic, tonic and febrifuge properties [6]. Different parts of the plant have also been reported for anti-microbial [7], anti-ulcer [8], anti-anxiety [9], anti-oxidant, hyperglycemic [10], anti hyperlipidemic [11] and antihelminthic [12]. Several triterpenoids, steroids, steroidal glycosides, flavonoids and alkaloids have been identified and reported from this plant [13]. In the present study the aqueous extract of *Mimusops elengi* was subjected to phytochemical screening, whereas the bioactive compounds were detected by high performance liquid chromatography and GC-MS analysis.

MATERIAL AND METHODS

Plant Material: Fresh *Mimusops elengi* leaves were collected from Sivakasi. The leaves were washed thoroughly with sterile distilled water, leaf material was then air dried under shade conditions and powder with the help of mixer grinder. The crude powdered sample of *Mimusops elengi* leaves (20 g) were weighed and subjected to solvent extraction for 8-10 hrs repeatedly. The powder was extracted by Vacuum rotatory evaporator with 200 mL of methanol as a solvent. The condensed extracts were used for preliminary screening of phytochemicals.

GC-MS Analysis: GC-MS analysis of these extracts were performed using a Perkin-Elmer GC Clarus 500 system and Gas chromatograph interfaced to a Mass spectrometer (GC-MS) equipped with a Elite-I, fused silica capillary column (30mmX0.25mm 1D X 1 ìMdf, composed of 100% Dimethyl poly siloxane). For GC-MS detection, an electron ionization system with ionizing energy of 70 eV was used. Helium gas (99.999%) was used as the carrier gas at constant flow rate 1ml/min and an injection volume of 2ìl was employed (split ratio of 10:1); Injector temperature 250°C; Ion-source temperature 280°C. The oven temperature was programmed from 110°C (isothermal for 2 min.), with an increase of 10°C/min, to 200°C, then 5°C/min to 280°C, ending with a 9min isothermal at 280°C. Mass spectra were taken at 70 eV; a scan interval of 0.5seconds and fragments from 45 to 450 Da.

Total GC running time was 36 minutes. The relative % amount of each component was calculated by comparing its average peak area to the total areas, software adopted to handle mass spectra and chromatograms was a Turbomass. Interpretation on mass spectrum GC-MS was conducted using the database of national Institute Standard and technology (NIST) having more than 62,000 patterns. The spectrum of the unknown component was compared with the spectrum of the known components stored in the NIST library. The Name, Molecular weight and structure of the components of the test materials were ascertained.

RESULTS AND DISCUSSION

The results pertaining to the GC-MS analysis are given in figures 1, 2, 3, 4, 5 & 6 and Table 1. Nine compounds were detected in ethanol extract of *Mimusops elengi* leaves. Among the identified phytochemicals, Stearic acid, 3-(octadecyloxy) propyl ester, Pregnane-3,11,12,14,20 – Phenol,3,12,20-triacetate 11-(hydroxyacetate), (3a,11a,12a,14a), Hexadecanoic acid, methyl ester, 10-Octadecenoic acid, methyl ester and Squalene were antihelminthic and anti bacterial, anti fungal and anti cancerus activity of the leaf extract. Rajini and Jothi Nisha [14] reported that nine bioactive

Table 1: Phytocomponents identified in the leaf methanol extracts of *Mimusops elengi*

Sr.No	Retention Time	Name of the Compound	Molecular Formula	Molecular weight	Peak Area %
1	12.27	Stearic acid 3-(octadecyloxy) propyl ester	$C_{39}H_{78}O_3$	595.03	15
2	16.13	Pregnane-3,11,12,14,20 – Phenol,3,12,20-triacetate 11-(hydroxyacetate),(3a,11a,12a,14a)	-	-	16.1
3	17.38	Hexadecanoic acid, methyl ester	$C_{17}H_{34}O_2$	270.45	17.38
4	19.1	10-Octadecenoic acid, methyl ester	$C_{19}H_{36}O_2$	296.48	19.1
5	28.37	Squalene	$C_{30}H_{50}$	410.71	28.37

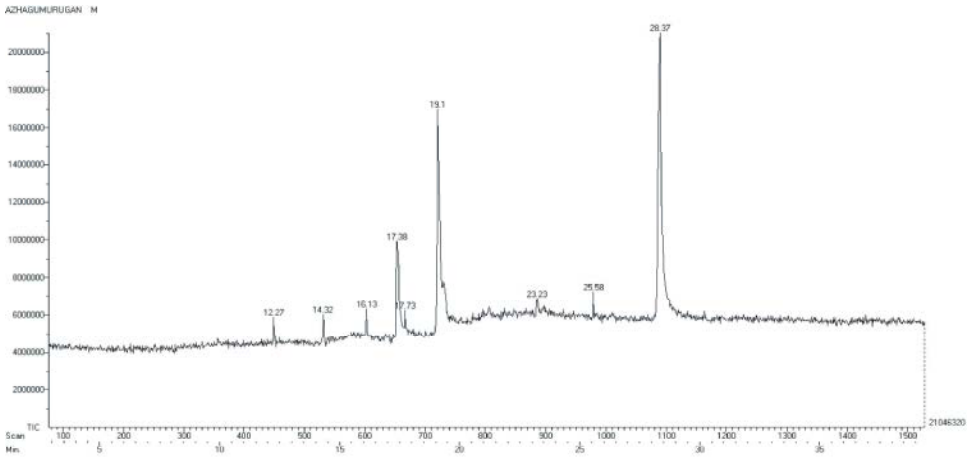

Fig 1: GC-MS chromatogram of methanolic extract of Leaf of *Mimusops elengi*.

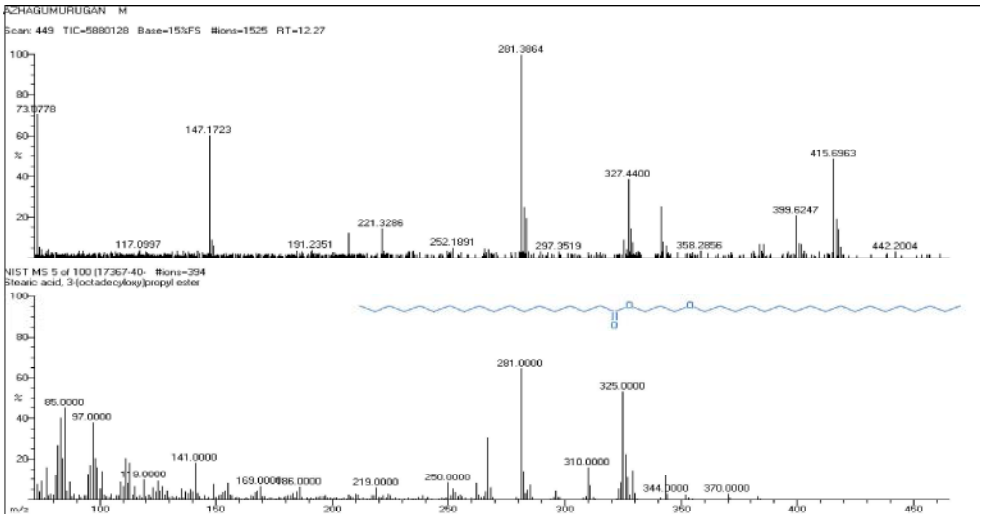

Fig 2: Mass spectrum of Stearic acid 3-(octadecyloxy) propyl ester

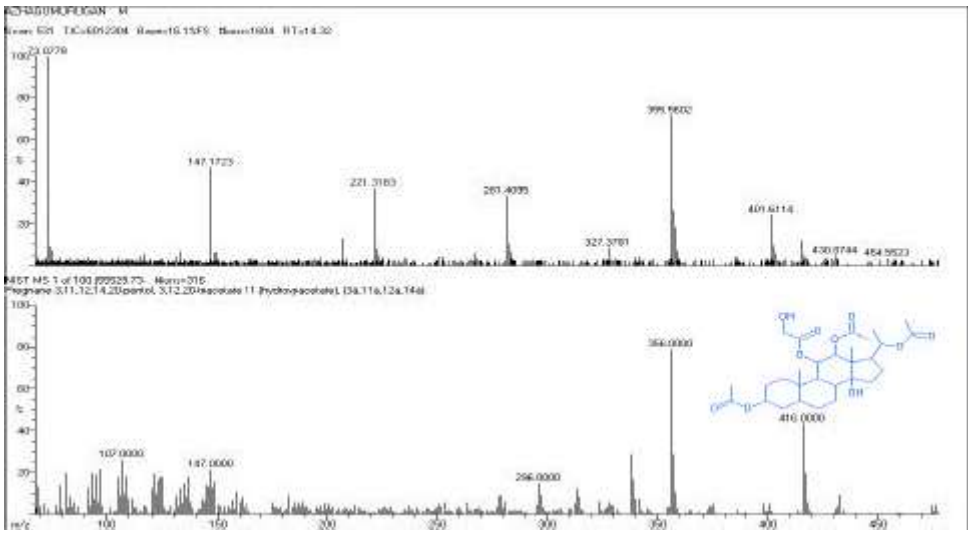

Fig 3: Mass spectrum of Pregnane-3,11,12,14,20 – Phenol,3,12,20-triacetate 11-(hydroxyacetate),(3a,11a,12a,14a)

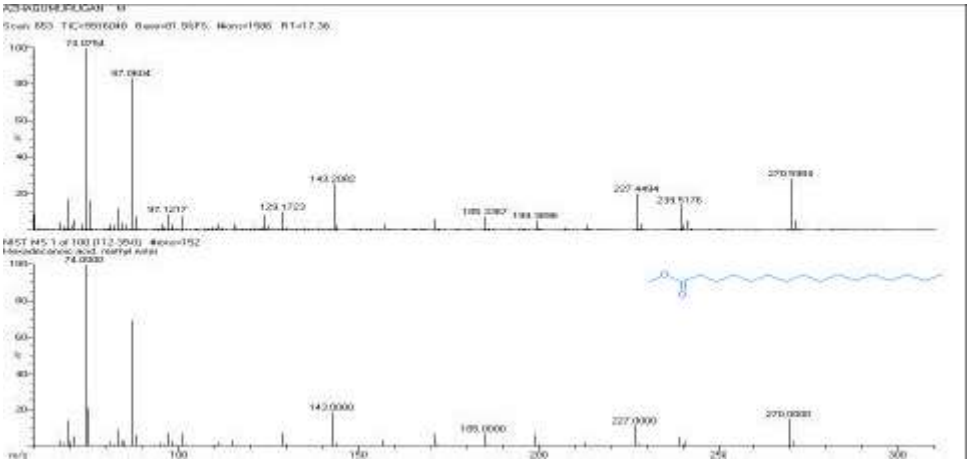

Fig 4: Mass spectrum of Hexadecanoic acid, methyl ester

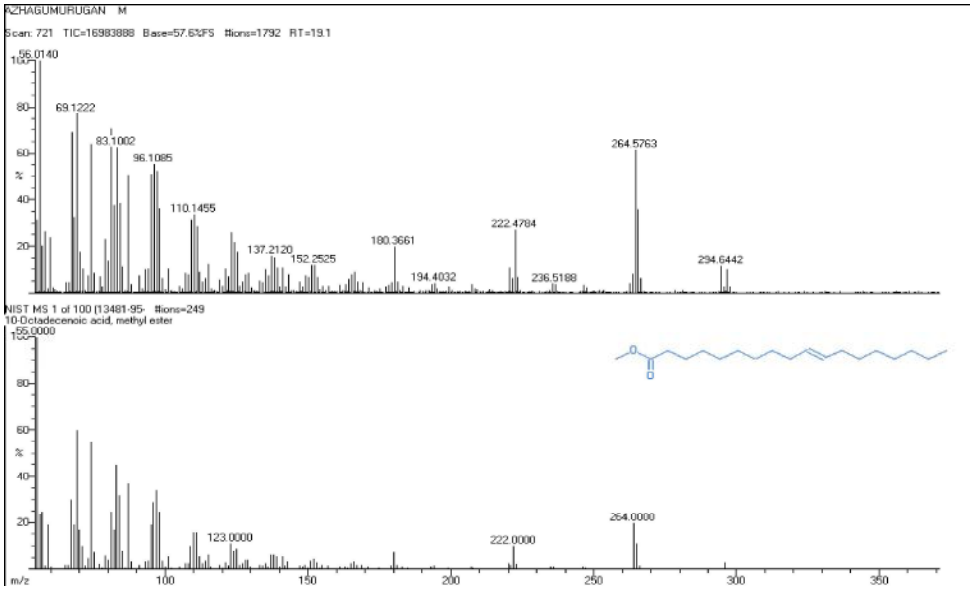

Fig 5: Mass spectrum of 10 Octadecenoic acid, methyl ester

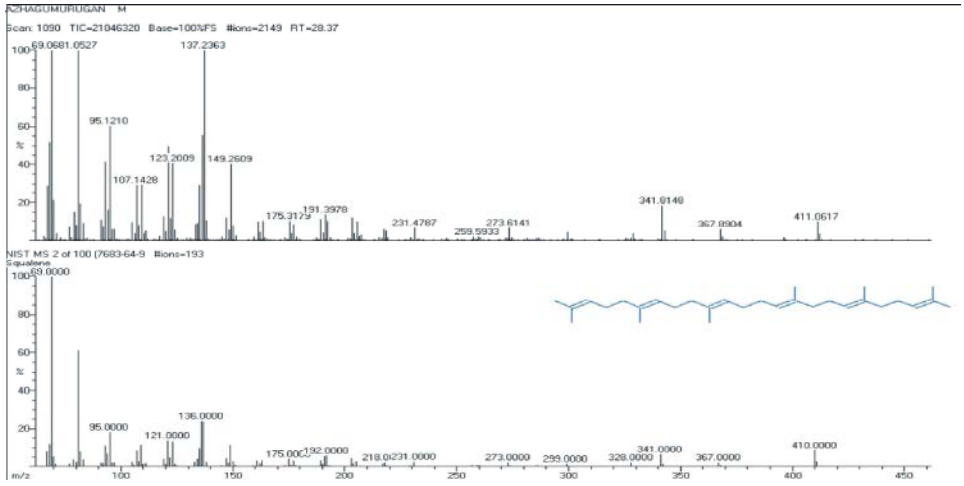

Fig 6: Mass spectrum of Squalene

compounds from the leaf of *Annona reticulata* in methanolic extract using GC-MS analysis. This compound source of bioactivity against the pathogenic microbes as well as justifying the use of this plant to treat many ailments in folk and herbal medicines. Thus, this type of GC-MS analysis is the first step towards understanding the nature of active principles in this medicinal plants and this type of study will be helpful for further detailed study.

The present study was undertaken to evaluate nematicidal activity of methanolic crude extract of *M. elengi* leaves on root knot nematode (*Meloidogyne incognita*). All the extracts exhibited concentration dependent activity at tested concentrations of 5-25 ppm. Higher activities were observed at the higher concentrations. Our study suggests these plants as potent nematicides.

CONCLUSION

In this study, the GC-MS analysis has justified the chemical compounds which uses for the phytochemical compounds were screened by the nematicidal effects were identified in the plant *Mimusops elengi* leaf extract.

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