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GC-MS ANALYSIS OF PHYTOCOMPONENTS IN THE ETHANOLIC LEAF EXTRACT OF *syzygium samarangense*

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ABSTRACT

The presence of diverse secondary metabolites has been reported from species of the genus Syzygium. However, there has been not much information available on phytochemical components and biological activity in the ethanolic extract of leaf of *Syzygium samarangense.* This study was designed to determine the phytocomponents in the ethanolic extract of leaf of *Syzygium samarangense.* GC-MS analysis of the ethanolic extract of *Syzygium samarangense* was performed using a 7890 A GC with 5975C with triple axis detector and a gas chromatograph interfaced to a mass spectrometer (GC-MS). This investigation was carried out to determine the possible chemical components from *Syzygium samarangense* by GC-MS. This analysis revealed that the ethanol extract of *Syzygium samarangense* (leaf) contained mainly a 1) 2,3-Dimethylphenol, tert-butyldimethylsilyl ether; 2) Caryophyllene; 3) 2-Isopropenyl-4a,8-dimethyl-1,2,3,4,4a,5,6,7-octahydronaphthalene; 4) β-Eudesmene; 5) α-Selinene; 6) 3,7,11,15-Tetramethyl-2-hexadecen-1-ol; 7) Hexadecanoic acid, methyl ester; 8) 9-Octadecenoic acid, methyl ester; 9) Octadecanoic acid, methyl ester; 10) Methyl docosanoate; 11) Methyl tricosanoate; 12) Methyl tetracosanoate; 13) A-Neooleana-3(5),12-diene; 14) Methyl hexacosanoate; 15) Stigmastan-3,5-diene; 16) Cycloartenol acetate; 17) Lupeol acetate; 18) α-Tocopherol. From the results, it is evident so as to *Syzygium samarangense* contains various bioactive compounds and is recommended as a plant of phytopharmaceutical importance.

Keywords: *Syzygium samarangense*, GC-MS, Alanine, Lupeol Acetate, α-Tocopherol.

INTRODUCTION

Among many such medically significant plants, *Syzigium samarangense* is one of the highly discussed species. *Syzigium samarangense* is a tropical tree growing almost 12 m tall that is distributed throughout Bangladesh, Philippines, India, Indonesia and Malaysia [1-2]. It is locally known as Jamrul. It comes in the category of minor or underutilized fruit crop. Ripe fruits are purpulish with high anthocyanin content with a pleasant, astringent taste and are processed to make vinegar, jam, jellies and squash [3]. It is multipurpose tree cultivating for varied uses as avenue tree for wind break. Due to its high tannin content bark yields a brown dye which is used in preserving fishing nets and tanning leather. The timber is used as fuel wood and preparation of different agricultural implements [4].

All Syzygium species shows rich medicinal applications. Syzygium species are known to be useful in Pain, diabetes, cough, headaches, and fever. Its potential as an effective antidiabetic agent cannot be ruled out It accredited due to the presence of the various pharmacological active phytochemicals such as alkaloids, fatty acids, steroids and tannins. In this study, the bioactive components of *Syzigium samarangense* have been evaluated using GC-MS [5-6].

Materials and Methods

Plant material

The leaves of the *Syzigium samarangense* was collected from Amboori, Trivandrum and identified by Dr. Rogimon P Thomas, HOD, Department of Botany, CMS College, Kottayam. Herbarium of the plant, *Syzigium samarangense*, was prepared and preserved in the Department of Botany, CMS College, Kottayam, Kerala, India.

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Preparation of extract

About 500 g of dried powder was extracted with solvents of different polarity in succession, starting with a highly non-polar solvent [Petroleum Ether (40-60°C)], followed by comparatively less non-polar solvents (Diethyl Ether), then with intermediate polar solvents (Chloroform) and finally with a more polar solvent (Ethanol and Water). Aqueous extract was prepared by macerating the dried drug powder in double distilled water. The extract was concentrated in water bath and stored in desiccators [7-8]

GC-MS Analysis

GC-MS was analyzed at the CARe Keralam, Koratty. For the identification of phytoconstituents which was present in the extract was done by GC- MS method [9-10]. These criteria were selected to achieve improved signal to noise ratio, better sensitivity and mass spectral integrity. The operation was carried out in electron impact (EI) mode.

Instrument Model- 7890 A GC with 5975C with triple axis detector

Column -DB 5MS 30 m x 0.250mm Diameter x 0.25 Micro Meter Thickness

Sample Preparation

Weigh 5gm ethanolic extract and keep overnight for maceration with 20ml methanol in a stoppered flask for 24 hrs. Filter and take 100 microliter of the filtrate and add 900 microliter methanol and injected to GCMS.

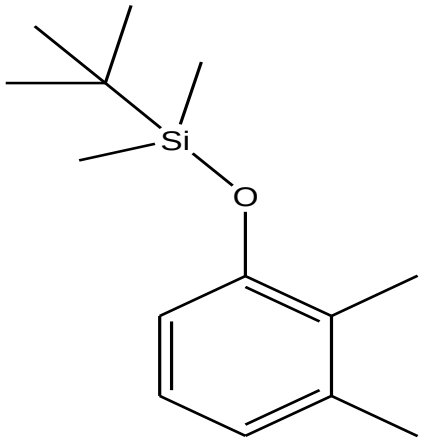
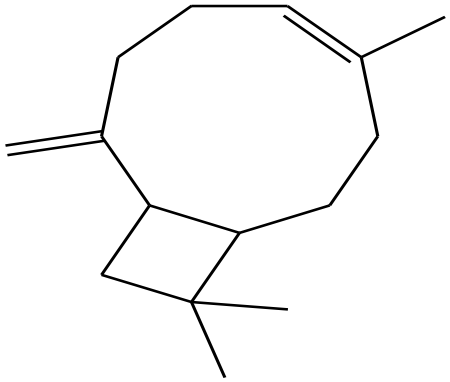
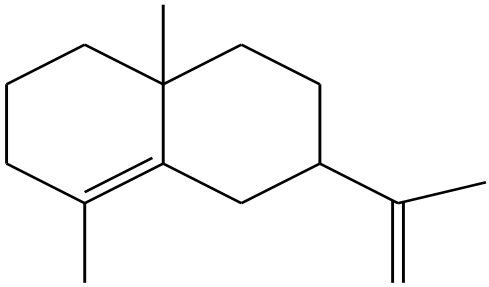
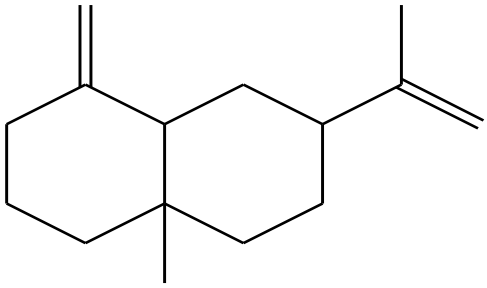
Injection Volume	3 µL
INJECTOR TEMP	280 °C
Pressure	7.0699 psi
Flow	1 mL/min
Carrier Gas	Helium
Injection Mode	Split
Library	NIST 08 Spectral Data
Ionization Temperature	80eV
Sample storage	4°C

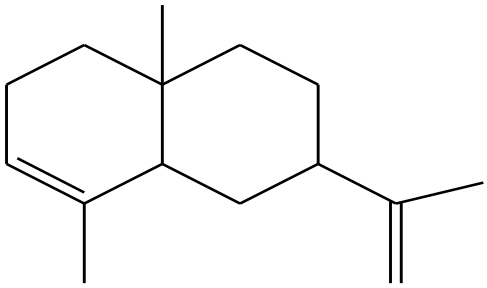
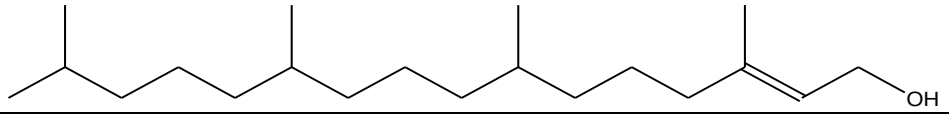
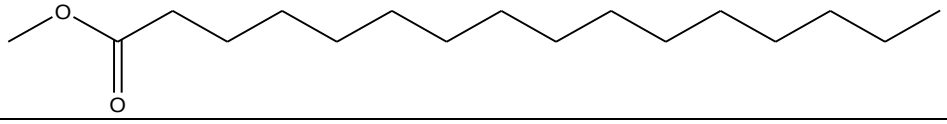
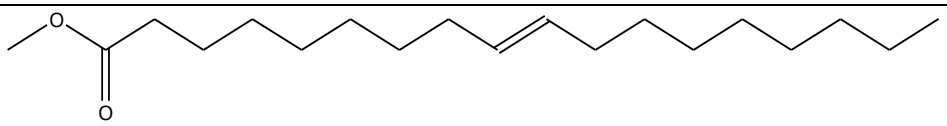
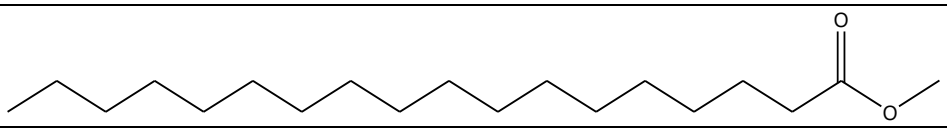
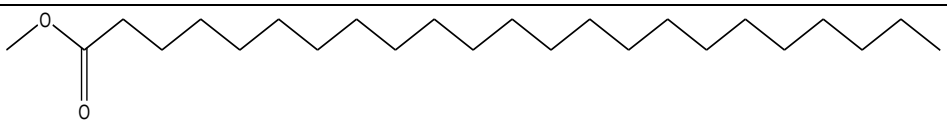
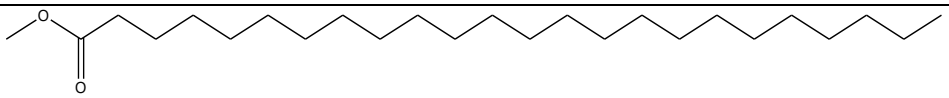
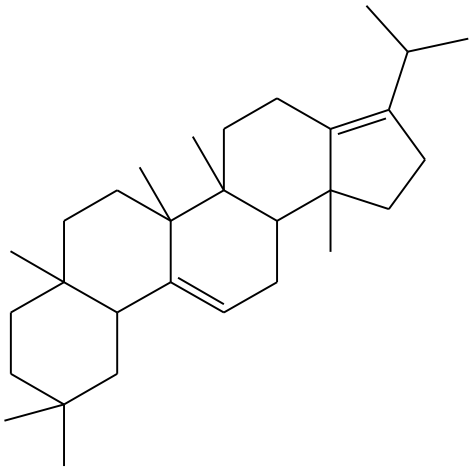
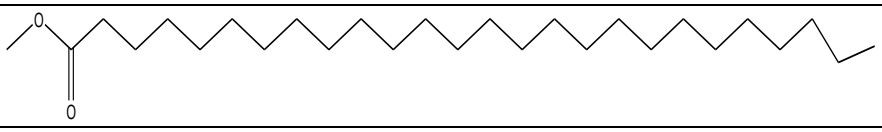
Interpretation of the mass spectrum of the ethanolic extracts was conducted using the database of the National Institute of Standard and Technology (NIST) library, having more than 62,000 spectral patterns. The spectra of the compounds were compared with the spectra of the National Institute of Standard and Technology (NIST) library database.

Table 1. Phytochemicals identified in the Ethanolic leaf extract of *Syzygium samarangense*

S.No	Retention Time	Name of the compound	Molecular Formula	Peak area (%)	Molecular Weight
01	8.467	2,3-Dimethylphenol, tert-butyldimethylsilyl ether	$C_{14}H_{24}OSi$	8.646	236
02	32.092	Caryophyllene	$C_{15}H_{24}$	4.075	204
03	33.815	2-Isopropenyl-4a,8-dimethyl-1,2,3,4,4a,5,6,7-octahydronaphthalene	$C_{15}H_{24}$	2.870	204
04	34.250	β-Eudesmene	$C_{15}H_{24}$	5.191	204
05	34.455	α-Selinene	$C_{15}H_{24}$	5.905	204
06	49.550	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	$C_{20}H_{40}O$	11.574	296
07	52.418	Hexadecanoic acid, methyl ester	$C_{17}H_{34}O_2$	9.085	270
08	56.637	9-Octadecenoic acid, methyl ester	$C_{19}H_{36}O_2$	1.966	296
09	57.245	Octadecanoic acid, methyl ester	$C_{19}H_{38}O_2$	3.027	298
10	64.464	Methyl docosanoate	$C_{23}H_{46}O_2$	3.167	354
11	66.033	Methyl tricosanoate	$C_{24}H_{48}O_2$	1.750	368
12	67.527	Methyl tetracosanoate	$C_{25}H_{50}O_2$	1.769	382
13	70.091	A-Neooleana-3(5),12-diene	$C_{30}H_{48}$	2.243	408
14	70.355	Methyl hexacosanoate	$C_{27}H_{54}O_2$	1.555	410
15	70.533	Stigmastan-3,5-diene	$C_{29}H_{48}$	2.328	396
16	72.254	Cycloartenol acetate	$C_{32}H_{52}O_2$	8.734	468
17	72.482	Lupeol acetate	$C_{32}H_{52}O_2$	2.962	468
18	73.476	α-Tocopherol	$C_{29}H_{50}O_2$	1.955	430

Table 2. Molecular structure of identified compounds from the ethanolic leaf extract of *Syzygium samarangense*

S. No	**Name of the compound**	**Molecular structure**
01	2,3-Dimethylphenol, tert-butyldimethylsilyl ether	
02	Caryophyllene	
03	2-Isopropenyl-4a,8-dimethyl-1,2,3,4,4a,5,6,7-octahydronaphthalene	
04	β-Eudesmene	

05	α-Selinene	
06	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	
07	Hexadecanoic acid, methyl ester	
08	9-Octadecenoic acid, methyl ester	
09	Octadecanoic acid, methyl ester	
10	Methyl docosanoate	
11	Methyl tricosanoate	
12	Methyl tetracosanoate	
13	A-Neooleana-3(5),12-diene	
14	Methyl hexacosanoate	

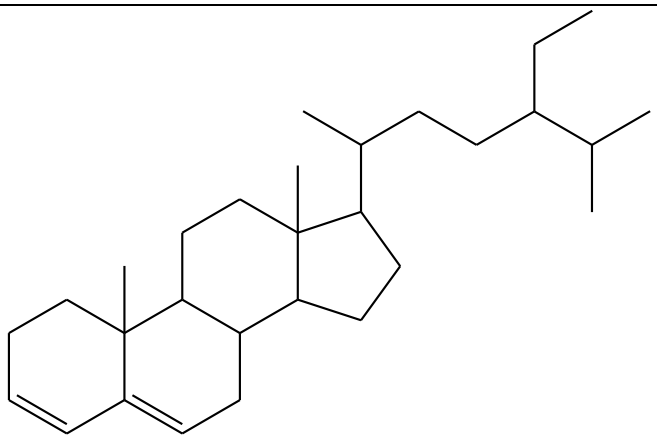
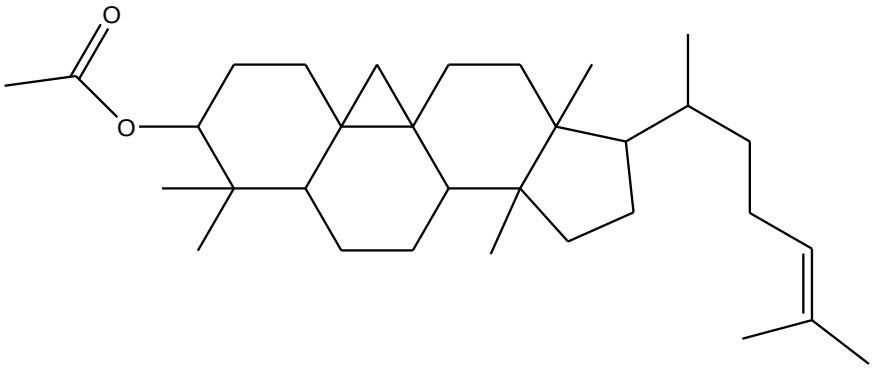
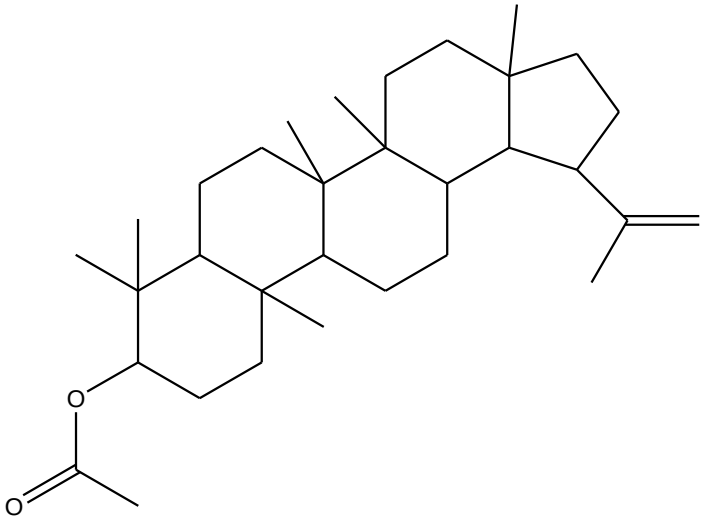
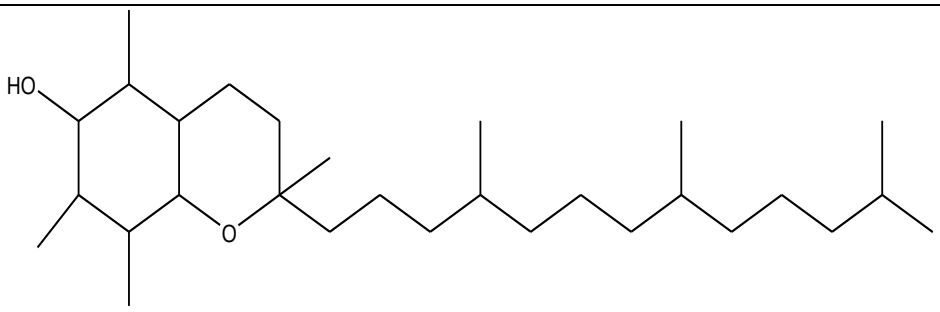
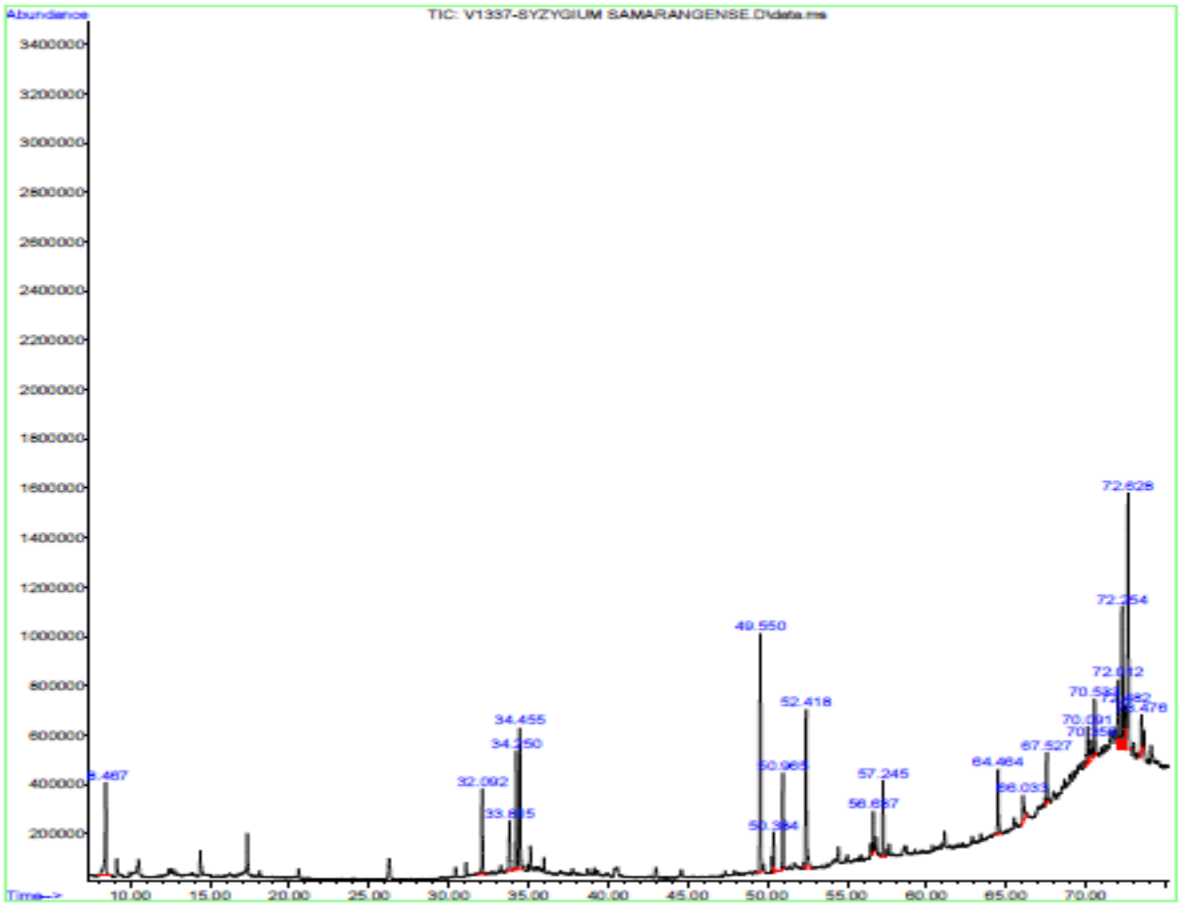
15	Stigmastan-3,5-diene	
16	Cycloartenol acetate	
17	Lupeol acetate	
18	α-Tocopherol	

Fig 1. GC-MS Chromatogram of methanolic leaf extract of *Syzygium samarangense*



RESULTS AND DISCUSSION

GC-MS chromatogram analysis of the ethanolic extract of *Syzygium samarangense* showed 18 peaks which indicating the presence of 18 phytochemical constituents. On comparison of the mass spectra of the constituents with the NIST library, the 18 phytocompounds were characterized and identified (Table 1). The active principles with their retention time (RT) molecular formula, molecular weight (MW) and molecular structure in the ethanol leaf extract of *Syzygium samarangense* revealed 18 compounds namely 1) 2,3-Dimethylphenol, tert-butyldimethylsilyl ether; 2) Caryophyllene; 3) 2-Isopropenyl-4a,8-dimethyl-1,2,3,4,4a,5,6,7-octahydro naphthalene; 4) β-Eudesmene; 5) α-Selinene; 6) 3,7,11,15-Tetramethyl-2-hexadecen-1-ol; 7) Hexadecanoic acid, methyl ester; 8) 9-Octadecenoic acid, methyl ester; 9) Octadecanoic acid, methyl ester; 10) Methyl docosanoate; 11) Methyl tricosanoate; 12) Methyl tetracosanoate; 13) A-Neooleana-3(5),12-diene; 14) Methyl hexacosanoate; 15) Stigmastan-3,5-diene; 16) Cycloartenol acetate; 17) Lupeol acetate; 18) α-Tocopherol, molecular structure of identified compound showed in Table 2 and chromatogram is showed in Figure 1.

CONCLUSION

Eighteen bioactive compounds were identified in the plant using GC-MS analysis. However, isolation of individual phytochemical constituents and subjecting it to the biological activity will be definitely giving fruitful results and will open a new area of investigation of individual components and their pharmacological potency. From these results, it could be concluded that "*Syzygium samarangense"* contains various bio-active compounds.

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