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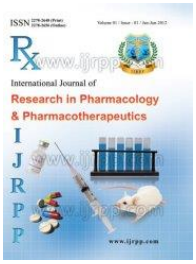

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Phytochemical Screening and GC-MS Analysis of *Diospyros montana* (Roxb.) root

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ABSTRACT

Diospyros montana (Roxb.) is one of the medicinally important plant belonging to the family Ebenaceae. It has been used by the ayurvedic practitioner in India to treat various ailments such as fever, dysuria and spermaturia. In the present study an attempt was made to investigate the phytochemical constituents present in the *Diospyros montana* (Roxb.) root. The preliminary phytochemical screening in different solvents extract was done by using standard methods. GC-MS analysis was performed on the methanolic root extract of *Diospyros montana* (Roxb.) to find out the chemical constituents. The phytochemical screening revealed the presence of carbohydrates, protein and amino acids, fixed oils and fats, saponins, sterols, alkaloids, phenols, tannins, flavonoids, anthocyanin and anthraquinones in different solvent extracts. The GC-MS study revealed the presence of about 100 bioactive compounds. The major chemical constituents are 9-Octadecenamide, (Z)- (7.88%), ç-Sitosterol (5.57%), 9-Octadecenoic acid (Z)-, 2-hydroxy-1-(hydroxymethyl) ethyl ester (5.42%), Dibutyl phthalate (4.81%),Ar-tumerone (3.52%), Cyclopentasiloxane, decamethyl- (3.28%), 6-Octadecenoic acid, methyl ester, (Z)- (3.08%), Stigmasterol (2.80%), Heptad cane, 9-hexyl- (2.27%) and Cyclohexasiloxane, dodecamethyl- (2.25%).

Keywords: Phytochemical, GC-MS, Methanol extract, *Diospyros montana* (Roxb.)

INTRODUCTION

Herbal medicines have been used from ancient time for various human diseases [1]. Medicinal plants contain biologically active compounds with specific therapeutic effects. *Diospyros montana* (Roxb.) locally known as Vik- tembhur, is also supposed as a poisonous forest tree belonging to the family Ebenaceae. It is a small deciduous tree up to 15 meters tall. The local people in forest region of Chimur tahsil, in Chandrapur district, Maharashtra (India) used the *Diospyros montana* root for the treatment of fever, dysuria and in the ailment of spermaturia. It is also reported as antidote against fish poisoning [2].

Modern pharmaceutics have been benefited from herbal plants. The specific healing effect of herbal

plants contains several phytochemical constituents [3-4]. A wide variety of secondary metabolites inclusive of alkaloids, steroids and flavonoids are responsible for therapeutic properties of plants [5]. The therapeutic achievements of the herbal plants exclusive to particular plant species or groups are consistent with the concept that the combination of secondary products in a particular plant is taxonomically distinct [6]. Biologically active principles contained in it are exploited in conventional medicine for various ailments [7]. In the past few years, GC-MS has become strongly established as a key technological metabolic profiling in both plant and non-plant species [8].

To the best of our knowledge, there is no scientific evidence to justify the traditional use of *Diospyros montana* (Roxb.) root in the ailment of spermaturia used by the local people of forest region in Chimur tahsil. The present investigation, of this work was to study the natural bioactive products and their phytochemical constituents.

MATERIAL AND METHOD

Collection of plant materials

The root of *Diospyros montana* was collected from forest region of Chimur tahsil, Chandrapur district, Maharashtra, India during November - 2014.

Preparation of root extract

The collected fresh root was cut into small pieces, dried it and then powered with a mechanical grinder and stored in a Zip lock bag. Crude plant extract was prepared by Soxhlet extraction method. 30 gm of powdered plant materials was extracted with 250 ml different solvents like petroleum ether, chloroform, ethyl acetate, acetone, methanol and water separately. The extracts were placed in glass petridishes. The total filtrate was concentrated to dryness to be used for further assays.

Qualitative phytochemical screening

Diospyros montana root extract was subjected to qualitative screening for the detection of phytochemical groups by standard protocols adopted by the various workers [9-16].

Gas Chromatography-Mass Spectrometric (GC-MS) analysis

The analysis of the volatile compounds in the methanolic root extract was performed using a THERMO TRACE 1300 GC, equipped with a TG 5MS capillary column (30m×0.25mm, 0.25µm) and a MSTSQ 8000 mass selective detector. Injector S/SL was used. For GC-MS detection an electron ionization system with ionization energy of 70 eV was used and Ion source temperature was 230○C. Helium was the carrier gas, at a flow rate of 1ml/min. The oven temperature program was 60°C (2 min) and then 10°C/min to 280°C (10 min). Injector and MS transfer line temperature were set at 250○C and 280○C respectively. The diluted samples (1/100 in methanol, v/v) of 1µl were injected manually in the split less mode. The components were identified based on the comparison of their relative retention time and mass spectra with those of standards, NIST library data of the GC-MS system and literature data.

RESULTS AND DISCUSSION

The preliminary phytochemical analysis of *Diospyros Montana* (Roxb.) root were shown in Table -1. It revealed the presence of carbohydrates and anthraquinones in the ethyl acetate, acetone, methanol and water extract. Except water protein and amino acids were present in all the five solvent extract. Fixed oils & fats and tannins were observed in all the solvent extract. Saponins were present in the water extract. Sterols and anthocyanin were observed in the methanol extract. Alkaloids were observed in methanol and water extract. Phenols and flavonoids were found in acetone, methanol and water extract. Cardiac glycosides were absent in all the solvent extracts.

The compounds present in the methanolic extract of root of *Diospyros montana* were identified by GC-MS analysis as shown in Table-2. The active components with their retention time (RT), peak area (%) and molecular formula was shown in Table- 2. The results revealed the presence of 100 bioactive compounds. The methanolic root extract of *Diospyros Montana* shows the presence of 10 major bioactive compounds such as 9-Octadecenamide, (Z)- (7.88%), ç-Sitosterol (5.57%), 9-Octadecenoic acid (Z)-,2-hydroxy-1-(hydroxymethyl) ethyl ester (5.42%), Dibutyl phthalate (4.81%), Ar-tumerone (3.52%), Cyclopentasiloxane, decamethyl- (3.28%),

6-Octadecenoic acid, methyl ester, (Z)- (3.08%), Stigmasterol (2.80%).

Heptadecane, 9-hexyl- (2.27%) and Cyclohexasiloxane, dodecamethyl- (2.25%) with retention time 21.83, 33.13, 24.37, 18.19, 15.13, 8.25, 19.44, 31.86, 21.96 and 10.74 respectively. In the present study we characterized the chemical profile of *Diospyros Montana* using GC-MS analysis. The chromatogram showed the relative concentration of various compounds getting eluted as a function of retention time. The heights of the peak indicate the relative concentrations of the components present in the plant. The mass spectrometric analyses the compound eluted at different times to identify the nature and structure of the compounds. The large compound fragments into small compounds giving rise to appearance of peaks at different M/Z ratios. These mass spectra are fingerprint of that compound which can be identified from the NIST data library. This report is the first of its kind to analyze the chemical constituents of *Diospyros montana*(Roxb.) using GC-MS analysis. In addition to this the results of the GC-MS profile can be used as pharmacognostical tool for the identification of the plant.

Table 1- Preliminary Phytochemical Screening of *Diospyros Montana* (Roxb.) Root in Various Solvent Extracts (Present- (+) Absent- (-)

Sr.	Chemical Constituents	Test	Petroleum ether (60-80°C)	Chloroform (61.2 °C)	Ethyl Acetate (77.1°C)	Acetone (56°C)	Methanol (64.7°C)	Water (100°C)
1	**Carbohydrates**	Molisch's test	-	-	-	+	+	+
		Fehling's test	-	-	+	+	+	+
		Benedict's test	-	-	+	+	+	+
2	**Protein and amino acids**	Millon's test	+	+	+	+	+	-
		Biuret test	+	+	+	+	-	-
		Ninhydrin test	-	-	+	+	+	-
3	**Fixed oils and fats**	Stain test	+	+	+	+	+	-
		Saponification test	-	-	-	-	-	-
		Sudan test	+	+	+	+	+	+
		Test for Glycerol	-	-	-	-	-	+
4	**Saponins**	Foam Test	-	-	-	-	-	+
		Froth Test	-	-	-	-	-	+
5	**Sterols**	Salkowaski test	-	-	-	-	+	-
		Libermann Burchard test	-	-	-	-	-	-
		Test for Terpenoids	-	-	-	-	-	-
6	**Alkaloids**	Mayer's test	-	-	-	-	-	-
		Hager's test	-	-	-	-	-	-
		Wagner's test	-	-	-	-	+	+
		Dragendorff's test	-	-	-	-	-	-
7	**Phenols**	Ferric chloride test	-	-	-	+	+	+
		Libermannstest	-	-	-	-	-	-

8	**Tannins**	Lead Acetate test	+	+	+	-	-	-
		Ferric chloride test	-	-	-	+	+	+
		Lead Acetate test	-	-	-	+	+	+
9	**Flavonoids**	Shinoda test	-	-	-	+	-	-
		Alkaline Reagent test	-	-	-	-	-	-
10	**Anthocyanin**	Dilute Hcl acid test	-	-	-	-	+	-
11	**Anthraquinones**	Borntragger's test	-	-	+	+	+	+
12	**Cardiac Glycosides**	KellarKilliani test	-	-	-	-	-	-

Table 2-Phytocompounds Constituents Identified from the Methanolic Root Extract of *Diospyrosmontana* by GC-MS

Sr.no	Retention Time (RT)	Peak Area (%)	Compound Analyzed	Molecular formula
1.	8.25	3.28	Cyclopentasiloxane, decamethyl-	$C_{10}H_{30}O_5Si_5$
2.	10.61	0.42	5,8-Epoxy-3H-2-benzopyran, 4,4a,5,8-tetrahydro-5,8-dimethyl-, (4aà,5à,8à)-	$C_{11}H_{14}O_2$
3.	10.74	2.25	Cyclohexasiloxane, dodecamethyl-	$C_{12}H_{36}O_6Si_6$
4.	12.97	1.21	Cycloheptasiloxane, tetradecamethyl-	$C_{14}H_{42}O_7Si_7$
5.	14.72	0.34	Cyclohexanamine, N-[8-oxo-non-2-en-1-ylidene]-	$C_{15}H_{25}NO$
6.	14.97	0.88	Cyclooctasiloxane, hexadecamethyl-	$C_{16}H_{48}O_8Si_8$
7.	15.13	3.52	Ar-tumerone	$C_{15}H_{20}O$
8.	15.54	1.75	Curlone	$C_{15}H_{22}O$
9.	16.34	0.75	7-Hydroxy-6,9a-dimethyl-3-methylene-decahydro-az uleno[4,5-b]furan-2,9-dione	$C_{15}H_{20}O_4$
10.	16.56	0.28	6,7-Epoxypregn-4-ene-9,11,18-triol-3,20-dione, 11,18-diacetate	$C_{25}H_{32}O_8$
11.	16.69	1.85	Cyclononasiloxane, octadecamethyl-	$C_{18}H_{54}O_9Si_9$
12.	16.98	0.27	9,10-Secocholesta-5,7,10(19)-triene-1,3-diol, 25-[(trimethylsilyl)oxy]-, (3á,5Z,7E)-	$C_{30}H_{52}O_3Si$
13.	17.24	0.43	à-D-Glucopyranoside, methyl 2-(acetylamino)-2-deoxy-3-O-(trimethylsilyl)-cyclic methylboronate	$C_{13}H_{26}BNO_6Si$
14.	17.58	0.24	à-D-Galactopyranose, 6-O-(trimethylsilyl)-, cyclic 1,2:3,4-bis(methylboronate)	$C_{11}H_{22}B_2O_6Si$
15.	17.75	0.76	Hexadecanoic acid, methyl ester	$C_{17}H_{34}O_2$
16.	18.19	4.81	Dibutyl phthalate	$C_{16}H_{22}O_4$
17.	18.34	1.23	5-Hydroxy-6-methyl-11,12-dioxatricyclo[7.2.1.0(1,6)]dodecane-8-carboxylic acid, methyl ester	$C_{13}H_{20}O_5$
18.	18.44	0.83	à-D-Glucofuranose, 6-O-(trimethylsilyl)-, cyclic 1,2:3,5-bis(butylboronate)	$C_{17}H_{34}B_2O_6Si$

19.	18.55	0.71	9,12,15-Octadecatrienoic acid, 2-[(trimethylsilyl)oxy]-1-[[(trimethylsilyl)oxy]methyl]ethyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
20.	18.81	0.42	9,12,15-Octadecatrienoic acid, 2-[(trimethylsilyl)oxy]-1-[[(trimethylsilyl)oxy]methyl]ethyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
21.	18.92	0.64	9,12,15-Octadecatrienoic acid, 2-[(trimethylsilyl)oxy]-1-[[(trimethylsilyl)oxy]methyl]ethyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
22.	19.26	0.16	9,12,15-Octadecatrienoic acid, 2-[(trimethylsilyl)oxy]-1-[[(trimethylsilyl)oxy]methyl]ethyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
23.	19.38	1.81	12,15-Octadecadienoic acid, methyl ester	$C_{19}H_{34}O_2$
24.	19.44	3.08	6-Octadecenoic acid, methyl ester, (Z)-	$C_{19}H_{36}O_2$
25.	19.64	0.63	Octasiloxane, 1,1,3,3,5,5,7,7,9,9,11,11,13,13,15,15-hexadecamethyl-	$C_{16}H_{50}O_7Si_8$
26.	19.73	0.23	9,12,15-Octadecatrienoic acid, 2-[(trimethylsilyl)oxy]-1-[[(trimethylsilyl)oxy]methyl]ethyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
27.	19.78	0.14	9,12,15-Octadecatrienoic acid, 2-[(trimethylsilyl)oxy]-1-[[(trimethylsilyl)oxy]methyl]ethyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
28.	19.95	1.06	9,12,15-Octadecatrienoic acid, 2-[(trimethylsilyl)oxy]-1-[[(trimethylsilyl)oxy]methyl]ethyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
29.	20.02	0.56	9,12,15-Octadecatrienoic acid, 2-[(trimethylsilyl)oxy]-1-[[(trimethylsilyl)oxy]methyl]ethyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
30.	20.12	1.10	9,12,15-Octadecatrienoic acid, 2-[(trimethylsilyl)oxy]-1-[[(trimethylsilyl)oxy]methyl]ethyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
31.	20.28	1.63	Heptadecane, 9-hexyl-	$C_{23}H_{48}$
32.	20.35	1.06	Oxiraneoctanoic acid, 3-octyl-, methyl ester	$C_{19}H_{36}O_3$
33.	20.60	0.38	Octadecane, 3-ethyl-5-(2-ethylbutyl)-	$C_{26}H_{54}$
34.	20.67	1.19	9,12,15-Octadecatrienoic acid, 2-[(trimethylsilyl)oxy]-1-[[(trimethylsilyl)oxy]methyl]ethyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
35.	20.93	0.85	9,12,15-Octadecatrienoic acid, 2-[(trimethylsilyl)oxy]-1-[[(trimethylsilyl)oxy]methyl]ethyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
36.	20.99	0.98	9,12,15-Octadecatrienoic acid, 2-[(trimethylsilyl)oxy]-1-[[(trimethylsilyl)oxy]methyl]ethyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
37.	21.13	1.56	Heptadecane, 9-hexyl-	$C_{23}H_{48}$
38.	21.21	0.29	Heptadecane, 9-hexyl-	$C_{23}H_{48}$
39.	21.32	0.32	9-Desoxo-9-x-acetoxy-3,8,12-tri-O-acetylingol	$C_{28}H_{40}O_{10}$

40.	21.45	0.22	5H-Cyclopropa[3,4]benz[1,2-e]azulen-5-one, 4,9,9a-tris(acetyloxy)-3-[(acetyloxy)methyl]-1,1a,1b ,4,4a,7a,7b,8,9,9a-decahydro-4a,7b-dihydroxy-1,1,6 ,8-tetramethyl-	$C_{28}H_{36}O_{11}$
41.	21.72	0.13	Strychane, 1-acetyl-20à-hydroxy-16-methylene-	$C_{21}H_{26}N_2O_2$
42.	21.83	7.88	9-Octadecenamide, (Z)-	$C_{18}H_{35}NO$
43.	21.96	2.27	Heptadecane, 9-hexyl-	$C_{23}H_{48}$
44.	22.04	0.13	18,19-Secoyohimban-19-oic acid, 16,17,20,21-tetradehydro-16-(hydroxymethyl)-methyl ester, (15á,16E)-	$C_{21}H_{24}N_2O_3$
45.	22.11	0.35	Cyclodecasiloxane, eicosamethyl-	$C_{20}H_{60}O_{10}Si_{10}$
46.	22.28	0.27	9-Octadecenoic acid, (2-phenyl-1,3-dioxolan-4-yl)methyl ester, cis-	$C_{28}H_{44}O_4$
47.	22.76	2.01	Octadecane, 3-ethyl-5-(2-ethylbutyl)-	$C_{26}H_{54}$
48.	22.86	0.18	9,12,15-Octadecatrienoic acid, 2-[(trimethylsilyl)oxy]-1-[[(trimethylsilyl)oxy]methyl]ethyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
49.	22.98	0.91	9,12,15-Octadecatrienoic acid, 2,3-bis[(trimethylsilyl)oxy]propyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
50.	23.09	0.25	9,12,15-Octadecatrienoic acid, 2,3-bis[(trimethylsilyl)oxy]propyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
51.	23.23	1.49	Propanoic acid, 2-(3-acetoxy-4,4,14-trimethylandrost-8-en-17-yl)-	$C_{27}H_{42}O_4$
52.	23.53	1.56	Octadecane, 3-ethyl-5-(2-ethylbutyl)-	$C_{26}H_{54}$
53.	23.73	0.34	9,12,15-Octadecatrienoic acid, 2,3-bis[(trimethylsilyl)oxy]propyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
54.	23.81	0.69	9,12,15-Octadecatrienoic acid, 2,3-bis[(trimethylsilyl)oxy]propyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
55.	23.99	0.24	9,12,15-Octadecatrienoic acid, 2,3-bis[(trimethylsilyl)oxy]propyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
56.	24.05	0.30	9,12,15-Octadecatrienoic acid, 2,3-bis[(trimethylsilyl)oxy]propyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
57.	24.28	1.36	Octadecane, 3-ethyl-5-(2-ethylbutyl)-	$C_{26}H_{54}$
58.	24.37	5.42	9-Octadecenoic acid (Z)-,2-hydroxy-1-(hydroxymethyl)ethyl ester	$C_{21}H_{40}O_4$
59.	24.56	0.29	9-Desoxo-9-x-acetoxy-3,8,12-tri-O-acetylingol	$C_{28}H_{40}O_{10}$
60.	24.78	0.20	Phorbol 12,13-dihexanoate	$C_{32}H_{48}O_8$
61.	24.87	0.38	2,4-Imidazolidinedione, 5-[3,4-bis[(trimethylsilyl)oxy] phenyl]-3-methyl-5-phenyl-1-(trimethylsilyl)-	$C_{25}H_{40}N_2O_4Si_3$
62.	24.94	0.16	5H-Cyclopropa[3,4]benz[1,2-e]azulen-5-one, 9,9a-bis(acetyloxy)-1,1a,1b,2,4a,7a,7b,8,9,9a-decahy dro-2,4a,7b-trihydroxy-3-(hydroxymethyl)-1,1,6,8-te tramethyl-, [1aR-(1aà,1bá,2á,4aá,7aà,7bà,8à,9á,9aà)]-	$C_{24}H_{32}O_9$
63.	25.10	1.35	Octadecane, 3-ethyl-5-(2-ethylbutyl)-	$C_{26}H_{54}$
64.	25.25	0.40	Olean-12-ene-3,15,16,21,22,28-hexol, (3á,15à,16à,21á,22à)-	$C_{30}H_{50}O_6$
65.	25.36	1.73	4H-Cyclopropa[5',6']benz[1',2':7,8] azuleno[5,6] oxiren-4-one, 8,8a-bis(acetyloxy)-2a-[(acetyloxy)methyl]-1,1a,1b, 1c,2a,3,3a,6a,6b,7,8,8a-dodecahydro-6b-hydroxy-3amethoxy-1,1,5,7-tetramethyl-, [1aR-(1aà,1bá,1cá,2aá,3aà,6aà,6bà,7à,8á,8aà)]-	$C_{27}H_{36}O_{10}$

66.	25.44	1.00	Propanoic acid, 2-(3-acetoxy-4,4,14-trimethylandrost-8-en-17-yl)-	$C_{27}H_{42}O_4$
67.	25.81	0.20	9,12,15-Octadecatrienoic acid, 2,3-bis[(trimethylsilyl)oxy]propyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
68.	26.06	0.88	Octadecane, 3-ethyl-5-(2-ethylbutyl)-	$C_{26}H_{54}$
69.	26.17	0.93	Rhodopin	$C_{40}H_{58}O$
70.	26.26	0.53	9,12,15-Octadecatrienoic acid, 2,3-bis[(trimethylsilyl)oxy]propyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
71.	26.39	0.30	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
72.	26.56	0.44	9,12,15-Octadecatrienoic acid, 2,3-bis[(trimethylsilyl)oxy]propyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
73.	26.74	0.27	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
74.	26.88	0.81	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
75.	27.11	0.31	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
76.	27.19	0.55	9,12,15-Octadecatrienoic acid, 2,3-bis[(trimethylsilyl)oxy]propyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
77.	27.29	0.51	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
78.	27.93	0.22	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
79.	28.11	0.26	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
80.	28.23	0.30	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
81.	28.49	0.20	9,12,15-Octadecatrienoic acid, 2,3-bis[(trimethylsilyl)oxy]propyl ester, (Z,Z,Z)-	$C_{27}H_{52}O_4Si_2$
82.	28.55	0.42	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
83.	28.68	1.20	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
84.	29.03	0.31	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
85.	29.22	0.25	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
86.	29.40	1.74	à-Tocopherol-á-D-mannoside	$C_{35}H_{60}O_7$
87.	29.65	0.23	Glycine, N-[(3à,5á,7à,12à)-24-oxo-3,7,12-tris[(trimethylsilyl)oxy]cholan-24-yl]-, methyl ester	$C_{36}H_{69}NO_6Si_3$
88.	31.02	0.16	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
89.	31.27	0.57	Astaxanthin	$C_{40}H_{52}O_4$
90.	31.43	0.26	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
91.	31.86	2.80	Stigmasterol	$C_{29}H_{48}O$
92.	31.99	0.28	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
93.	32.10	0.32	psi.,.psi.-Carotene 1,1',2,2'-tetrahydro-1,1'-dimethoxy-	$C_{42}H_{64}O_2$
94.	32.25	0.24	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
95.	32.47	0.20	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
96.	32.58	0.41	1-Monolinoleoylglycerol trimethylsilyl ether	$C_{27}H_{54}O_4Si_2$
97.	33.13	5.57	ç-Sitosterol	$C_{29}H_{50}O$
98.	33.54	1.34	Astaxanthin	$C_{40}H_{52}O_4$
99.	33.95	0.74	4H-Cyclopropa[5',6']benz[1',2':7,8]azuleno[5,6-b]o xiren-4-one, 8,8a-bis(acetyloxy)-2a-[(acetyloxy)methyl]-1,1a,1b,1 c,2a,3,3a,6a,6b,7,8,8a-dodecahydro-3,3a,6b-trihydr oxy-1,1,5,7-tetramethyl-	$C_{26}H_{34}O_{11}$
100	33.99	0.83	4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a,5,6,6a,6b, 7,8,8a,9,10,11,12,12a,14,14a,14b-octadecahydro-2H -picen-3-one	$C_{30}H_{48}O$

GC-MS analysis showed the existence of various compounds with different chemical structures. The presence of various bioactive compounds confirms application of *Diospyros Montana* for various ailments by traditional practitioners. However, isolation of individual phytochemical constituents

may proceed to find a novel drug or a lead compound.

CONCLUSION

In the present study, 100 components from the root of *Diospyros Montana* were identified by GC-MS analysis. The presences of various bioactive compounds in the root of *Diospyros Montana* shows their medicinal importance. However, isolation of individual phytochemical constituents and subjecting it to biological activity will definitely give fruitful results. So it is recommended as a plant for phytopharmaceutical importance. However, further studies are needed to undertake its bioactivity and toxicity profile.

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REFERENCES

[1]. Arokiyaraj S., Radha R., Martin S. and Perinbam K., Phytochemical analysis and antidiabetic activity of *Cadabafruticosa* R.Br. *Indian Journal of Science and Technolology*, 1, 2008, 1-4.

[2]. KrantiRai and ElaTiwari, A Poisonous Forest Tree "Vishtendu" (*Diospyrosmontana*Roxb.): Taxonomic Evaluation. *Int. J. of Sci. Res.*, 3(10), 2014, 48-51.

[3]. Sivakumar T. and Gajalakshmi D., *Invitro* antioxidant and chemical constituents from the leaves of *Ormocarpumcochinchinense*Elumbotti. *American Journal of Plant Physiology*. 8(3), 2013, 114-122

[4]. Sivakumar T. and Gajalakshmi D., Gas chromatography – Mass spectroscopy analysis of *Ormocarpumcochinchinense* Leaf Extract-Traditional bone healing plants. *International Journal of Pharmaceutical Research and Bio Science*, 3(2), 2014, 352-359

[5]. Kaur S., Michael H., Arora S., Harkonen P.L., and Kumar S., The in-vitro cytotoxic and apoptotic activity of Triphala- an Indian herbal drug. *Journal of Ethanopharmcology*, 10, 2005, 15-20.

[6]. Wink D.K., Vodovotz Y. and Grishan M.B., Antioxidant effects of nitric oxide. *Methods of Enzymology*, 301, 1999, 413-424.

[7]. Srinivasan K., Natarajan D. and Dheen M., (2006) Antibacterial activity of selected medicinal plants. *Ham Med.*, 2: 5-8.

[8]. Janakiraman N., Johnson M. and Sahaya Sathish S., GC-MS analysis of bioactive constitutes (Acanthaceae). *Asian Specific Journal of Tropical Biomedicine*, 2012, 546-549

[9]. Amarasingham R.P., Biset N.G., Millard P.H. and Woods M.C., Phytochemical Survey of Malaya part II. Alkaloids and Saponins. *J. Econ. Bot*., 18, 1964, 270-278

[10]. Bazarbarua A., Text book of Practical Plant Chemistry S. Chand and Co. Ltd., New Delhi 2000.

[11]. Daniel M., Methods In: Plant Chemistry and Economic Botany. Kalyani publishers New Delhi. 1991, 63-64.

[12]. Das A.K. and Bhattacharjee A.K., A systemic approach to phytochemical screening. *Tropical Science*, 12, 1970, 54-58.

[13]. Harborne J.B., Phytochemical Methods. Chapman and Hall, London 1973.

[14]. Kokate C.K., Plant Constituents In: Practical Pharmacognosy. Delhi: Vallabh Prakashan. 1, 1986, 111- 115.

[15]. Sofowora A.E., Medicinal Plants and Traditional Medicines in Africa. Spectrum Books Ltd., Ibadan, Nigeria. 2, 1993, 191-289.

[16]. Trease G.E. and Evans M.C., Textbook of Pharmacognosy. 14, 1997, 24–28, 13–53