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STUDY OF CHEMICAL CONSTITUENTS OF BLUMEA LACERA (BURM. F.) D.C. AVAILABLE FROM BHAGALPUR, BIHAR, INDIA

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Natural products have played a highly significant role over the years in the discovery of new drugs. Blumea lacera (Burm. f.) D.C., an important medicinal plant belongs to the family Asteracea (Compositae). This medicinal plant is wide spread and is common up to Bhagalpur, Bihar. The main objective of this article is studied for its chemical constituents like Hydrocarbon, Heterocyclic compounds, Flavonoids, Steroids, Terpenoids, Amino acid and carbohydrate etc.

KEYWORDS : Blumea lacera, Asteraceae, Hydrocarbon, Heterocyclic compounds, Ketone.

INTRODUCTION

Use of herbal medicines are known to us since time immemorial. India has got a rich heritage of knowledge on plant based drugs both for use in curative and preventive medicine. Ancient Scholars, Charak, Sushruta, Bhagwatta and several others have given remarkable description of Indian Medicinal Plants in Atharvaveda. "Charak Samhita" is one of the earliest treatises of "Ayurveda" (about 6000 B.C.). Since then several books have been written detailing the use of plant for the cure of diseases. The texts-Charak Samhita, Sushruta Samhita, Ashtanga Hridyam etc. show that the knowledge of disease and drugs was to a large extent derived from observation and inference. The colour, shape, habit or other physical characteristics of a plant were indicative of it's medicinal value. For example, the yellow colour of saffron (*Crocus sativus*) served to point out its value in liver disorders; the serpentine shape of *Rauwolfia* roots indicated that they should be useful in the treatment of snake-bite etc. Certain plants were found useful for the treatment of some myriad illness (Arbev, 1953).

A number of world repute research centres such as National Cancer Institute, USA; Central Drug Research Institute, India; Bose Institute, India and many of the Ayurvedic Companies are trying to save the plants, screen their biological activities and isolate the medicinally active compounds. However, it is very unfortunate that due to lack of an

interaction among the biologist, chemists and Pharmacists (Farnsworth, 1984), success in this field is only limited.

In China, an outstanding progress has been made in bringing together the principles of traditional and modern medicinal system by applying most sophisticated scientific missionaries to traditional drug (Chang *et.al.,* 1985)

The compound Yeuhchukene is an example of the success of a multidisciplinary 'research team' approach and was isolated as a part of the Task Force Programme of World Health Organisation (WHO) for developing new birth-control agents (Waterman 1989).

The present Phylochemical investigation will be useful for the researchers and pharmacists to locate the source of active principles of plants. Those cases, where it is present in abundance, could itself be taken as an excellent source for medicinal exploitation, where as certain phytochemical compounds, which have medicinal properties, yet they are present in very small quantity, in nature, can be easily synthesised for pharmacological purposes.

There are several medicinal plants, which are frequently used by the tribal/rural people for the cure of disease. Collection and study of plants of Bhagalpur can be traced back to year 1809-1813, when Buchman-Hamilton visited this area in course of plant exploration tour of Bihar and Nepal. Later on, Haines (1961) and Varma (1981) carried on the survey of the flora of Bhagalpur from taxonomic point of view. But no attempts have been made to know the constituent group of chemical compounds in the plants of this area.

The plant *Blumea Lacera* occurs throughout the plains of India from the north-west ascending to 2,000 ft in the Himalayas. It is a common roadside weed in Ceylon and Malaya. It is distributed to the Malay islands, Australia, China and Tropical Africa. *Blumea* consists of about 81 species (Caius, 1986). In many parts of India, *Blumea* is cultivated for its green leaves and roots. *Blumea* is late kharif crop in these parts (Oudhia and Tripathi, 1999b). This plant is useful in case of bleeding piles (Ghosh, 1988). Recently this fact has been authenticated by (Vastrad and Pakkanavar, 2002).

In Bhagalpur locality, this plant is popularly called "Kukurondha" in folk medicine. *Blumea* in Ayurveda is described as an acrid, antipyretic, liver tonic and Anti - inflammatory (Warrier, *et.al*. 1996). Essential oil from *Blumea* has been shown Analgesic, Hypothermic and tranquilizing action (Anonymous, 1972).

Leaf paste of *Blumea lacera* prepared by mixing with mother's milk is applied over the eye twice a day for two weeks for improving vision (Indian J. Traditional knowledge, 2007). Root paste of *Blumea lacera* is taken with honey three times a day to cure diarrhoea (Sen *et.al.* 2008, Indian J. Traditional knowledge). It is also known to cure bronchitis, blood diseases and fevers, Chidaduang, *et.al.* (2005). The expressed juice of the leaves is used as an anthelmintic, febrifuge, astringent and diuretic; mixed with black pepper, it is given in bleeding piles; root mixed with black pepper is given in cholera. The plant is also capable of yielding fairly large amount of camphor, Chopra *et.al.* (2008).

The fresh juice of Kukurondha leaf is used as drops or the leaf is made into paste and applied over wound associated with pus. In case of external pile mass, the paste of the leaf is made into paste and applied over the area having pile mass. In case of internal piles, small tablet is prepared from the paste of the leaf along with powder of black pepper and given internally. No adverse effect is reported or known after the usage of Kukurondha.

The photochemical study of *Blumea lacera* (Burm. f.) D.C. reveals the presence of Alkaloids, Flavonoids, Steroid, Terpenoids, Hydrocarbon, polyphenol etc. Very little chemical work has been reported on this medicinal plant. Campestrol (Steroid) has been isolated from

the aerial parts and 5-hydroxy-3,6,7,3',4'- Pentamethoxy flavone and 5,3'4,'-trihydroxy flavone have been isolated from leaves (Rastogi and Mehrotra, 1991). The presence of coniferyl alcohol diangelate, thymol-3-0-ß-glucoside, ß-sitosteryl-3-0-ß-D-glucopyranoside and stigmastery1-3-0-ß-D-glucopyranonside were reported by Chindaduang *et.al.* 2005. Two new glycosides, the triterpenoid glycoside 19α-hydroxyurs-12-ene-24,28-dioate 3-O-ß-D-xylopyranoside and the phenol glycoside 2-isoprenyl-5-isopropylphenol 4-O-ß-D-xylopyranoside have been isolated from the whole plant Rashmi *et.al.* 1995. So far the presence of other compounds were studied in my research work.

In the light of above mentioned facts, we can easily realize the medicinal importance of *Blumea lacera* but very little; sporadic and limited information is available so far as phytochemical investigation is concerned. Through my present work, l have tried to explore this plant species bearing tremendous medicinal prodigious. Effort has also been taken to develop an herbal antiseptic/germicidal from the plants extract/important targeted plant metabolites.

Experimental

The Blumea Lacera, a medicinal plant, describe in the present study was collected from the campus of Bihar Agriculture College, Sabour, District-Bhagalpur and its surrounding area. This plant was brought to the laboratory in a loosely packed plastic bag. Plant was identified with the help of taxonomist in the University Department of Botany, Tilkamanjhi Bhagalpur University Bhagalpur. The plants were gathered and cleaned which involved screening, washing and stripping leaves from stems. The unnecessary parts were removed prior to drying avoid wasting of time and energy. Cleaning was also done by hand. Once drying was completed, plants were packaged in preparation for further processing. Dried plant materials tend to be hygroscopic so, these were stored under controlled humidity. It was then grinded to powder form by using a grinding machine in the laboratory of Post Graduate Department of Chemistry, Tilkamanjhi Bhagalpur University, Bhagalpur. 100 gm of powder of plant was immersed into 1000 ml petroleum ether (60º-80ºC) in 2.5 litre reagent bottle for 96 hours with shaking after several intervals (Harborne, 1976). After 96 hours it was then filtered and the filtrated was again immersed in the same way for another three times. All the filtrate were combined and evaporated under reduced pressure using rotary film evaporator. After evaporation 2.84 gm extract (by weight) was isolated and this extract was kept for further chemical studies. This is my research work.

Result and discussion

From the petroleum ether (60º-80ºC) extracts of the whole plants of *Blumea lacera*, altogether ten compounds were isolated. On the basis of chromatographic and spectroscopic studies (GC-Mass spectral data), these compounds were identified as 2,6,10-trimethyl-14-Ethylene-14-Pentadecene (Neophytadiene) (I), Tetradecane (II), 2-Pentadecanone-6,10,14-trimethyl (Hexahydrofarnesyl acetone) (III), 12-Oxabicyclo [9.1.0] dodeca-3,7-diene-1,5,5,8-tetramethyl-[1R-(1R*,3E,7E,11R*)] (IV), (-)-beta-Caryophyllene Epoxide (V), Hexadecane (Cetane) (VI), alpha-Humulene (alpha-Caryophyllene) (VII), Pentadecane (VIII), (E)-beta-Farnesene (IX), Benzene-2-(1,1-dimethylethyl)-1,4-dimethoxy (1,4-Dimethoxy-2-tert-butylbenzene) (X).

Among them 2, 6,10-trimethyl-14-Ethylene-14-Pentadecene (Neophytadiene), (-)-beta-Caryophyllene Epoxide, Hexadecane (Cetane), alpha-Humulene (alpha-Caryophyllene) and (E)-beta-Farnesene was earlier reported by various author and Tetradecane, 2-Pentadecanone-6,10,14-trimethyl (Hexahydrofarnesyl acetone), 12-Oxabicyclo [9.1.0] dodeca-3,7-diene-1,5,5,8-tetramethyl-[1R-(1R*,3E,7E,11R*)], Pentadecane and Benzene-2-(1,1-dimethylethyl)-1,4-dimethoxy (1,4-Dimethoxy-2-tert-butylbenzene) are new record from my research work. These compounds are authenticated by Gas Chromatography-Mass Spectroscopy techniques. The graph of Gas Chromatography-Mass Spectroscopy is given below.

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Operator  : R.K.PANDEY
Acquired  : 20 Apr 2010  20:04     using AcqMethod DB-624-30M-AB.M
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Sample Name: (16-02-10) 104-S3-SAMPLE
Misc Info  :
Vial Number: 1
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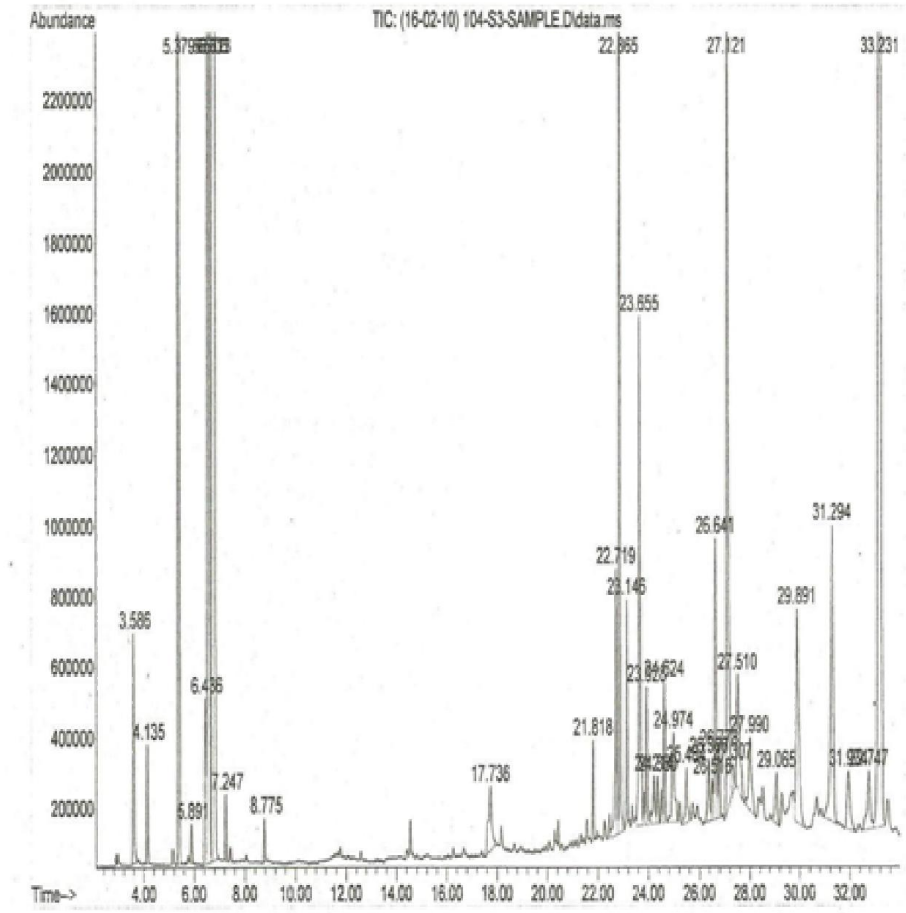

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Sample : (16-02-10) 104-S3-SAMPLE
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration Parameters: autoint1.e
Integrator: ChemStation

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Title :

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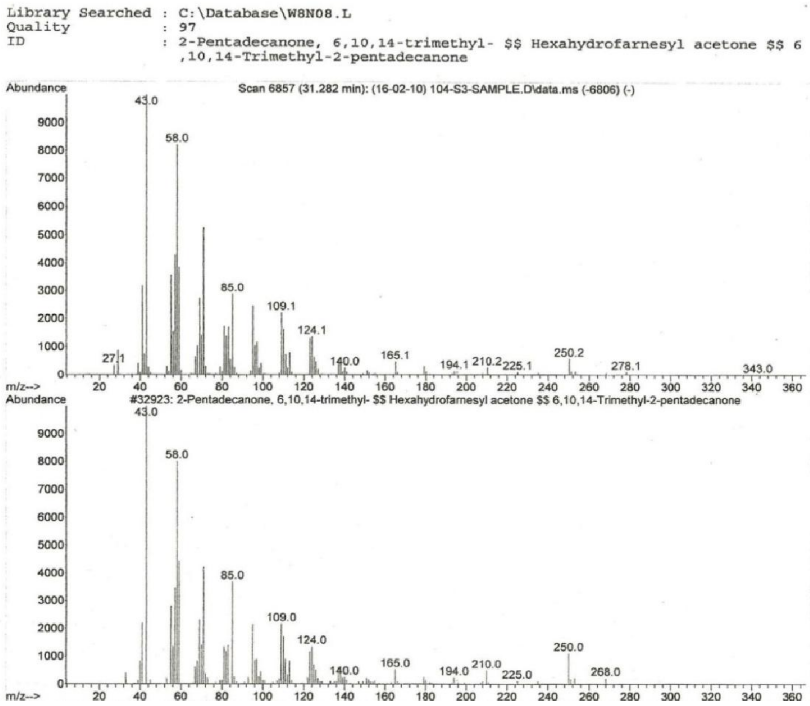
peak #	R.T. min	first scan	max scan	last scan	PK TY	peak height	corr. area	corr. % max.	% of total
1	3.586	752	768	804	BB	653006	22815047	2.24%	0.843%
2	4.135	870	889	914	BB	337401	9942195	0.97%	0.368%
3	5.379	1142	1162	1191	BB	7247815	225684054	22.12%	8.343%
4	5.891	1258	1275	1297	BB	109286	3816679	0.37%	0.141%
5	6.436	1374	1395	1403	BV	470711	16595192	1.63%	0.613%
6	6.572	1403	1425	1443	VV	4523405	207599666	20.35%	7.674%
7	6.703	1443	1454	1457	VV 3	12460993	188601692	18.49%	6.972%
8	6.813	1457	1478	1511	VB 3	17071073	1020201919	100.00%	37.714%
9	7.247	1549	1573	1596	BB	187693	5861770	0.57%	0.217%
10	8.775	1886	1909	1930	BB 2	123264	3772658	0.37%	0.139%
11	17.736	3832	3879	3931	BB	183048	16834129	1.65%	0.622%
12	21.818	4751	4776	4789	BV 2	280813	7333677	0.72%	0.271%
13	22.719	4927	4974	4988	VV	748755	28602095	2.80%	1.057%
14	22.865	4988	5007	5042	VV	4387112	126082422	12.36%	4.661%
15	23.146	5042	5068	5082	PV 3	635522	19485714	1.91%	0.720%
16	23.655	5148	5180	5208	VV	1437395	59410804	5.82%	2.196%
17	23.928	5228	5240	5263	VV	390417	12792598	1.25%	0.473%
18	24.214	5280	5303	5321	VV 4	135449	6814229	0.67%	0.252%
19	24.360	5321	5335	5352	VV 4	133522	5676567	0.56%	0.210%
20	24.624	5379	5393	5417	VB 2	397975	14014062	1.37%	0.518%
21	24.974	5418	5470	5510	BV 10	253242	18949163	1.86%	0.700%
22	25.484	5545	5582	5617	BV 9	156732	9108007	0.89%	0.337%
23	26.366	5734	5776	5794	BV 3	177822	8730515	0.86%	0.323%
24	26.516	5794	5809	5818	VV 2	116198	4955782	0.49%	0.183%
25	26.641	5818	5837	5854	VV	794594	37484227	3.67%	1.386%
26	26.778	5854	5867	5887	VV 4	190880	8693409	0.85%	0.321%
27	27.121	5913	5942	5975	BV 4	2222428	120620236	11.82%	4.459%
28	27.307	5975	5983	6006	VB 4	81631	4761406	0.47%	0.176%
29	27.510	6009	6028	6087	BV 5	323223	25688322	2.52%	0.950%
30	27.990	6087	6133	6189	PV 5	205356	16951177	1.66%	0.627%
31	29.065	6332	6370	6396	BV 8	145387	9649474	0.95%	0.357%
32	29.891	6529	6551	6629	VB 6	604536	47842343	4.69%	1.769%
33	31.294	6783	6860	6905	BB 5	839314	67135013	6.58%	2.482%
34	31.934	6956	7000	7065	BB 8	165032	14614603	1.43%	0.540%
35	32.747	7112	7179	7220	BV 8	165483	15098452	1.48%	0.558%
36	33.231	7220	7286	7320	VV	3665152	292913758	28.71%	10.828%

Sum of corrected areas: 2705133057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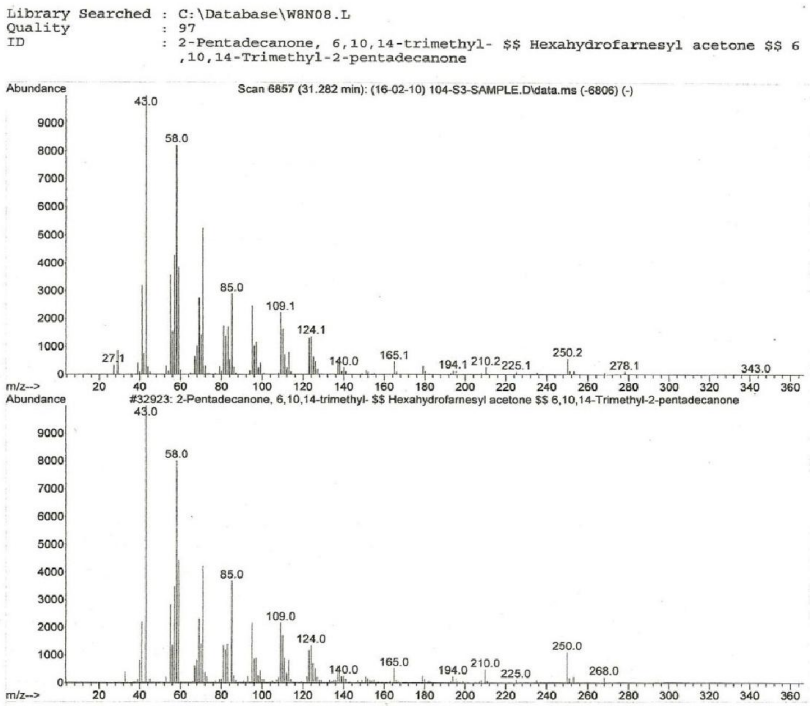
Abundance
Scan 6857 (31.282 min): (16-02-10) 104-S3-SAMPLE.D\data.ms (-6806) (-)
m/z-->
Abundance
#32923: 2-Pentadecanone, 6,10,14-trimethyl- $$ Hexahydrofarnesyl acetone $$ 6,10,14-Trimethyl-2-pentadecanone
m/z-->

Fig. I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Abundance
Scan 6857 (31.282 min): (16-02-10) 104-S3-SAMPLE.D\data.ms (-6806) (-)
m/z-->
Abundance
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m/z-->

FIG. II

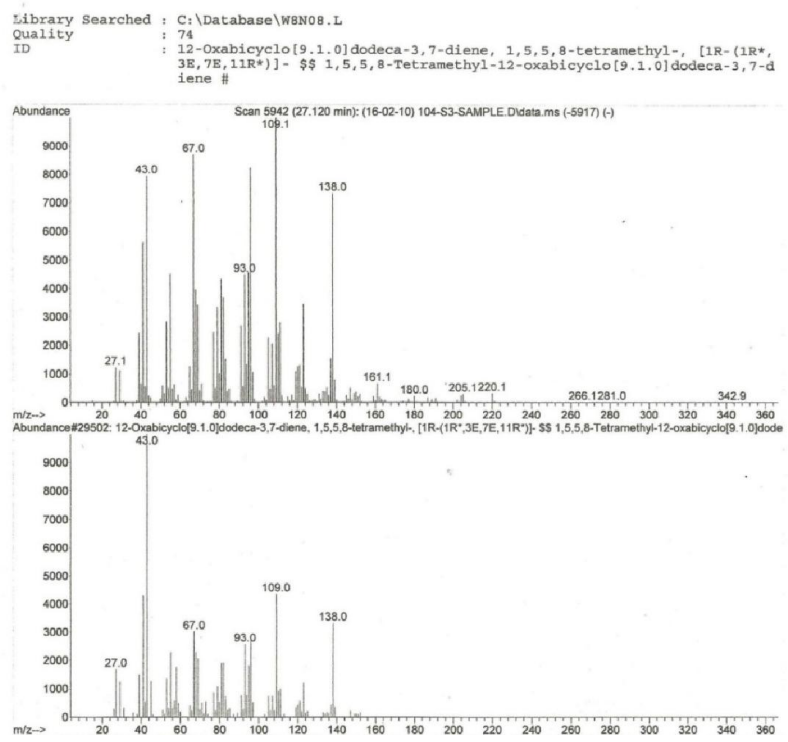


Fig. III

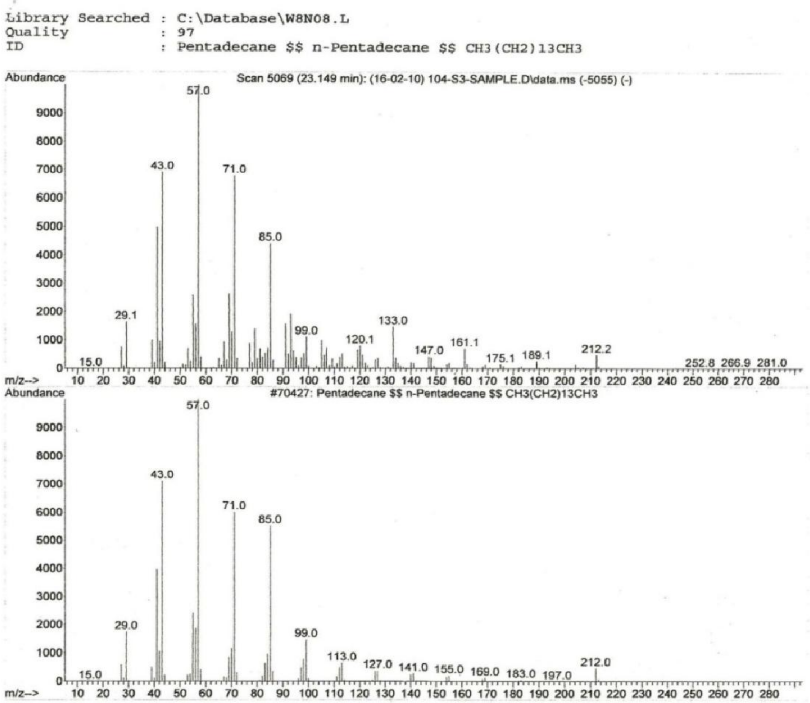


Fig. IV

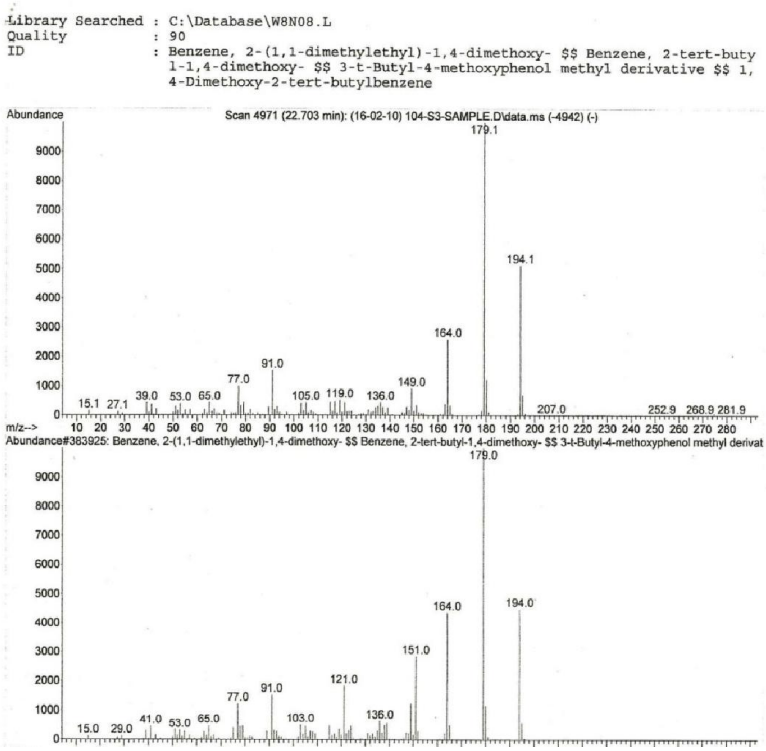
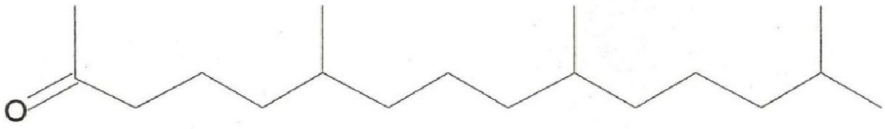
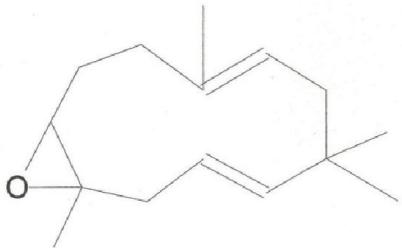


Fig. V

Tetradecane (I)

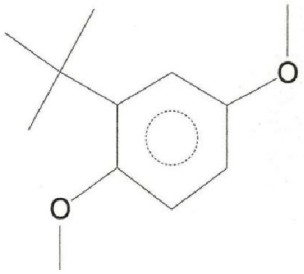


Hexahydrofarnesyl acetone (II)



12-Oxabicyclo [9.1.0] dodeca-3,7-diene-1,5,5,8-tetramethyl-[1R-(1R*,3E,7E,11R*)] (III)

Pentadecane (IV)



Benzene-2-(1,1-dimethylethyl)-1,4-dimethoxy (V)

Conclusion

These five new compounds Tetradecane, 2-Pentadecanone-6,10,14-trimethyl, 12-Oxabicyclo [9.1.0] dodeca-3,7-diene-1,5,5,8-tetramethyl-[1R-(1R*,3E,7E,11R*)], Pentadecane and Benzene-2-(1,1-dimethylethyl)-1,4-dimethoxy (1,4-Dimethoxy-2-tert-butylbenzene) are new records.

Further work is going on in our laboratory to study more and more plants along with the study of medicinal value.

Acknowledgement

We thanks to the Head of Department of Chemistry, T.M.B.U., Bhagalpur for providing me laboratory and library facilities during my research work, also thanks to my guide, Dr. N.K. Yadav 'Indu' Vice-Chancellor Central University of Jharkhand, Ranchi for their encouragement. Dr. N. Pandit, University Department of Botany, T.M.B.U., Bhagalpur for valuable suggestion during my research work.

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