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GC-MS Analysis of *Calotropis gigantean* Linn whole plant chloroform extract

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Abstract
Calotropis gigantean Linn is distributed in Himalaya region and all over India. This plant is widely used for different types of therapeutic activities. The present study was planned to investigate the number of constituents present in chloroform extract of whole plant of *Calotropis gigantean* Linn. by quantitative GC-MS analysis and phytochemical screening. From the GC-MS analysis we concluded that chloroform extract has 15 constituents. The preliminary phytochemical screening reveals the presence of alkaloids, steroids, triterpenoids, resins and carbohydrates.

Keywords:GC-MS, Calotropis, Chloroform, Preliminary Phytochemical

INTRODUCTION

The Asclepiadaceae is a large family comprising of 175-180 genera and 2200 species distributed mainly in the tropical and subtropical region of the world, represented in India by 23 genera and 41 species [1]. Several genera of this family contain biologically active compounds [2]. Among these are the species of Asclepias and Calotropis which contain cardenolides toxic to vertebrates [3-4]. Certain insects notably monarch butterflies [5] and milk weed bugs [6] sequester these cardenolides from Asclepias host plants and apparently utilize them for defense against vertebrate predators [7]. Calotropis is a small genus of about 6 species of shrubs or small trees,distributed in tropical and subtropical Africa, Asia and central and South America, represented in India by only two species namely Calotropis procera and *Calotropis gigantean* linn. Both the species closely resemble each other in structure and find similar uses [8].

MATERIALS AND METHODS

Plant material:

The plant *Calotropis gigantean* Linn was collected for local area of Udaipur in the month of January 2011 and authenticated from Department of Botany, Nagpur University. Voucher specimen no. 9111 was deposited in the university.

*Preliminary Phytochemical screening and fluorescence analysis:*The fresh plants were subjected to shade drying (22oC) for two weeks and then processed at laboratory mill. Air dried coarse powder thus obtained (1 kg) was extracted with petroleum ether, chloroform, ethanol and distilled water in soxhlet extractor by continued successive hot extraction method. Finally the marc was collected and concentrated for various qualitative phytochemical tests and fluorescence analysis observed at UV 366nm for identification of chemical constituents present in the plant material. Results are presented in Table No.1.

GC-MS analysis: The GC-MS analyses were carried out in Perkin Elmer, auto system XL GC+ with the following parameters: Carrier gas: Helium with a flow rate of 0.7 ml/min, Column temperature: 180°C for 5minutes, 180-260°C at 3°C/min., 260°C for 5minutes 260-280 at 0.2°C/min, and280°C for 5 minutes. Injector temperature was 280°C and detector temperature was 290oC. Volume injected: 1µL of sample, Ionization potential: 70 eV, Ion source temperature: 290oC. Identification of compound GC-MS chromatogram of Chloroform extract of *Calotropis gigantean* Linn (Figure.1) showed 15 peaks indicating the presence of 15 phytoconstituents. Interpretation of mass spectrum GC-MS was conducted by using the database of National Institute of Standard and Technology (NIST) having more than 62000 patterns (Figure 1 and Table 2).

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RESULTS AND DISCUSSION

The preliminary phytochemical screening reveals that the presence of steroids, terepenoids, glycosides, resins material, carbohydrates. GC-MS running time for Chlorofrom extract of *Calotropis gigantean* Linn was 5 min. The total number of compounds identified in chloroform extract was 15. The GC-MS retention time (RT) and percentage peak of the individual compounds were presented in Table 2. The major phytoconstituents present in chloroform extract of *Calotropis gigantean* Linn were Tetradecane (20.51), 1-Butoxy,2-ethyl Hexane(13.91), Betulin (10.84), 2-Methyl benzoic acid(10.13), 2-(1-Hydroxy-1-methylethyl)-2,3-dihydrofuro(3,2-)chromen-7-one(8.46), 1-Hexacosanol (6.02), Oxirane (5.28), 1,2 Dimethyl benzene (2.11). Due to the limitation of present study, author could not evaluate the bio availability of various elements and biological screening of *Calotropis gigantean* Linn whole plant chloroform extract are suggested for future research.

Table 1: Percentage extractive, fluorescence analysis, and preliminary phytochemical screening of Whole plant of Calotropis gigantean Linn.

Solvent Extracts	(%W/W)	FluorescenceObserved (UV 366nm)	Chemical constituents					
			Alkaloids	Sterols	Terpenoid	Sugar	Glycoside	Phenolic
Pet. Ether (60-80^{0}C)	2.75±0.076	Orange colour	----	++	+++	---	-----	-----
Chloroform	1.20±0.060	Reddish orange colour	-----	++	+	++	++	++
Ethanol	3.25±0.070	Yellowish Orange	++	++	++	+	+++	++
Distilled Water	7.09±0.067	Greenish Blue	----	----	+	++	++	+

+ Present +++Prominently Present++Significantly Present----Absent

Table 2: List of Probable Compound of Chloroform Extract for Peak at 20.37 R_T (CG)

Sr.No.	Name of Compound	RT	Area	Height	% Area
1	2-Methyl -4,6 quinolinediol	18.70	3,658.0	130,878	1.76
2	2-(1-Hydroxy-1-methyl ethyl)2,3dihydrofuro(3,2)chromen7one	20.37	17,621.1	479,263	8.46
3	1-Methyl-2-clorobenzene	20.61	2,585.4	99,586	1.24
4	Methyl Hexadecanoate	20.98	1,903.5	61,280	0.91
5	2,3-Dimethyl Naphthalene	22.15	1,790.1	36,200	0.86
6	2,3-dihydro-Benzofuran	25.51	757.2	18,518	0.36
7	1,2 Dimethyl benzene	32.42	4,385.9	37,150	2.11
8	Heneicosane	33.19	4,088.0	56,377	1.96
9	Betulin	33.98	22,565.0	266,249	10.84
10	1-Butoxy,2-ethyl Hexane	34.93	28,961.6	298,249	13.91
11	Tetradecane	37.26	42,699.9	394,420	20.51
12	Oxirane	41.36	10,999.8	59,014	5.28
13	1-Hexacosanol	43.09	12,535.8	85,573	6.02
14	2-Methyl benzoic Acid	47.03	21,086.1	108,937	10.13
15	11-Tridecen-1-ol	48.35	4,089.8	15,032	1.96

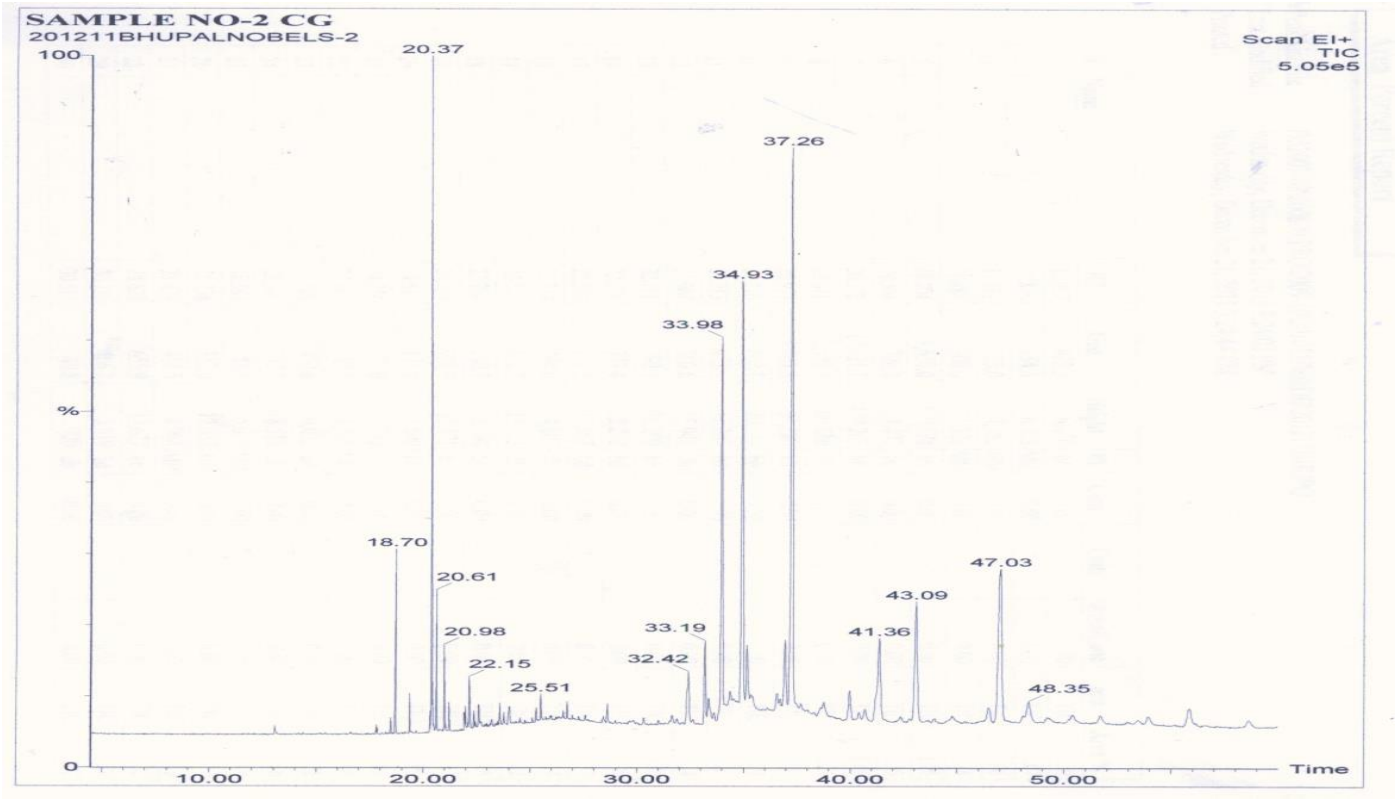

Figure.1: GC-MS Chromatogram of Chlorofrom extract of Calotropis gigantean Linn

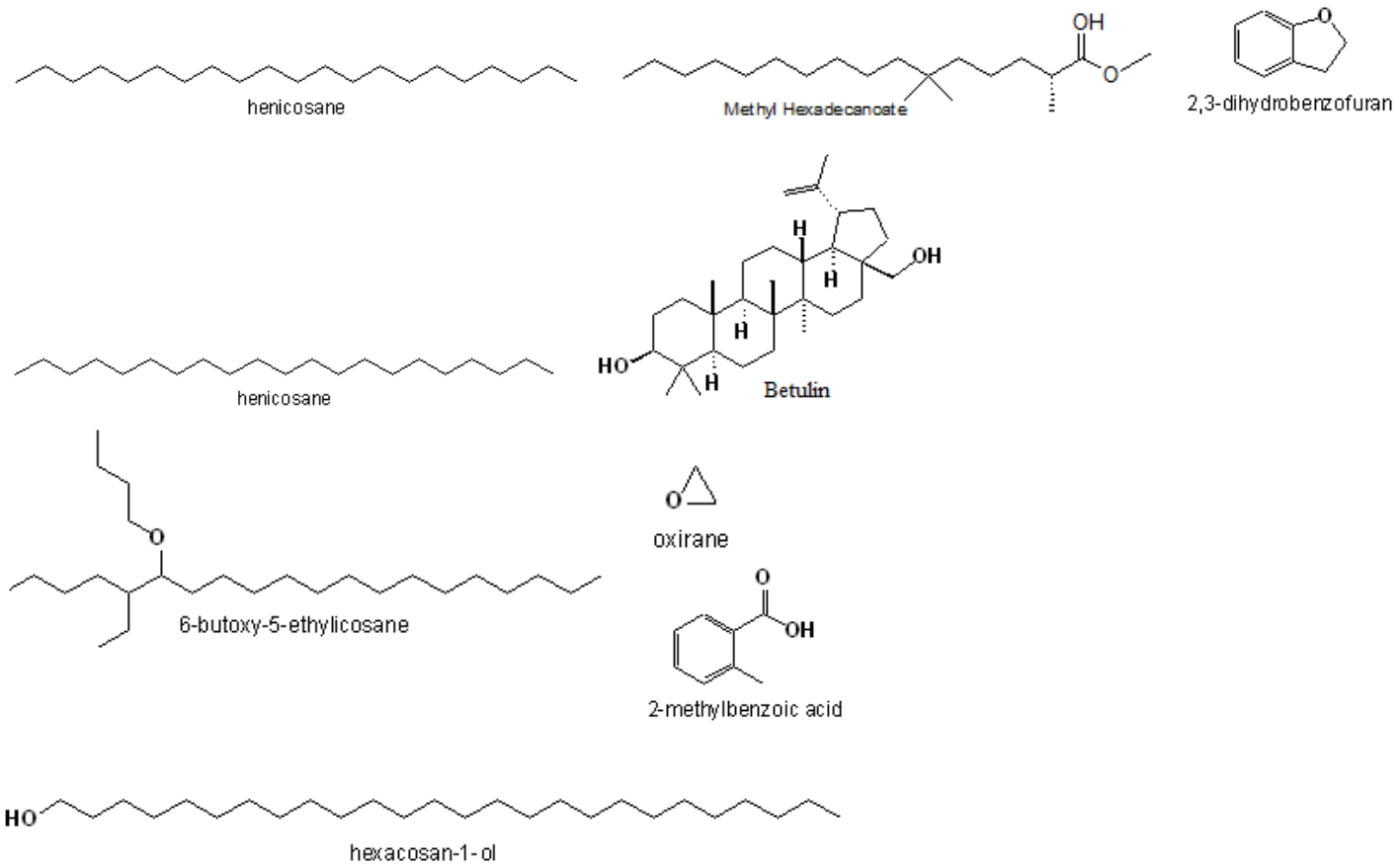

Figure 2: Phytocomponents identified in chloroform extract of the whole plant of *Calotropis gigantean* Linn. by GC-MS.

*C*ONCLUSION

In the present study the results of phytochemical analysis showed presence of some bioactive compounds Figure 2. Tetradecane(20.51), 1-Butoxy,2-ethyl Hexane(13.91), Betulin (10.84),2-Methyl benzoic Acid(10.13), 2-(1-Hydroxy-1-methylethyl)-2,3 dihydrofuro (3,2-)chromen-7-one(8.46), 1-Hexacosanol (6.02), Oxirane (5.28), 1,2 Dimethyl benzene (2.11) were identified by Gas Chromatogram-Mass Spectrometry (GC-MS) analysis of the extracts substituent amount of microelements and microelements were present in the aerial part of *Calotropis gigantean* Linn. Further study is required to find out the accurate compound responsible for the plants medicinal value. We hope that our study emphasizes the accuracy and efficacy of traditional remedies, and that it inspires people to realize the importance of protecting natural resources for sustainable use, not in the least for its potent pharmaceutical use.

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