GC-MS Studies of the Plant Clematis Gouriana

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ABSTRACT

The aim of the present study was to investigate the essential chemicals of the plant clematis gouriana..The GC-MS analysis is done using the instrument GC Clarus 500 Perkin Elmer with Turbo mass 5.2 software. The sample volume is 2µL. The sample Ethanolic extract of ***clematis gouriana****. Is run for 36 minutes. The chromatogram (Figure.10) shows 14 prominent peaks in the Retention time range 12.195-29.031.*

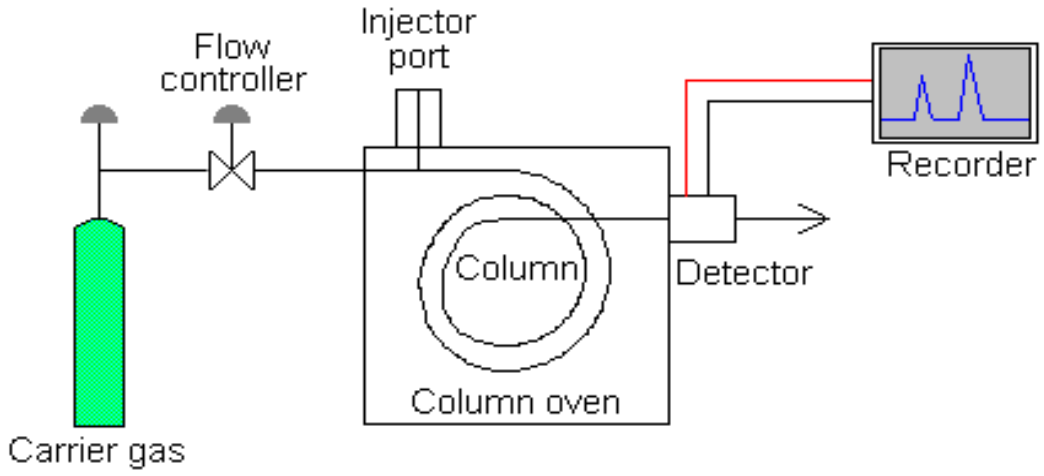
Keywoprds: Clematis Gouriana, GC-MS Analysis, Chromatogram, Retention time.

1. INTRODUCTION

GAS CHROMATOGRAPHY

Gas Chromatography (GC), also sometimes known as Gas-Liquid chromatography, (GLC), is a separation technique in which the mobile phase is a gas. Gas chromatography is always carried out in a column, which is typically "packed" or "capillary" (see below).

Gas chromatography (GC) is based on a partition equilibrium of analyte between a solid stationary phase (often a liquid silicone-based material) and a mobile gas (most often Helium). The stationary phase is adhered to the inside of a small-diameter glass tube (a capillary column) or a solid matrix inside a larger metal tube (a packed column). It is widely used in analytical chemistry; though the high temperatures used in GC make it unsuitable for high molecular weight biopolymers or proteins (heat will denature them), frequently encountered in biochemistry, it is well suited for use in the petrochemical, environmental monitoring and remediation, and industrial chemical fields. It is also used extensively in chemistry research



11.EXPERIMENTAL METHODS

Analysis of Sample: The Ethanolic extract of the plant is subjected GC-MS studies. The details are given here.

111.GC PROGRAMME

Column Elite-1(100% dim ethyl poly siloxane), 30*0.25mm*1µmdf

Equipment GC Clarus 500 Perkin Elmer

Carrier Gas 1ml per min, Split 10:1

Detector Mass detector Turbo mass gold-Perkin Elmer

Software Turbo mass 5.2

Sample injected 2µl

Oven temperature programme

110^0C-2 min hold

Up to 200^oC at the rate of 10^oC/min-No hold

Up to 280^oC at the rate of 5^oC/min-9 min hold

Injector temperature 250^oC

Total GC running time 36 min

1V.MS PROGRAMME

Library used NIST Version- Year 2005

Inlet line temperature 200oC

Source temperature 200^o C

Electron energy 70ev

Mass scan (m/z) 45-450

Solvent Delay 0-2 min

Total MS running time 36 min

GC-MS DATA

The chromatogram of the GC-MS analysis is given in the Figure 1
The list of compounds predicted by the Software Turbo mass 5.2 is given in the Table 1 *Photochemical screening of the plant Clematis gouriana*

S.No	Phytochemicals	Ether Layer I&III	Ether Layer II	Ether Layer IV	Aqueous Layer	Hexane Extract
1.	Alkaloids			(+)	(+)	
2.	Carbohydrates	(+)				
3.	Steroids	(+)				
4.	Saponins	(+)			(+)	
5.	Tannin		(-)		(+)	
6.	Phenolic compounds		(+)			(-)
7.	Flavonoids	(-)	(+)			
8.	Terpenoids	(+)				

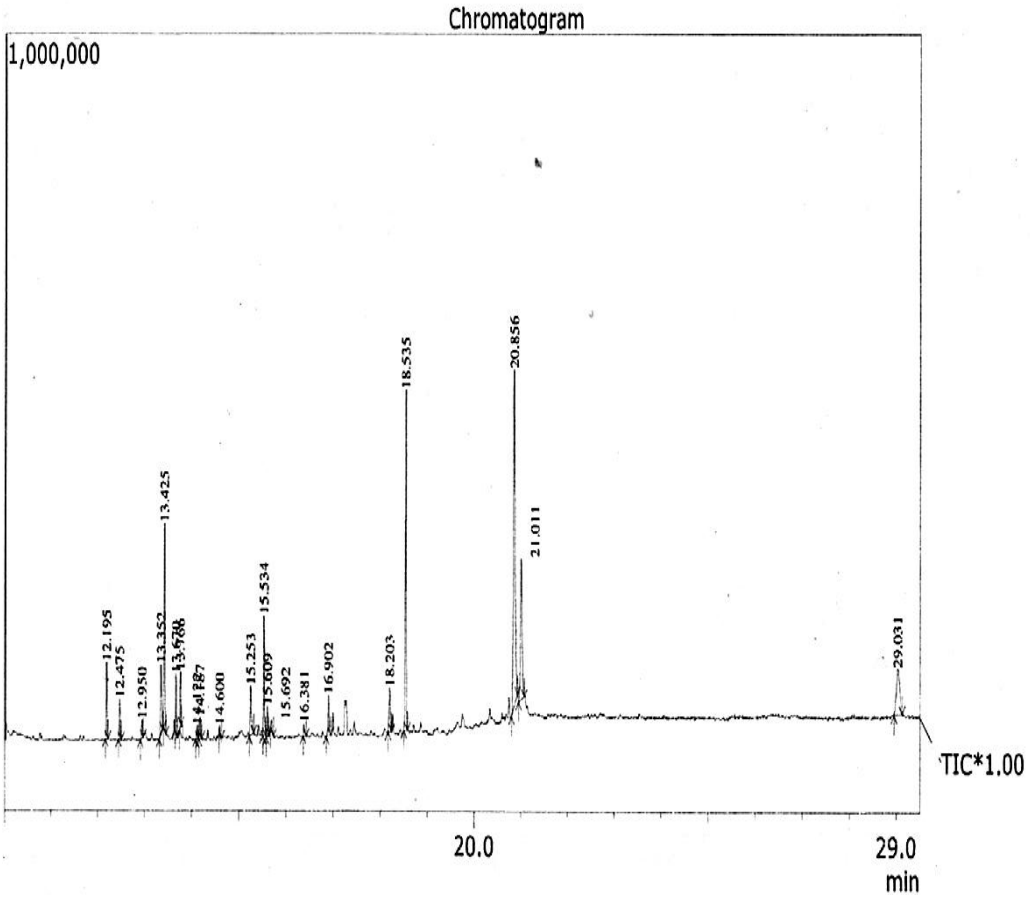
List of compounds present in the ethanolic extract of clematis gouriana.

.No.	RT (min)	Name of the compound	Molecular Formula	MW	Peak Area %
1.	12.195	6, 10, 14-Trimethyl-2-pentadecanone.	$C_{18}H_{36}O$	147	3.35
2.	12.475	Isobutyl phthalate	$C_{16}H_{22}O_4$	154	1.64
3.	12.950	Phthalic acid, 4-bromophenyl heptyl ester.	$C_{21}H_{23}BrO_4$	128	0.76
4.	13.352	Hexadecanoic acid.	$C_{16}H_{32}O_2$	446	4.02
5.	13.425	Di-butyl phthalate	$C_{16}H_{22}O_4$	396	8.70
6.	13.670	Hexadecanoic acid, ethyl ester	$C_{18}H_{36}O_2$	208	2.25
7.	14.187	N-Tridecanol.	$C_{13}H_{28}O$	198	0.97
8.	14.600	4-methyl -2-4-diphenyloxazol-5(4H)-one.	$C_{16}H_{13}NO_2$	256	0.35
9.	15.253	Octadecanoic acid$$Stearicacid.	$C_{18}H_{28}O_2$	282	2.90
10.	15.534	Octadecanoic acid, ethyl ester.	$C_{20}H_{40}O_2$	284	4.94
11.	15.609	3-bromo octane	$C_8H_{17}Br$	296	1.25
12.	15.692	Hexahydrothunbergol.	$C_{20}H_{38}O$	306	0.40
13.	16.381	Tetradecyl 2-methyl propanoate	$C_{16}H_{36}O_2$	410	6.32
14.	18.203	3, 7, 11, 15-tetramethylhexadecanol.	$C_{20}H_{34}O_2$	306	2.48
15.	18.535	Mono(2-ethylhexyl)phthalate	$C_{16}H_{22}O_4$	238	15.50

16.	20.856	.delta.-Tocopherol	$C_{27}O_2$	356	27.03
17.	21.011	.delta.-Tocopherol	$C_{27}O_2$	356	11.7
18	29.031	A:Friedooleanan-3-one	$C_{30}H_{50}O$	426	6.93

V. CONCLUSION

The GC-MS analysis is done using the instrument GC Clarus 500 Perkin Elmer with Turbo mass 5.2 software. The sample volume is 2µL. The sample Ethanolic extract of ***clematis gouriana***. Is run for 36 minutes. The chromatogram (Figure.10) shows 14 prominent peaks in the Retention time range 12.195-29.031. The peak at 12.195 retention time is having the peak area 3.35. This largest peak is due to the presence of .Delta.-Tocopherol (Molecular weight 194). The Second less prominent peak at 18.535 retention time has the peak area 15.50 it is due to the presence of Mono (2-ethyl hexyls) phthalate (M.W.238). The third less significant peak at 21.011 retention time with the peak area11.7 is characteristic of .Delta.-Tocopherol (M.W.278). The Fourth less prominent peak at13.425 retention time (8.70 peak area) denotes the Dibutyl- phthalate (M.W. 396). The other less prominent peaks at other retention times are given in Table.11.S analysis predicts the presence of various Phytoconstituents of acids, esters, alcohols, glycosides, ethers, etc. The possible structures of these compounds are given in Figure



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PLANTS PROFILE

ABOUT THE PLANT. ***CLEMATIS GOURIANA***

Family : Ranunculaceae

Sub family: Ranunculoideae

Hindi : Belkum

Kannada : Telajadari

Sanskrit : Morata

Telugu : Pedutivva

Tamil : Attumeesaikodi

Genus : Clematis

Species : Clematis gouriana

Clematis gouriana is a large climber, capable of climbing up tall trees. Stems are brown and grooved. Oppositely arranged leaves are variable - they can be pinnate, 2-pinnate or 3-pinnate. Leaflets are oblong, lancelike, and sharp tipped, toothed, and rounded at the base. Flowers, 1-1.5 cm across, are fragrant, greenish-white, appearing in branched panicles 15-25 cm long. The flowers have four sepals, which look like middle of the flower. Flowering: November-February.

EXPERIMENTAL METHODS

COLD PERCOLATION METHOD

The shade –dried plant material is cut into pieces and packed in a wide-mouthed bottle. (2 lit). The moisture free ethanol is poured into the bottle just to soak the plant material completely. The bottle is closed air-tight and allowed to stand for 72 hours, undisturbed. After 72 hours, ethanol is collected in a pure dry bottle (2 lit). The ethanolic extract is subjected flash-evaporation to get the concentrated extract. The concentrated ethanolic extract is taken for the photochemical screening.

PHYTOCHEMICAL SCREENING

Photochemical screening is a process of analyzing the plant constituents with suitable reagents. Based on the response, the plant constituents are confirmed. The ethanolic extract was further extracted with alkali and acid and subsequently extracted with ether to get ether layers I, II, III and IV. These four ether layers were taken for the photochemical screening of polar neutral, acidic and basic compounds. A separate hexane extract was also prepared and tested for the non-polar constituents.

The extraction procedures are given in figure.

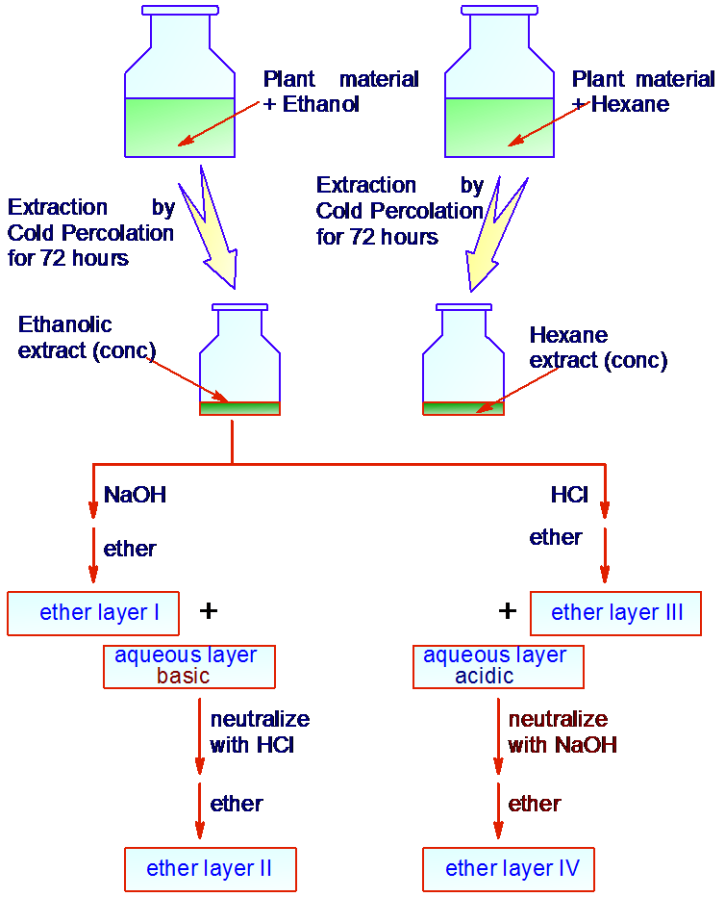

Figure1: The Scheme of extraction of the plant constituents from

Table1: Photochemical screening of the plant Clematis gouriana

S.No	Phytochemicals	Ether Layer I&III	Ether Layer II	Ether Layer IV	Aqueous layer	Hexane extract
1.	Alkaloids			(+)	(+)	
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3.	Steroids	(+)				
4.	Saponins	(+)			(+)	
5.	Tannin		(-)		(+)	
6.	Phenolic compounds		(+)			(-)
7.	Flavonoids	(-)	(+)			
8.	Terpenoids	(+)				

CONCLUSION

This chapter summarizes the findings of the present paper - Photochemical Screening of Clematis *gouriana.*

The non- polar hexane extract reveals the presence of Oils and Fats on photochemical Screening. The Polar neutral extracts- Ether I and III are analyzed phytochemically to contain Carbohydrates,Steroids,Saponins,Terpenoids.The neutralized alkaline Ether extract-Ether 11 are reveals the presence of Phenolic compounds,Flavonoids on photochemical Screening. The Alkaloids constituents are found to be present in the Ether extract-Ether 1V.The final aqueous extract shows the presence of Tanins, Saponins content on photochemical screening.

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