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Short Communication

SPECTRAL ANALYSIS OF CHLOROFORM ROOTS EXTRACT OF *CITRULLUS COLOCYNTHIS* (L.) USING GAS CHROMATOGRAPHY-MASS SPECTROMETRY

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ABSTRACT

Citrullus colocynthis (L.) is an important medicinal plant belonging to the family Cucurbitaceae traditionally used as an abortifacient, cathartic, purgative, vermifuse and for the treatment of fever, amenorrhea, jaundice, leukemia, rheumatism, cancer, diabetes and hair loss. Root sample of the plant were subjected to phytochemical investigation through Gas chromatography-Mass spectrometry (GC-MS). Twenty two major phytochemical compounds were identified in the chloroform extract of *Citrullus colocynthis*. The identification of phytochemical compounds is based on the peak area, retention time molecular weight and molecular formula.

Keywords: Citrullus colocynthis, *Phytochemicals, Chloroform extract, GC-MS*.

1. INTRODUCTION

Citrullus colocynthis (L.) a member of Cucurbitaceae family, is a desert plant with a rich history as an important medicinal plant and as a source of valuable oil. It is commonly known as bitter apple, colosynth, tumba or wild gourd. It is distributed in African and Arabian countries and India. It is commonly known as bitter apple, colosynth or wild gourd and used as an abortifacient [1], cathartic, purgative and vermifuge, and for the treatment of fever, cancer, amenorrhea, jaundice, leukemia, rheumatism, tumour, insect repellant [2] and hair loss [3].

A number of plant secondary metabolites including cucurbitacins, flavonoids, caffeic acid derivatives and terpenoids have previously been reported from this plant [4-10]. Root sample of the plant were subjected to phytochemical investigation through Gas chromatography-Mass spectrometry (GC-MS). Twenty two major phytochemical compounds were identified in the chloroform extract of *C. colocynthis*. The identification of phytochemical compounds is based on the peak area, retention time molecular weight and molecular formula [11]. Gas chromatography-mass spectrometry (GC-MS) analysis of *C. colocynthis* revealed the existence of the 1-tetradecene, tetradecane, 3,5-bis (dimethylethyl)-phenol, 1-hexadecene, 1-octadecene, heptadecane, 3-methylheptadecane, icosane, 9-methylbicylo [3.3.1] nonane, octadecanoic acid, tertacosan-1-ol, eicosyl pentafluoropropionate, eicosyl heptafluorobutyrate, tetracontane, hexacosyl heptafluorobutyrate, tetra-triacontyl heptafluorobutyrate, 2-methylhexa-cosane and tetratriacontyl heptafluorobutyrate.

2. MATERIAL AND METHODS

2.1. Collection and pretreatment of *C. colocynthis* root sample

Samples of *C. colocynthis* root were collected from local market in Jaipur city Rajasthan, India. The plant was identified by Dr. Mahesh C. Sharma, Associate Professor, Department of Chemistry, University of Rajasthan. Roots were thoroughly washed using deionized water and were transferred in our laboratory. The Roots sample were washed, cleaned and dried. *C. colocynthis* roots were packed in sealed polythene bags for further experimental purposes.

2.2. Preparation of extracts

The dried *C. colocynthis* roots were ground to fine powder using a grinder. The powdered roots (approximately 1.0 kg) of *C. colocynthis* were placed in a Soxhlet apparatus and extracted with 2.0 L Chloroform for 12 hours on a water bath. Excess solvent was removed under vacuum in a rotary evaporator (Rotary Vacuum Evaporator N.N. Series equipped with an Aspirator and a Digital Water Bath SB-651; Eyela, Tokyo, Japan) at 45°C and further made moisture free with sodium sulphate. The resulting extract was stored at 4°C until further analysis.

2.3. GC-MS Analysis

Gas chromatography combined with mass spectroscopy is a preferable methodology for routine analysis of compounds. The GC-MS analysis of above mentioned extracts was performed with a Gas chromatography unit Shimadzu GCMS-QP2010 Plus comprising AOC-20i+s auto sampler. Various components were identified by different retention times which were detected by mass Spectrophotometer. The chromatogram a plot of intensity against retention time was recorded by the software attached to it. From the graph the compounds are identified comparing the data with the existing software libraries like WILEY 8. lIB, NIST 11. lib, NIST 11s. lib, FFNSC 2. lib. and mass spectra of standard. The Name, Molecular weight and structure of the components of the test materials were ascertained.

3. RESULTS AND DISCUSSION

3.1. The GC/MS Analysis

The GC spectrum of the Chloroform extract shows total 22 compounds present in the Chloroform extract were determined by the chromatographic method with the help of NIST and WILEY library as shown in Table 1. Compound tertacosan-1-ol was found to be in the highest concentration (8.72%) followed by 1-octadecene (8.48%), eicosyl-2,2,3,3,3-pentafluoro-propionate (5.78%) and 1-hexadecene (5.67%), other compounds were found in trace amount (Table 1). Either one or all the identified compounds may be responsible for the antimicrobial activity of the Chloroform extract. Further separation of the identified compounds will be done in due course.

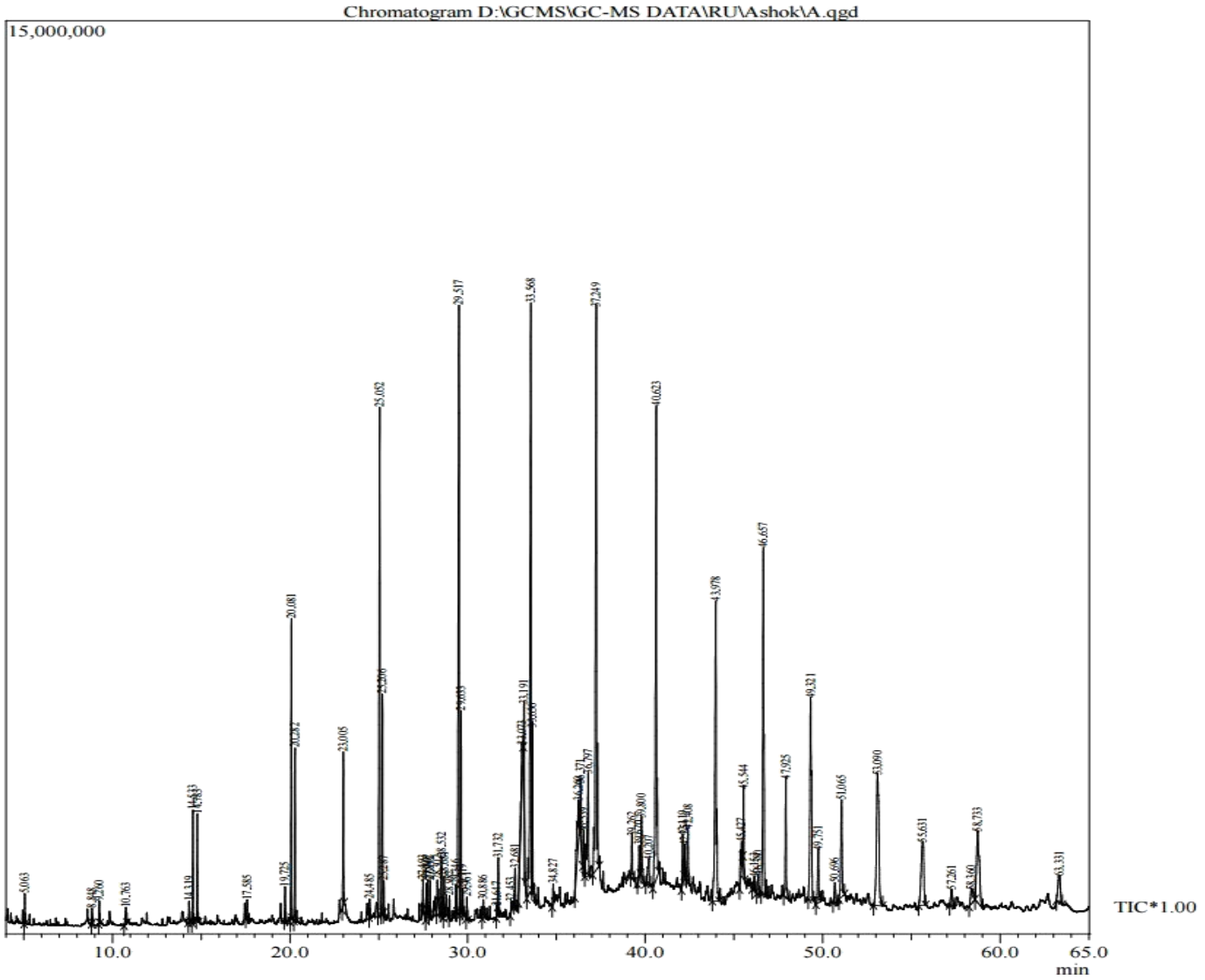
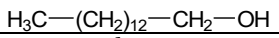
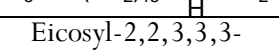
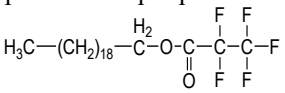


Fig. 1: GC-MS Spectrum of Chloroform extract of *C. colocynthis* root

Table1: Phytochemicals identified in the Chloroform extract of the root sample of *C. colocynthis* by GC-MS

Peak#	R. Time	Peak Area	Peak Area%	Name
1	20.081	13426437	2.84	1-Tetradecene
2	20.282	6839362	1.45	Tetradecane
3	23.005	6699305	1.42	3,5-bis(dimethylethyl)-phenol
4	25.052	26807764	5.67	1-Hexadecene
5	25.206	9057732	1.91	Tetradecane
6	29.517	36341356	7.68	Octadec-1-ene
7	29.633	8765092	1.85	Heptadecane
8	33.073	5363695	1.13	3-methylHeptadecane
9	33.568	40146198	8.48	Octadec-1-ene
10	33.656	7698551	1.63	Icosane
11	36.260	6581762	1.39	9- Methylbicylo[3.3.1] nonane
12	36.797	9129360	1.93	Octadecanoic acid
13	37.249	41261972	8.72	Tertacosan-1-ol (Lignocerol)
14	40.623	32049437	6.77	Tertacosan-1-ol (Lignocerol)
15	43.978	27326573	5.78	Eicosyl 2,2,3,3,3-Pentafluoropropionate
16	46.657	23257254	4.92	Eicosyl heptafluorobutyrate
17	47.925	6830526	1.44	Tetracontane
18	49.321	20252215	4.28	Hexacosyl heptafluorobutyrate
19	51.065	8088425	1.71	Tetracontane
20	53.090	20828069	4.40	Tetratriacontyl heptafluorobutyrate
21	55.631	10940151	2.31	2-Methyl hexacosane
22	58.733	12838075	2.71	Tetratriacontyl heptafluorobutyrate

Table 2: Major phytochemical compounds identified in Chloroform extract of *C. colocynthis*

S. No.	Phytochemical compound	RT (min)	Molecular Formula	Molecular weight	MS Fragment -ions	Peak Area %
1	Tertacosan-1-ol (Lignocerol) 	37.249	$C_{24}H_{50}O$	354	27, 41, 55, 83, 97, 111, 125, 139, 153, 168, 280, 294, 308, 336	8.72
2	Octadec-1-ene 	33.568	C18H36	252	39, 41, 43, 57, 83, 97, 111, 125, 224, 252	8.48
3	Eicosyl-2,2,3,3,3-pentafluoropropionate 	43.978	C23H41F5O2	444	27, 41, 55, 57, 83, 97, 111, 125, 139, 154, 168, 182, 196, 210, 224, 238, 252, 278, 307, 325, 426	5.78

4. CONCLUSION

Present study of Chloroform extract of *C. colocynthis* root indicated that it contains biologically active compounds. The properties of these compounds probably contribute, at least to some extent, to the pharmacological and traditional medicinal uses of the *C. colocynthis*. Further separation and identification of compound present in it may give new biologically active compounds, which can be used as lead compounds in future.

5. ACKNOWLEDGEMENTS

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Conflict of Interest

Authors declare no conflict of interest.

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