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RESEARCH ARTICLE

GC-MS Analysis of *Ichnocarpus frutescens* (L.) W.T. Aiton Root Hydro-Alcoholic Extract

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ABSTRACT:

Ichnocarpus frutescens (Apocynaceae) are generally known as *Krishn sariva* in Hindi, Kali Sariva in Sanskrit, a large, evergreen, red woody climber, native to India, Java, China, Ceylon, South Asia, Northern, Australia and found in ascending to an altitude of 4000 ft. Different tribes of India are used this plant as a substitute for Indian Sarsaparilla (*Hemidesmus Indicus*) it has been used conventionally in diverse ailments of human beings that is headache, wound, fever, tongue, ulcers, cramps, night blindness, stomach pain, bone, fracture, skin infection, diabetes, liver disorder, as an alternative, tonic, diuretic and diaphoretic, Pharmacologically plant shows Antiobesity, analgesic, antipyretic, anti-inflammatory, skeletal muscle relaxant, hepatoprotective, antitumor. The present study has aimed to identify the Phyto-substance present in *Ichnocarpus frutescens* using GC-MS analysis. The root part was extracted by maceration in which we have taken 70% Ethyl alcohol and 30% of distilled water. The phyto-components of Hydroalcoholic extract were identified by GC-MS investigation and eight were identified by GC-MS investigation and found eight numbers of phyto-components. Phyto-constituents of the extracts were D-Ribo-Hexose, 2, 6-dideoxy-3-O-methyl-, Diethyl Phthalate, Desulphosingrin, 3-O-Methyl-d-glucose, d-Mannose, Ethyl Oleate, Hexadecanoic acid, 2 Hydroxy-1-(hydroxymethyl) ethyl ester, Octadecanoic acid, 2-hydroxy-1-(Hydroxymethyl) ethyl ester. This study is the major characterization of the phyto-components of plant data that indicates the hydro-alcoholic extract has remarkable activities.

KEYWORDS: Ethylalcohol 70% and distilled water 30%, $C_7H_{14}O$, $C_{12}H_{14}O_4$, $C_{10}H_{17}NO_6S$, Krishn sariva.

INTRODUCTION:

In various traditional systems of medicine, plants are used for medication for different ailments. In general, plants are utilized by Vaidya, tribals and local healer as medicine and are improved by time to time for better efficacy. Different species of plant restrain a huge number of phyto-components which have medicinal values but are virgin till date[1,2,3,4]. It is a large, evergreen, laticiferous, woody creeper with rusty red appearance, found almost all over India, ascending to an altitude of 4,000 ft and also found in Ceylon, China, Java and Australia[5,6,7].

Traditionally the plant has been used in headache, wound, fever[6], tongue, ulcer cramps, headache, night blindness[4], bone fracture, skin infection, diabetes, and livers disorders[5] pharmacologically plants show different activities including Anticarcinoma, antiurolithiatic, Antidiabetic, Antipyretic, analgesics, Antiinflammatory, Antiobesity, antitumor, anticonvulsant activity[7], hepatoprotective, a skeletal muscle relaxant[8,9,10,11].

The plant may show different activity due to the presence of phytocomponents like coumarins, phenolic acid, friedelin, friedelinol, 5 hydroxyoctacosan-25-1, dotriacontanoic acid, sitosterol and sitosterol palmitate. With this background, the present study was aimed to identify the phytocomponents from the ethanolic extract of *I. frutescens* root part by using GC-MS investigation[6,7,10,11].

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MATERIAL AND METHOD:

Collection and preparation of plant materials:

Fresh root parts of the plant were collected from Nrusinghanath Ayurvedic college and research centers Lumbini Bhesaj Udyan herbal garden, Paikmal, Odisha, India, and identified by Botanical Survey of India, Kolkata, India, bearing Ref. no. CNH/TECH.II/2021/33. The root parts are dried under shade and pounded into using a mechanical grinder. The powdered material was stored in airtight containers until use.

Preparation of Extract:

The powdered material is extracted by taking hydro-alcohol (ethyl alcohol 70% and distilled water 30%) successively by maceration. The extracts thus obtained were concentrated in a rotary evaporator and stored in the refrigerator at 4^0C for further use. The extract was employed for GC-MS analysis.

GC-MS Investigation:

The investigation of *I. frutescens* hydro-alcoholic extract was performed by using GC-MS (Agilent 5977 MSD). The investigational circumstance of the GC-MS system was as the following condition; Agilent (30m x 250µm x 0.25µm) column, helium gas was used as carrier gas at a constant flow rate of 1.2ml/min and an injection volume of 1.0µl was employed (split ratio of 10:1, injector temperature operated at 280°C; ion-source temperature 230°C and the oven temperature was programmed from 60°C (isothermal for 2min.) with an increase of 10°C/ min. to 280°C (isothermal for 10min.). Mass spectroscopy (MS TSQ 8000) was taken at 70 eV; with a scanning interval of 0.5 sec and fragments from 40 to 550 Da. Identification of Compounds: The Phyto-components were identified by analysis of mass-spectrum with the library data of Mainlib. The name, molecular formula, and molecular weight of the components were established[12].

RESULT:

The GC - MS chromatogram (Fig. 1) of the *I. frutescens* hydro-alcoholic root extract demonstrates the presence of eight compounds. The identified phytoconstituents' retention time (RT), name, peak area (%), molecular formula, molecular weight, and nature of compound are presented in Table 1 and the structure of phytocomponents are illustrated in Fig. 2.

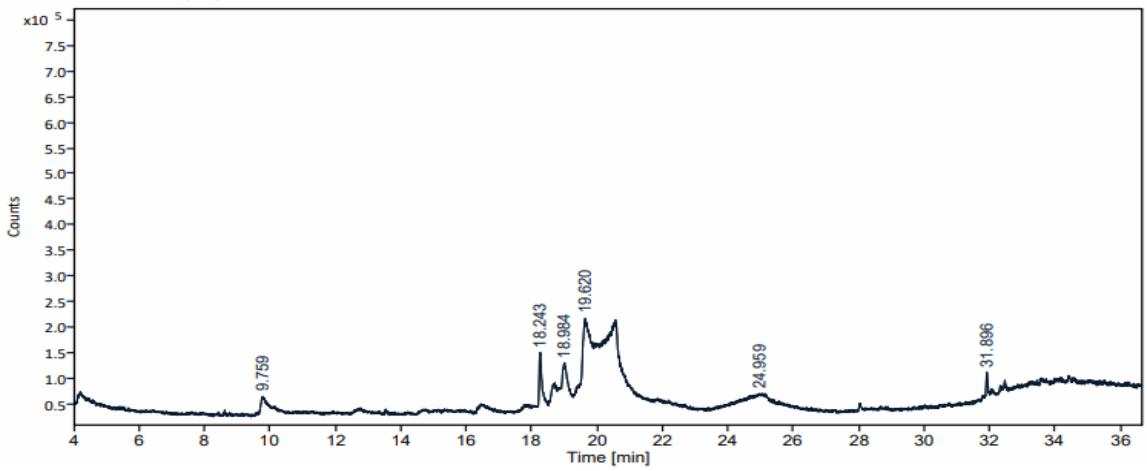
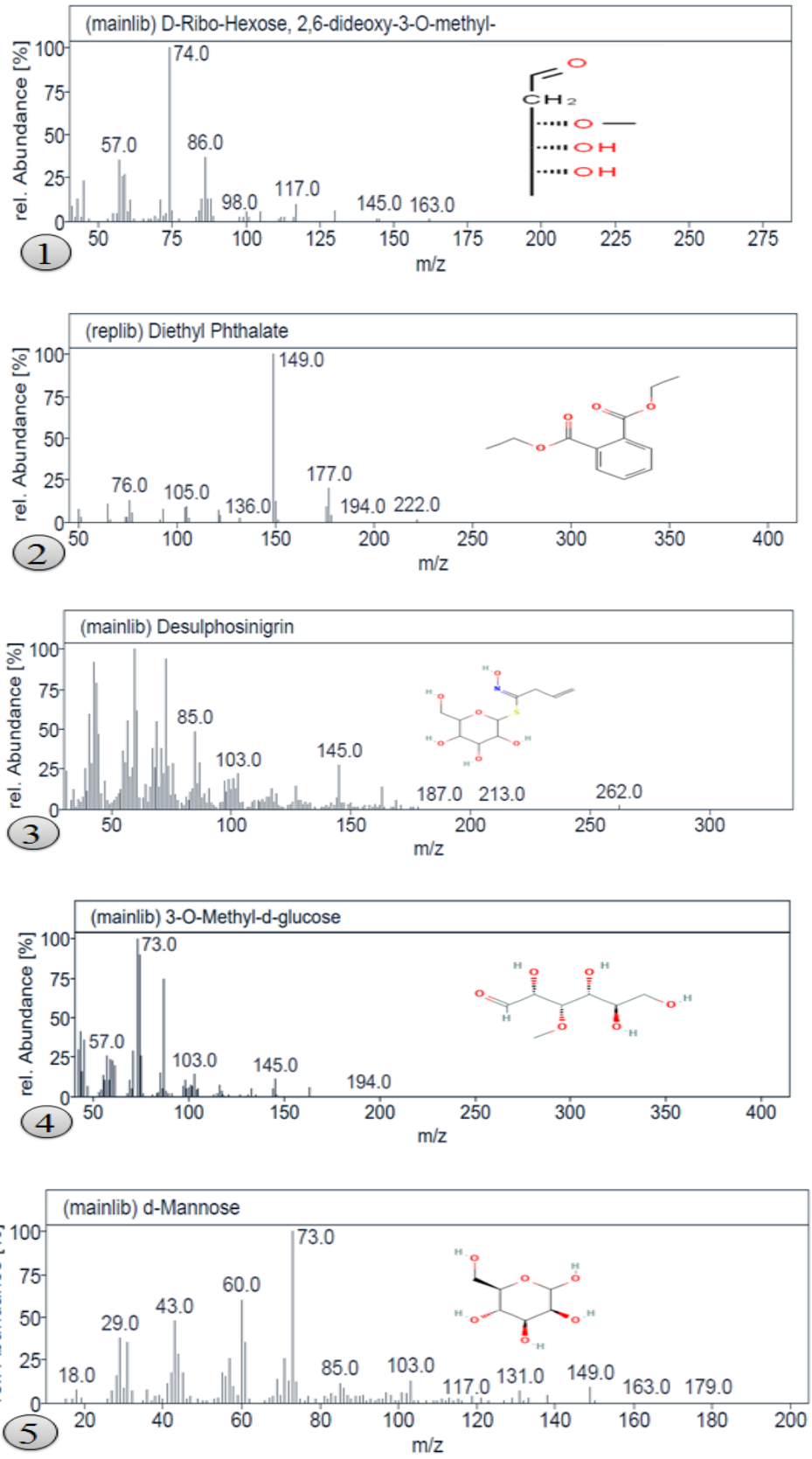


Fig.1: GC - MS chromatogram of the *I. frutescens* hydro-alcoholic root extract

Table 1: Phytoconstituents identified in the hydro-alcoholic extract of *I. frutescens* root part by GC-MS

Compound No.	RT	Name of the compound	Molecular formula	Molecular weight	Peak Area %	Nature of compound
1	9.759	D-Ribo-Hexose,2,6-dideoxy-3-o-methyl (D-Cymarose)	$C_7H_{14}O$	162.184	9.78	Sugar components
2	18.243	Diethyl Phthalate	$C_{12}H_{14}O_4$	222	8.89	Diester of phthalic acid
3	18.984	Desulphosinigrin	$C_{10}H_{17}NO_6S$	279.31	9.33	Glucosinolate
4	19.620	3-O-Methyl-d-glucose	$C_7H_{14}O_6$	194.18	17.44	Sugar
5	24.959	d-Mannose	$C_6H_{12}O_6$	180.16	22.66	Sugar
6	31.896	Ethyl oleate	$C_{20}H_{38}O_2$	310.5	4.14	fatty acid
7	38.102	Hexadecanoic acid, 2-hydroxy-(hydroxymethyl) ethyl ester	$C_{19}H_{38}O_4$	330.5	15.43	Fatty acid
8	41.290	Octadecanoic acid,2-hydroxy-1-(hydroxy methyl) ethyl ester	$C_{21}H_{42}O_4$	358.5558	12.32	Fatty acid


(mainlib) D-Ribo-Hexose, 2,6-dideoxy-3-O-methyl-
rel. Abundance [%]
m/z
74.0
57.0
86.0
98.0
117.0
145.0
163.0
1
(replib) Diethyl Phthalate
149.0
76.0
105.0
136.0
177.0
194.0
222.0
2
(mainlib) Desulphosinigrin
85.0
103.0
145.0
187.0
213.0
262.0
3
(mainlib) 3-O-Methyl-d-glucose
73.0
57.0
103.0
145.0
194.0
4
(mainlib) d-Mannose
73.0
60.0
43.0
29.0
18.0
85.0
103.0
117.0
131.0
149.0
163.0
179.0
5

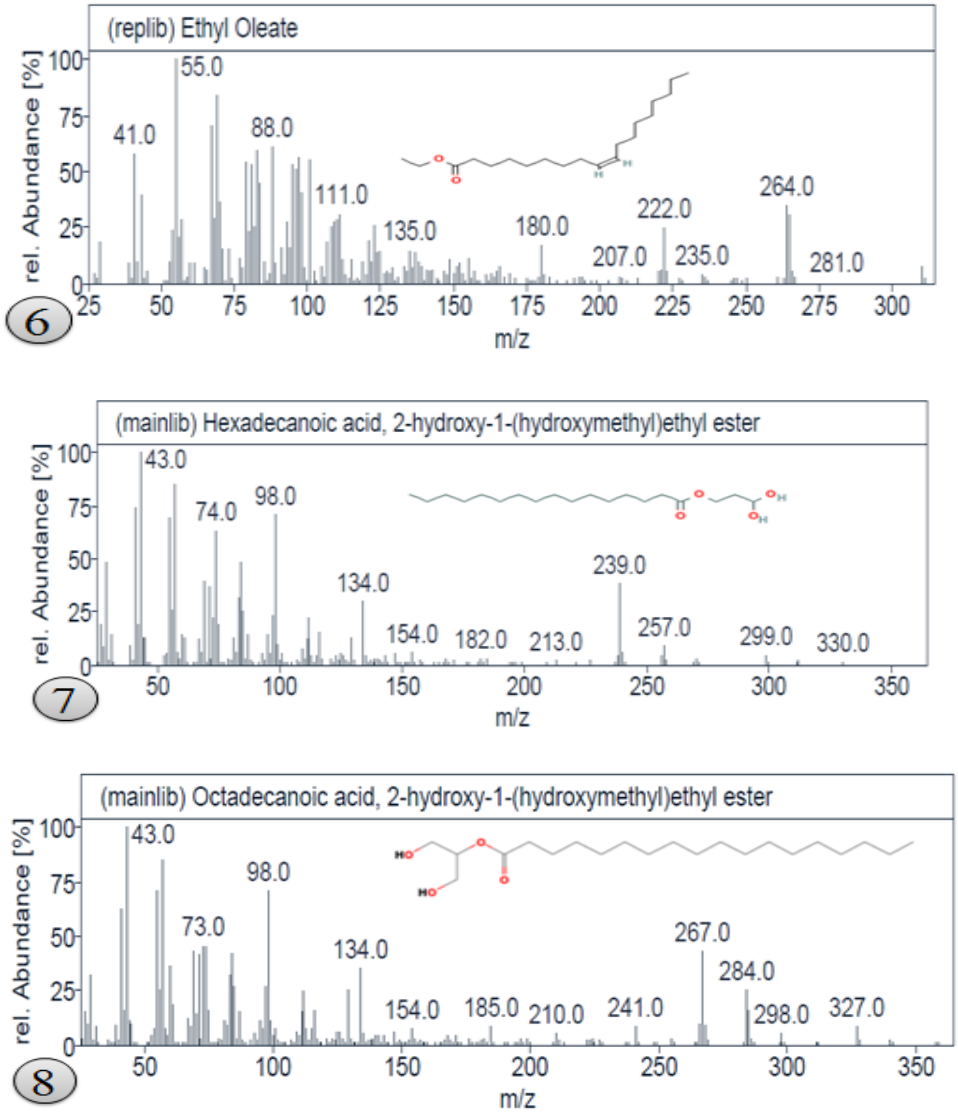


Fig. 2: Structure of bio-active phyto-compounds of *I. frutescens* hydro-alcoholic root extract. (1) D-Ribo-Hexose, 2, 6-dideoxy-3-O-methyl; (2) Diethyl Phthalate; (3) Desulphosinigrin; (4) 3-O-Methyl-d-glucose; (5) d-Mannose; (6) Ethyl oleate; (7) Hexadecanoic acid,2-hydroxy-(hydroxymethyl) ethyl ester: (8) Octadecanoic acid,2-hydroxy-1-(hydroxy methyl)ethyl ester

DISCUSSION:

In the present study, the GC-MS investigation of the hydroalcoholic extract of *Ichnocarpus frutescens* showed the presence of eight compounds. In terms of percentage quantity, 3-O-Methyl-d-glucose, d-Mannose & Hexadecanoid acid[13], 2 hydroxy-1-(hydroxymethyl)ethyl ester were found to be a prime percentage in the extract. The major phytocompound 3-O-Methyl-d-glucose has preservative activity. d-mannose is used to treat a rare disease called carbohydrate-deficient glycoprotein syndrome type 1b. It may also reduce bleeding disorders and low blood sugar in people with the disease, and hexadecanoic acid, 2-hydroxymethyl-1-(hydroxymethyl), ethyl ester, shows antimicrobial activity. Desulphosinigrin shows antibacterial activity[14-20].

CONCLUSION:

The present investigation concluded that the hydroalcoholic extract has a number of bio-active phyto-components responsible for many biological activities and justifies the use of the plant for different diseases and disorders of human beings by Vaidya, tribals, and local healers or traditional practitioners as medicine. So, further separation, isolation, and characterization of individual phyto-components from the plant, maybe undertaken to discover novel drugs and their therapeutic actions to treat various ailments.

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CONFLICT OF INTEREST:

We declare that we have no conflict of interest.

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