PHYTOCHEMICAL AND GC-MS ANALYSIS OF ALCOHOLIC EXTRACT OF LEAVES OF *SENNA UNIFLORA (MILL.)*

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ABSTRACT

The scope of the study is to determine the bioactive constituents were present in the Ethanolic leaf extract of *Senna uniflora*. Ethanolic leaf extracts were analyzed by using Clarus 680 GC-MS. The results of GC-MS analysis estimate the presence of fifteen compounds in Ethanolic leaf extract of *Senna uniflora* and the most available compounds are Squalene (13.455%). It is used as an Antiagining, anti-inflammatory, antidermittic, anticoronary, and vasodilator. N-Hexadecanoic acid(5.8%),oxirane,tertacedyl(5.8%),(Z)6,(Z)9-pentadecadien1-ol(8.1%),Bicyclo[4.1.0]Heptane,7-Pentyl(5.1%), used as an Antimicrobial, Anti-Inflammatory agents.

Keywords: Ethanolic leaf extract, Senna uniflora, GC-MS.

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INTRODUCTION

Medicinal plants also called medicinal herbs, have been discover and used in traditional medicine practice since prehistoric times [1]. Plants synthesize hundreds of chemical compounds for functions including defence against insects, fungi, diseases etc [1]. Numerous photochemical and biological activities have been identified. Medicinal plants naturally synthesize secondary metabolites, alkaloids, sterols, resins, volatile oils, glycosides, lactones etc.

Medicinal plants are broadly used in non-industrialized societies, because they are readily available and cheaper than modern medicines [2] in the way, we search and identified many medicinal uses and medicinal phytochemical from natural plants. Medicinal plants possess an important therapeutic agents as well as valuable raw materials for manufacturing numerous modern medicines [3].

Apart from the medicinal uses these herbs used in the purposes like pest control, Natural dyes and formulation of food item then teas, perfumes among others .Herbs are playing vital role in Ayurveda [2]. '*Senna Uniflora*' is also called one leaf Senna. It was grown in many countries and also found in road sides. **'***Senna uniflora'* (or) '*Cassia uniflora'* has a many chemical compounds and medicinal properties [1]. The leaves of *Senna uniflora* are used as poultices for wounds and the roots of the plant are used for combating dropsy.

MATERIALS AND METHODS
Collection plant materials

The leaves of *Senna uniflora mill* was collected from its habitat in and around Devanandhal, Thiruvannamalai district, Tamilnadu, India. The plant was identified by Prof .P JAYARAM Director of Institution of Herbal Science Plant Anatomy Research Centre (PARC), West Tambaram and Chennai and the herbarium voucher no: PARC\2021\4583.

0.25 mm × 0.25 μm df), composed of 5% of Diphenyl /95% of Dimethyl polysiloxane. For GC-MS detection, an electron ionization system with ionizing energy of 70eV was used. Helium gas used as carrier gas at a constant flow rate of 1mL/min and an injection volume of 1μL was employed (split ratio of 10:1). The injector temperature was 260 ºC. Ion source temperature was kept at 240 ºC. The total GC running time, 35 minutes mass spectra were taken at 70 eV; a scan interval of 0.5 seconds, scan range from 40-1000 m/z. The total MS running time was 345 minutes. The software adopted to handle mass spectra and chromatograms is called Turbomass version 5.4.2. The relative percentage amount of each component was calculated by comparing its average peak area to the total area by the above software.

Interpretation on mass spectrum GC-MS was conducted using the library of National Institute Standard and Technology (NIST) version year 2008 which has more than 62,000 patterns. The spectrum of unknown component was compared with the available spectrum in the NIST library. The name, molecular weight structure, retention time and peak area of the components of the test materials were ascertained.

Preparation of leaves extract

Fresh leaves of *Senna uniflora* was washed properly with tap water and the leaves were shade dried at room temperature for 15 days and grinded to powder, and then make into fine powder by using mechanical blender [1]. About 50g of the powder was soaked in 100ml of ethanol for 5 days then filtered using funnel through muslin cloth to collect the filtrate. 5ml of sample was evaporated to dryness and reconstituted into 2 ml methanol. The extracts were then subjected to GC-MS analysis.

GC-MS Analysis

GC-MS Analysis of the leaves extract was performed using a GC Clarus 680 Perkin Elmer system and gas interfaced to a mass spectrometer [GC-MS] equipped with an Elite 5 MS capillary column (30 mm ×

RESULT AND DISCUSSION

The compounds present in the ethanol extract of leaves of *Senna uniflora* were identified by GC-MS analysis.

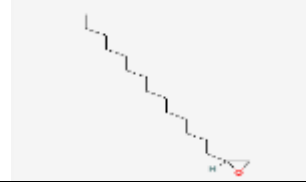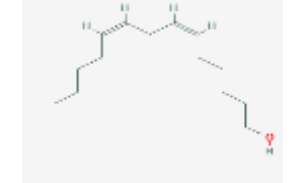The active principle with their Retention time (RT), Molecular formula, Molecular weight (MW) and Peak area percentage of the leaves of **Senna uniflora** are presented in Table 1. The most abundant compounds in ethanol extract of leaves of *Senna uniflora* are 2, 4-DIMETHYL-7-OXO-4, 7-DIHYDRO-TRIAZOLO (3, 2-C) TRIAZINE (19.228%), SQUALENE (13.455%), (Z) 6, (Z) 9-PENTADECADIEN-1-OL (9.792%), 1-OCTADECYNE (8.110%).
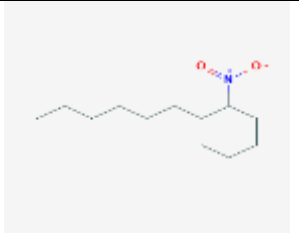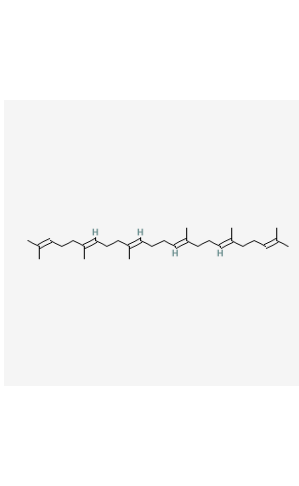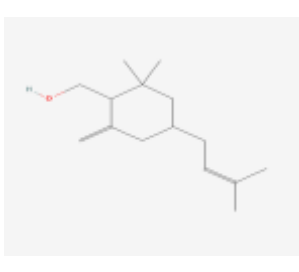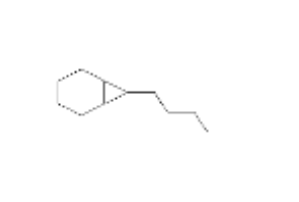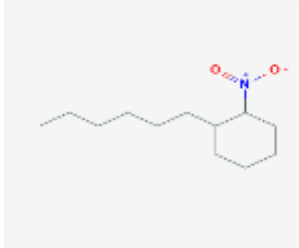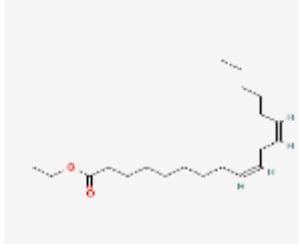
Table 1. 1components detected in the leaves ethanol extract of *Senna uniflora*

S. No	Compound Name	% of Peak Area	Retention time (RT)	Molecular formula (MF)	Molecular weight (MW)
1.	N-HEXADECANOIC ACID	5.830	21.81	C16H32O2	256
2.	N-HEXADECANOIC ACID	1.456	22.20	C16H32O2	256
3.	OXIRANE, TETRADECYL	5.758	22.73	C16H32O	240
4.	CIS,CIS-7,10,-HEXADECADIENAL	5.931	22.94	C16H28O	236
5.	(Z)6,(Z)9-PENTADECADIEN-1-OL	9.792	23.31	C15H28O	224
6.	1-OCTADECYNE	8.110	23.89	C18H34	250
7.	1-HEXYL-2-NITROCYCLOHEXANE	2.499	24.41	C12H23O2N	213
8.	SQUALENE	13.455	24.54	C30H50	410
9.	1-METHYLENE-2B-HYDROXYMETHYL-3,3-DIMETHYL-4B-(3-METHYLBUT-2-ENYL)-C	2.086	25.02	C15H26O	222
10.	BICYCLO[4.1.0]HEPTANE, 7-PENTYL	5.175	25.30	C12H22	166
11.	1-HEXYL-2-NITROCYCLOHEXANE	3.691	25.55	C12H23O2N	213

12.	1-NAPHTHALENEPROPANOL, .ALPHA.-ETHYLDECAHYDRO-5-(HYDROXYMETHYL)-	3.160	25.87	C20H36O2	308
13.	OCTADECANAL	3.750	26.04	C18H36O	268
14.	1-HEXYL-2-NITROCYCLOHEXANE	5.628	26.55	C12H23O2N	213
15.	2,4-DIMETHYL-7-OXO-4,7-DIHYDRO-TRIAZOLO(3,2-C)TRIAZINE	19.228	27.00	C6H7ON5	165
16.	1.ALPHA.,2.ALPHA.-EPOXY-1.BETA.-METHYLCHOLESTA-4,6-DIEN-3-ONE	2.943	28.29	C28H42O2	410
17.	PSEDUOSARSASAPOGENIN-5,20-DIEN	1.510	29.04	C27H42O3	414

Table 2 Activity of components identified in the leaves powder sample

S. No	Compound Name	Structure	% of Peak Area	Retention time (RT)	Molecular formula (MF)	Molecular weight (MW)	Biological activity
1.	N-HEXADECANOIC ACID		5.830	21.81	C16H32O2	256	Anti-Inflammatory, Anti-Oxidant, Anti-Cancer [7].
2.	N-HEXADECANOIC ACID		1.456	22.20	C16H32O2	256	Anti-inflammatory, Hypocholesterolemic, Antitumor.
3.	OXIRANE, TETRADECYL		5.758	22.73	C16H32O	240	Anti-Bacterial, Anti-Infective agent, Coagulant.
4.	CIS,CIS-7,10,-HEXADECADIENAL		5.931	22.94	C16H28O	236	Anti-Inflammatory
5.	(Z)6,(Z)9-PENTADECADIEN-1-OL		9.792	23.31	C15H28O	224	Anti-Bacterial, Anti-Oxidant, Anti-Microbial [4].
6.	1-OCTADECYNE		8.110	23.89	C18H34	250	Anti-Inflammatory, Cytotoxic activity, Anti-Microbial [8].

7.	1-HEXYL-2-NITROCYCLOHEXANE		2.499	24.41	C12H23O2N	213	Neuroactive, Anti-inflammatory, Analgesic property
8.	SQUALENE		13.455	24.54	C30H50	410	Anti-Microbial, Anti- Tumor, Anti-diabetic, Anti-oxidant, Vasodilator, Anti-Inflammatory, Antiaging, Antidermititic, antileukmic, Antispasmodic, Antibronchitic [5].
9.	1-METHYLENE-2B-HYDROXYMETHYL-3,3-DIMETHYL-4B-(3-METHYLBUT-2-ENYL)-C		2.086	25.02	C15H26O	222	No activity reported.
10	BICYCLO[4.1.0]HEPTANE, 7-PENTYL		5.175	25.30	C12H22	166	Anti-bacterial activity [9].
11.	1-HEXYL-2-NITROCYCLOHEXANE		3.691	25.55	C12H23O2N	213	Neuroactive, Analgesic property, anti-inflammatory [6].
12.	1-NAPHTHALENEPROPANOL, .ALPHA.-ETHYLDECAHYDRO-5-(HYDROXYMETHYL)-		3.160	25.87	C20H36O2	308	Anti-Inflammatory activity.
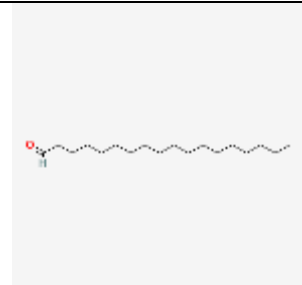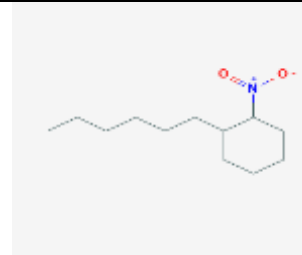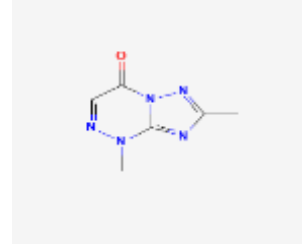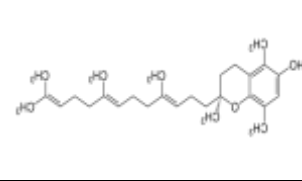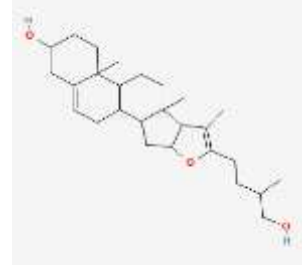
13.	OCTADECANAL		3.750	26.04	C18H36O	268	Anti-bacterial Antifungal
14.	1-HEXYL-2-NITROCYCLO HEXANE		5.628	26.55	C12H23O2 N	213	Neuroactive Analgesic property.
15.	2,4-DIMETHYL-7-OXO-4,7-DIHYDRO-TRIAZOLO(3,2-C)TRIAZINE		19.228	27.00	C6H7ON5	165	No activity reported.
16.	1.ALPHA.,2.ALPHA.-EPOXY-1.BETA.-METHYLCHOLESTA-4,6-DIEN-3-ONE		2.943	28.29	C28H42O2	410	Anti-Oxidant
17.	PSEDUOSARSASAPOGENIN-5,20-DIEN		1.510	29.04	C27H42O3	414	Anti- viral, Anti-neoplastic activity.

Fig.1. GC-MS Chromatogram of the leaves ethanol extract of *Senna uniflora*
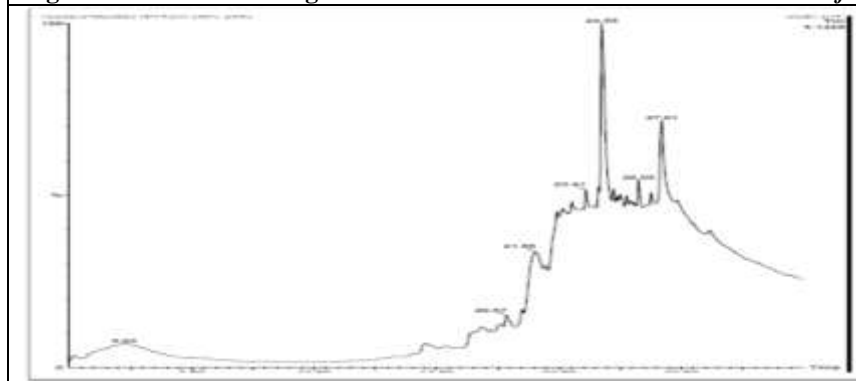
Medicinal plants naturally synthesize secondary metabolites, alkaloids, sterols, resins, volatile oils, glycosides, lactones etc. Recently, World Health Organization (WHO) estimated 80% of worldwide people rely on herbal medicines [1]. The application of modern instrument and techniques are used to identify the medicinal compounds and also used to identify biological activities. Some are like anti-cancer, anti-inflammatory etc., using such techniques like GC-MS, FT-IR, GC-LS. Gas chromatography-mass spectrometry is one the valuable technique to identify phytochemical compounds. In the present study 15 compounds have been identified from the ethanol extract of leaves of *Senna uniflora* by Gas chromatography. In mass spectrometry analysis, among 15 identified phytochemicals some the compounds are having many biological activities, some have few biological activities.

Among them, Squalene has peak area of 13.455% act as Anti-Microbial, Anti- Tumor, Anti-diabetic, Anti-oxidant, Vasodilator, Anti- Inflammatory agent, N- Hexadecanoic acid has peak area of 5.830% and act as Anti- Inflammatory agent, Anti- Neoplastic agent, Anti- Oxidant, Oxirane, tetradecyl has peak area of 5.758% Anti-Bacterial, Anti-Infective agent, Coagulant, (Z)6,(Z)9-Pentadecadien-1-ol has peak area of 9.792% and act as Anti-Bacterial, Anti-Oxidant, Anti-Microbial, 1-Octadecyne has peak area of 8.110% and act as Anti-Inflammatory, Cytotoxic, Anti-Microbial agent, Pseduosarsasapogenin-5,20-dien has peak area of 1.510% act as Anti-Viral, Anti-Neoplastic agent, Cis,Cis-7,10,-hexadecadienal has peak area of 5.931% and 1-naphthalenepropanol,alpha-ethyldecahydro-5-(hydroxymethyl) has peak area of 3.160% both has Anti-Inflammatory activities, Bicyclo[4.1.0]heptane, 7-pentyl has peak area of 5.175% act as Anti-Microbial agent, 1-alpha, 2-alpha-epoxy-1-beta-methylcholesta-4,6-dien-3-one has peak area of 2.943% acts as Anti-oxidant .

Among 15 compounds some have high peak area but no activity is reported. Those compounds are 2, 4-dimethyl-7-oxo-4, 7-dihydro-triazolo (3, 2-C) triazine has peak area of 19.228%, 1-hexyl-2-nitrocyclohexane has peak area of 5.628%, and some have low peak area has no activity reported. Those are Octadecanal has peak area of 3.750% and1-methylene-2b-hydroxymethyl-3,3-dimethyl-4b-(3-methylbut-2-enyl)-c has peak area of 2.086%. Although some chemical compounds among 15 identified compounds have not being reported regarding biological activity can be investigated further to they find useful information related to biological applications.

CONCLSION

This type of GC-MS analysis is the first step towards understanding nature of active compounds and the medicinal uses in this medicinal plant for future development of medicine department. It may useful for further investigation and detailed phytochemistry and pharmacological studies. It may add new information to the existing information in the medical field and prove the therapeutic grades of *Senna uniflora*.

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