Educational Administration: Theory and Practice
2024,30 (3), 2662-2664
ISSN:2148-2403
https://kuey.net/

Research Article

Gc-Ms Characterization Of The Polyherbal Combination

Abdul Saheel Qureshi[1], Dr. Ch Kantlam[2], Dr. Sumia Fatima[3*]

[1]Research Scholar, Bharatiya Engineering Science and Technology Innovation University, Anantapur, Andhra Pradesh, India
[1]Associate Professor, Azad College of Pharmacy, Moinabad, Hyderabad, India
[2]Professor and Principal, Brilliant Grammar School Educational Society's Group of Institutions- Integrated Campus (Faculty of Pharmacy, Hyderabad, India
[3*]Professor and Vice Principal, Azad College of Pharmacy, Moinabad, Hyderabad, India

***Corresponding Author:** Dr. Sumia Fatima
*Professor & Vice principal, Azad College of Pharmacy, Moinabad, Hyderabad-501504, Telangana State

Citation: Dr. Sumia Fatima et al. (2024), Gc-Ms Characterization Of The Polyherbal Combination, Educational Administration: Theory and Practice, 30(3), 2662-2664
Doi: 10.53555/kuey.v30i3.7500

ARTICLE INFO

ABSTRACT

The study aimed to investigate the phytochemical components present in a 70% hydroethanolic extract derived from a polyherbal blend comprising *Argemone mexicana* leaves, *Echinops echinatus* roots, and the aerial parts of *Tricholepis glaberrima*, using gas chromatography-mass spectrometry (GC-MS). The GC-MS analysis was carried out using an Agilent 6890 GC coupled with a 5973N mass selective detector and a fused silica capillary column (Elite-I, Cpsil 8cb: 30m x 25mm x 0.25mm). The analysis identified 27 compounds, among which the key medicinally significant constituents included Silanedial diethyl, Oxime-methoxyl phenyl, 2-methoxy-4-vinyl phenol, Vanillin, Benzofuran, Hexaoleanoic acid, Phytol, and Dehydroabietic acid.

Keywords: Polyherbal mixture, *Argemone mexicana* leaves, *Echinops echinatus* roots and *Tricholepis glaberrima* aerial parts, , GC-MS Analysis.

1. INTRODUCTION

The tradition of using medicinal plants has been preserved across generations and continues to play a vital role in healthcare. India, recognized as the largest producer of medicinal herbs, is often called the "botanical garden of the world."[1] Currently, several plants, including *Argemone mexicana*, *Echinops echinatus*, and *Tricholepis glaberrima*, are collectively known by the trade name Brahmadandi. This plant is well-regarded in the Indian system of medicine for its effectiveness in treating various ailments. [2]

Argemone mexicana, belonging to the Papaveraceae family and commonly known as Ghamoya, is a herb native to India with significant cultural and medicinal importance. It is extensively utilized in traditional practices such as Ayurveda, Unani, and Siddha. Traditionally, the herb has been used for its diuretic, purgative, anti-inflammatory, and analgesic properties, and is known to expel worms, soothe itching, treat skin conditions, and counteract various poisons. Additionally, Argemone mexicana has shown a range of pharmacological activities, including wound healing, anti-asthmatic, anti-stress, hepatoprotective, anti-HIV, anti-diabetic, and anti-inflammatory effects.[3]

Echinops echinatus, commonly referred to as Indian Global Thistle, is a shrub from the Asteraceae family found in India, Pakistan, and Sri Lanka. This plant is rich in chemical compounds, including carbohydrates, alkaloids, flavonoids, terpenoids, and steroids. Traditionally, it has been used to address various ailments such as fever, inflammation, asthma, sexual disorders, and neurological problems. The root, in particular, is recognized for its abortifacient and aphrodisiac properties. Additionally, the plant has been reported to possess antifungal, analgesic, anti-inflammatory, diuretic, antioxidant, and wound-healing properties.[4]

Tricholepis glaberrima DC, a member of the Asteraceae family and commonly known as "Brahmadandi," holds significant value in traditional medicine. In Ayurveda, it is employed as a nervine tonic and aphrodisiac and is used to treat skin conditions and coughs. The plant's therapeutic applications extend to its anti-inflammatory effects, treatment of urinary disorders, and antiseptic properties. It is rich in bioactive compounds, including flavonoids, triterpenoids, saponin glycosides, and sterols.[5]

In recent years, gas chromatography-mass spectrometry (GC-MS) has emerged as a crucial technique for profiling secondary metabolites across various species.[1] A review of the available literature on the polyherbal combination of *Argemone mexicana* leaves, *Echinops echinatus* roots, and *Tricholepis*

glaberrima aerial parts revealed no prior studies on the chemical composition of this mixture. Therefore, this study aims to identify the chemical constituents by preparing a 70% hydroethanolic extract and analyzing it using GC-MS.

2. MATERIALS AND METHODS

2.1 Collection and Authentication of Plant Material: The leaves of *Argemone mexicana*, roots of *Echinops echinatus*, and aerial parts of *Tricholepis glaberrima* were gathered from Chittoor District and were authenticated by Dr. K. Madhava Chetty, a Plant Taxonomist (IAAT:357) and Assistant Professor in the Department of Botany at Sri Venkateshwara University, Tirupati.

2.2 Extraction Procedure: A total of 300 grams of dried plant material, in equal proportions (1:1:1), was macerated using 70% hydro ethanol. The extract obtained was then evaporated over a water bath until it achieved a semisolid consistency. The semisolid extract was subsequently stored in an airtight container for future use.

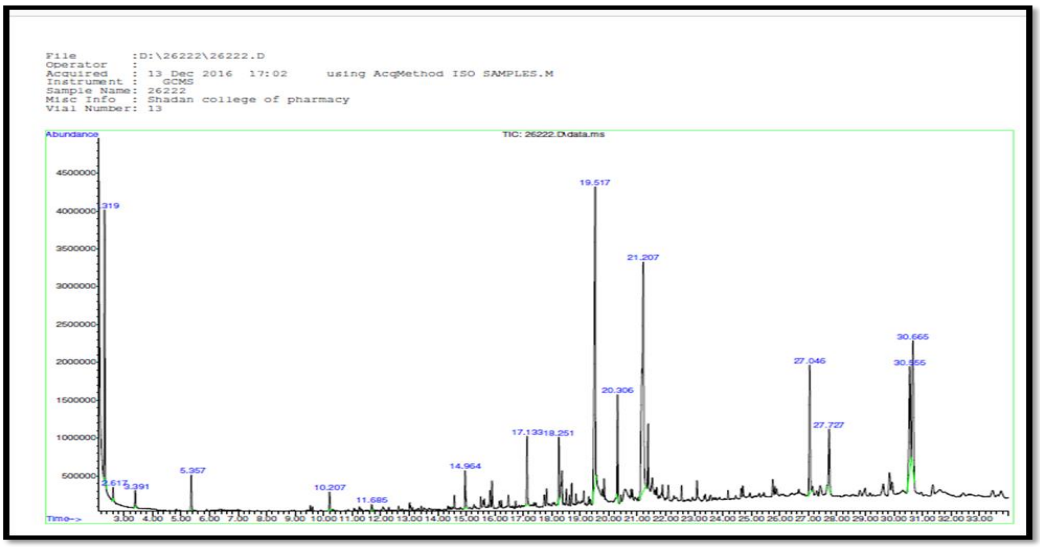
2.3 GC-MS Analysis

The GC-MS analysis of the polyherbal mixture was performed using an Agilent 6890 Gas Chromatograph, which was paired with a 5973N Mass Selective Detector (MSD). The system was equipped with an Elite-I fused silica capillary column (Cpsil 8cb: 30 m x 0.25 mm) composed of 100% Dimethylpolysiloxane. For detection, an electron ionization system operating at 70 eV was employed. High-purity hydrogen (99.99%) was used as the carrier gas, with a flow rate of 1.5 mL/min and an injection volume of 2 microliters. A split ratio of 10:1 was maintained during the analysis, starting with an injection temperature of 40°C and increasing to a final temperature of 280°C, while the ion source was set at 230°C. The oven temperature was programmed from 110°C (held isothermally for 2 minutes) with a ramp rate of 10°C per minute up to 300°C. The scan interval was 0.5 seconds, covering fragments from 20 to 200 Daltons, and the total run time was 36 minutes. The relative average peak area, retention time, molecular formula, and molecular weight were recorded. Interpretation of the mass spectra was conducted using the National Institute of Standards and Technology (NIST) database, which contains 62,000 patterns. The spectra of unknown components were compared with those of known components stored in the NIST library, enabling the identification of the names, molecular weights, and structures of the sample components.

3. RESULTS

3.1 Extraction: The 70% hydroethanolic extract of the polyherbal mixture AET yielded a percentage of 14%.

3.2 GC-MS (Gas Chromatograhy-Mass Spectrometry) Analysis : The GC-MS spectrum of the 70% hydroethanolic extract from the polyherbal mixture, which includes the leaves of *Argemone mexicana*, roots of *Echinops echinatus*, and aerial parts of *Tricholepis glaberrima*, is displayed in Graph 1. The GC-MS analysis identified 27 phytochemical constituents, including Silanedial diethyl, Oxime-methoxyl phenyl, 2-methoxy-4-vinyl phenol, Vanillin, Benzofuran, Hexaoleanoic acid, Phytol, and Dehydroabietic acid, which may contribute to the medicinal properties of the extract. Table 1 lists the major phytochemical constituents identified by GC-MS along with their associated biological activities.



Graph 1: GC-MS Spectrum of Chloroform extract of Polyherbal Mixture

Table 1: Compounds identified by GC-MS in Chloroform extract of Polyherbal Mixture

S.No.	RT (min)	Name	Mol. Formula	M.W. (g/mol)	Peak Area%	Biological Activity
1	2.319	Benzene/Annulene	C_6H_6	78.11	10.081	Carcinogenic
2	2.617	Trichloroethylene/ Trichloroethene	C_2HCl_3	131.39	0.385	Once used as an anaesthetic for surgery
3	3.391	Toluene/Methyl Benzene	C_7H_8	92.14	0.673	CNS depressant
4	5.357	1,3-dimethyl benzene/m-Xylene	C_8H_{10}	106.17	1.286	Laboratory chemical, used in paints & coatings
5	10.207	Bicyclo [5,3,0] decapentaene/ Azulene/Azotensin	$C_{10}H_8$	128.17	0.718	Block the synthesis of Prostaglandins; anti-inflammatory, analgesic, antipyretic
6	11.685	Thymol/5-methyl-2-(1-methylethyl)phenol	$C_{10}H_{14}O$	150.22	0.295	Antibacterial, Anti-infective, Antifungal
7	17.133	3,4-Dihydro-1-oxo-1H-2-benzopyran-5-carbaldehyde/ Erythrocentaurin	$C_{10}H_8O_3$	176.17	2.949	Laxative, Antimicrobial, Antiinflammatory
8	18.251	7,11,15-Trimethyl, 3-methylene-1-Hexadecene/ Neophytadiene	$C_{20}H_{38}$	278.52	2.847	Antiinflammatory, Antimicrobial, Antioxidant
9	19.517	Hexadecanoic acid/Palmitic acid	$C_{16}H_{32}O_2$	256.42	19.219	Enzyme Inhibitors
10	21.207	Cis-9, Cis-12-Octadecadienoic acid/Linoleic acid	$C_{18}H_{32}O_2$	280.45	25.251	Used in biosynthesis of Prostaglandins/ Reduces body fat in animals/ Antiinflammatory
11	27.046	Squalene	$C_{30}H_{50}$	410.73	7.533	Anticancer, Antiproliferative, Intermediate in biosynthesis of cholesterol

4. CONCLUSION

The detection of various bioactive compounds in the 70% hydroethanolic extract of the polyherbal mixture, which includes *Argemone mexicana* leaves, *Echinops echinatus* roots, and *Tricholepis glaberrima* aerial parts, supports the traditional use of the whole plant for various therapeutic purposes. Isolating individual phytochemical constituents and evaluating their biological activities could provide valuable insights and open new avenues for investigating the pharmacological potential of these components. The results suggest that the 70% hydroethanolic extract of this polyherbal mixture contains multiple bioactive compounds with diverse pharmacological activities, warranting further research. Thus, it is recommended to consider this plant for its phyto pharmaceutical significance.

Acknowledgement

The authors would like to express their sincere gratitude to Dr. Vijaya Sarathi, Senior Scientist at IICT, Tarnaka, Hyderabad, Telangana, India, for providing the facilities and support necessary to conduct this research.

References

1. Kanthal LK, Dey A, Satyavathi K and Bhojaraju P. GC-MS analysis of bioactive compounds in methanolic extract of *Lactuca runcinata* DC, *Pharmacognosy Research, 6(1)*, 2014 Jan-Mar, 58-61.
   Padashetty SA, Mishra SH. An HPTLC method for the evaluation of two medicinal plants commercially available in the Indian market under the trade name Brahmadandi, *Chromatographia, 64*, 2007, 447-449.
2. Fatima S et. al. Evaluation of Antiulcer activity of 70% Hydroethanolic leaf extract of *Argemone mexicana* Linn. in experimental rats, *IOSR Journal of Pharmacy, 6(4)*, 2016, 41-50.
3. Qureshi AS, Dr. Pasha K, Fatima S. HPTLC fingerprint analysis of 70% Hydroethanolic roots extract of *Echinops echinatus*, *World Journal of Pharmacy and Pharmaceutical Sciences, 6(4)*, 2017, 1100-1105.
4. Naphade SS, et. al. Neuropharmacological profile of *Tricholepis glaberrima* extract in mice, *Pharmacology Online, 2*, 2009, 140-150.