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GC-MS ANALYSIS OF PHYTOCOMPONENTS ON WHOLE PLANT EXTRACT ADIANTUM *CAPILLUS-VENERIS* L. - A POTENTIAL FOLKLORE MEDICINAL PLANT

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ABSTRACT: The present study of phytochemical analysis in the whole plant powder extract with absolute alcohol as well as phytochemical compound screened by using GC-MS method. In this GC-MS analysis, 15 bioactive phytochemical compounds were identified in the whole plant powder extract of *Adiantum capillus-veneris* L. The 15 compounds mainly Dodecanoic acid, ethyl ester, Nonadecane, Tetradecanoic acid, 3,7,11,15-Tetramethyl-2-hexadecen-1-ol, Acetic acid, 3,7,11,15-tetramethyl-hexadecyl ester, 3,7,11,15-Tetramethyl-2-hexadecen-1-ol, 3,7,11,15-Tetramethyl-2-hexadecen-1-ol, Docosane, 1,2-Benzenedicarboxylic acid, butyl octyl ester Phthalic acid, butyl octyl ester, n-Hexadecanoic acid, Hexadecanoic acid, ethyl ester, 9-Octadecenoic acid, Octadecanoic acid, ethyl ester, Di-n-octyl phthalate Tetracontane These different active phytochemicals have been found to keep a wide range of activities, which may be helpful in the defense against incurable diseases hence *Adiantum capillus-veneris* L. used as medicinal and therapeutic purpose. The current investigation deals with extraction of vital biological active compounds. This study will help to design the novel drugs for many incurable diseases.

KEYWORDS: GC-MS, Phytochemicals, Medicinal plants, phytopharmaceuticals, *Adiantum capillus-veneris* L.

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1. INTRODUCTION

Pteridophytes are an essential component of world flora, representing about 225-230 genera containing some 12000 species all over the world [1]. Pteridophytes have voluminous chemical compounds which are significant in therapeutic purposes as well as plants have plentiful potential uses, specifically as traditional medicine and pharmacopoeial drugs. A large quantity of the world population be contingent on traditional medicine for the reason that of the scarcity and high costs of orthodox medicine. Medicinal plants have providing the modern medicine with plentiful plant-derived therapeutic agents. Many plants contain a range of phytopharmaceuticals, which have originate very significant applications in the fields of agriculture, veterinary and human medicine. Natural products play a leading role in the development of innovative drug leads for the treatment and prevention of diseases [1-3]. Information of the chemical constituents of plant is helpful in the discovery of therapeutic agent as well as new cradles of economic materials like oil and gums. The most vital bioactive constituents of the plants are alkaloids, tannins, flavonoids and phenolic compounds. In India large amount of fern species had been screened for their pharmacological properties but still a massive wealth of endangered species are unknown. Medicinal plants are at curiosity to the field of biotechnology as well as most of the drug industries depend on plant parts for the future production of pharmaceutical compounds. [4]

2. MATERIALS AND METHODS

Collection of plant material

The whole plant of *Adiantum capillus-veneris* L. were collected from the Mahabaleshwar, Maharashtra India. They were identified and authenticated by the Department of Botany herbarium, Jaysingpur College Jaysingpur, Kolhapur, India.

Preparation of powder and extract

The whole plant powder extract of *Adiantum capillus-veneris* L. (500g) was shade dried, powdered and extracted with ethanol for 6-8 hours using soxhlet apparatus. The extract was then filtered over and done with Whatmann filter paper No.41 along with 2g sodium sulfate to remove the sediments and traces of water in the filtrate. Already filtering, the filter paper as well as sodium sulphate is wetted with absolute alcohol. The filtrate is then concentrated by bubbling nitrogen gas into the solution and simultaneously reduce the volume to 1ml. The extract contains both polar and non-polar phytocomponents.

GC-MS Analysis

The GC-MS analysis of *Adiantum capillus-veneris* L. whole plant powder extract with in absolute alcohol, was performed using a Clarus 500 Perkin Elmer gas chromatography equipped with an Elite-5 capillary column (5% phenyl 95% dimethyl polysiloxane) (30nm X 0.25mm ID X 0.25 μ mdf) as well as mass detector turbo mass gold of the company which was operated in EI mode. Helium

was the carrier's gas at a flow rate of 1ml/min. and simultaneously the injector was operated at 290°C and the oven temperature was programmed as follows; 50°C at 8°C/min to 200°C (5min) at 7°C/min to 290°C(10min).

Identification of components

Analysis on mass spectrum of GC-MS was done using the database of National Institute Standard and Technology (NIST), WILEY8, FAME having more than 62,000 patterns. The mass spectrum of the unidentified component was compared with the spectrum of the identified components stored in the (NIST), WILEY8, FAME library. The name, molecular weight and structure of the components of the test materials were ascertained.[9-10]

3. RESULTS AND DISCUSSION

GC-MS chromatogram of the ethanolic leaf extract of *Adiantum capillus-veneris* L. (Fig-2) displayed 15 peaks indicating the presence of fifteen compounds. The chemical compounds identified in the ethanolic extract of the whole plant of *Adiantum capillus-veneris* L. presented in Table 1. GC-MS analysis discovered that the presence of The 15 compounds mainly Dodecanoic acid, ethyl ester, Nonadecane, Tetradecanoic acid, 3,7,11,15-Tetramethyl-2-hexadecen-1-ol, Acetic acid, 3,7,11,15-tetramethyl-hexadecyl ester, 3,7,11,15-Tetramethyl-2-hexadecen-1-ol, 3,7,11,15-Tetramethyl-2-hexadecen-1-ol, Docosane, 1,2-Benzenedicarboxylic acid, butyl octyl ester Phthalic acid, butyl octyl ester, n-Hexadecanoic acid, Hexadecanoic acid, ethyl ester, 9-Octadecenoic acid, Octadecanoic acid, ethyl ester, Di-n-octyl phthalate Tetracontane. The GC-MS analyses discovered that the alcoholic extract is mainly composed of oxygenated hydrocarbons and principally phenolic hydrocarbons. These phytochemicals are responsible for numerous pharmacological actions like antimicrobial activities useful in a treatment of variety of diseases, Acting against No. of viral infections using colds, flu and herpis, Useful for killing bacteria that cause diseases such as Chlamydia, MRSA and Bronchitis, Good alternative treatment of acne suffers, Treatment of diseases caused by certain fungi & parasites, Anti-viral agent. It can block the ability of certain viruses to replicate, thus limiting their ability to cause disease. In treatment of different strains of Influenza. Antimicrobial agent. This study is only an initial study of the occurrence of certain properties of *Adiantum capillus-veneris* L. whole plant an in-depth study will deliver a good material base for all the biochemical and phytochemical functions stated above. New scientific plans for the evaluation of natural products with definite biological activities require the implementation of bulky screening process. *Adiantum capillus-veneris* L. is a potential folklore therapeutic plant used for numerous diseases and infections. Phytochemical analysis by GC-MS exposed presence of Lauric Acid (Didecanoic acid) Lauric Acid (Didecanoic acid) Dibutyl Phthalate Dibutyl Phthalate, Di-n-octyl phthalate, Hexadecanoic acid (Palmitic Acid), Octadecanoic acid, Tetradecanoic Acid (Myristic acid), Heptadecanoic acid (Margaric acid), Octadecanoic acid, Tetradecanoic Acid (Myristic acid),

Heptadecanoic acid (Margaric acid), 1,2-Benzenedicarboxylic acid, Butylated hydroxytoluene.

Compositional difference in quantities, qualities as well as structural features may effect compounds behavior on GC-MS as well as bioactivities of their originator fractions.[5,10]

Plant	Bioactive Compounds	Molecular Weight	Molecular Formula	CAS Value	Retention time
Adiantum capillus-veneris L.	Dodecanoic acid, ethyl ester	228	C14H28O2	106-33-2	12.800
	Nonadecane	268	C19H40	629-92-5	14.179
	Tetradecanoic acid	228	C14H28O2	544-63-8	14.692
	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	296	C20H40O	102608-53-7	15.649
	Acetic acid, 3,7,11,15-tetramethyl-hexadecyl ester	340	C22H44O2	0-00-0	15.743
	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	296	C20H40O	102608-53-7	15.887
	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	296	C20H40O	102608-53-7	16.077
	Docosane	310	C22H46	629-97-0	16.279
	1,2-Benzenedicarboxylic acid, butyl octyl ester Phthalic acid, butyl octyl ester	334	C20H30O4	84-78-6	16.548
	n-Hexadecanoic acid	256	C16H32O2	57-10-3	16.768
	Hexadecanoic acid, ethyl ester	284	C18H36O2	628-97-7	17.057
	9-Octadecenoic acid.	282	C18H34O2	112-79-8	18.397
	Octadecanoic acid, ethyl ester	312	C20H40O2	111-61-5	18.900
	Di-n-octyl phthalate	390	C24H38O4	117-84-0	21.671
Tetracontane	562	C40H82	4181-95-7	22.299	

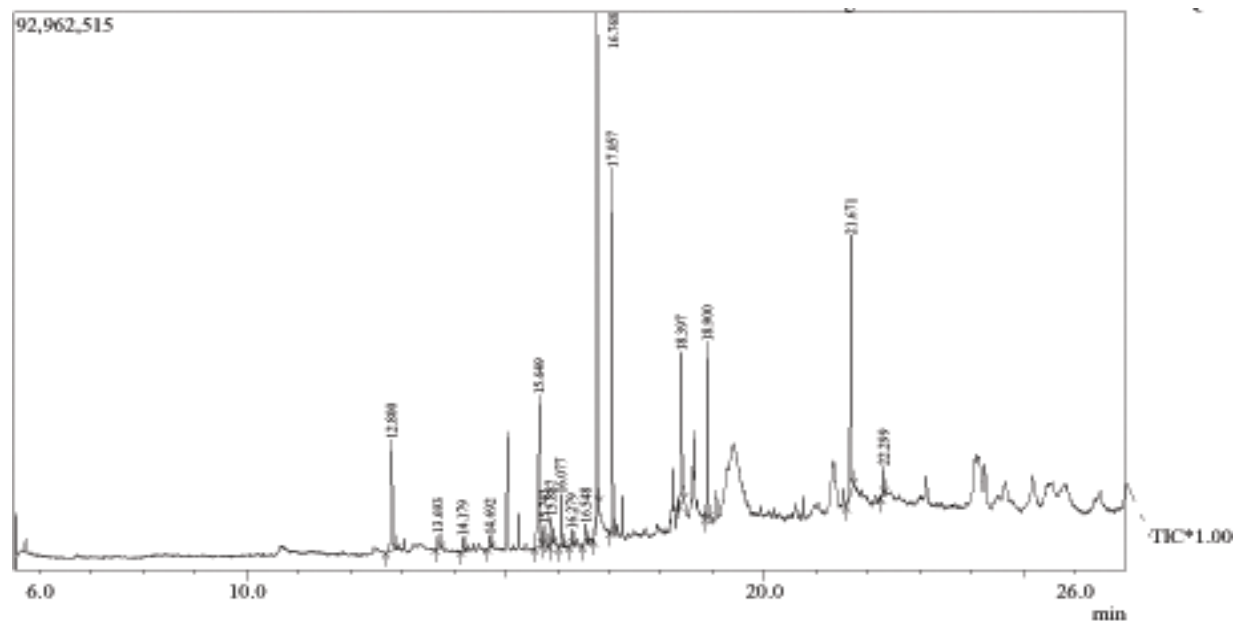
GCMS Profile

Fig. 1 GC-MS Chromatogram of ethanolic extract of whole plant extract of *Adiantum capillus-veneris* L.

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