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ANALYSIS OF BIOACTIVE COMPOUNDS ON ETHANOLIC EXTRACT OF WHOLE PLANT OF *CYATHEA GIGANTEA*

Manisha V Kale

Department of Botany, Jaysingpur College, Jaysingpur 416 101, Maharashtra, India

ABSTRACT: Objective: To evaluate the bioactive compounds of ethyl extract of *Cyathea gigantea* using GCMS analysis. Methods: The *Cayathea gigantea* whole plants were extracted with ethanol and analyzed with gas chromatography- mass spectrometry. The mass spectra of the compounds were corresponding with the National Institute of standards and technology (NIST) library. Results: The analysis revealed the presence of 8 compounds. Some of the bioactive compounds screened include Dodecanoic acid, ethyl ester, Tetradecanoic acid, ethyl ester 3, 7, 11, 15-Tetramethyl-2-hexadecen-1-ol *n*-Hexadecanoic acid Hexadecanoic acid, ethyl ester Octadec-9-enoic acid *Octadecanoic* acid, ethyl ester Di-n-octyl phthalate. The compounds were identified by matching with retention time and peak area and by interpretation of mass spectra. Conclusion: After that result it can be concluded that the bioactive compounds have many applications as medicinal properties.

KEYWORDS: *Cayathea gigantea*, GCMS analysis, NIST library, bioactive compounds, Ethanol.

***Corresponding Author: Dr. Manisha V Kale** Ph.D.

Department of Botany, Jaysingpur College, Jaysingpur 416 101, Maharashtra, India

*Email Address: manishavkale@gmail.com

1.INTRODUCTION

Cyathea gigantea (*C. gigantea*) (Wall. ex. Hook.) (Cyatheaceae) is a tree fern originate widely in moist open areas of Northeastern to Southern India, Thailand, Nepal and Western Java. The Cyatheaceae is the crusty tree fern family and consist of the world's giant tree ferns, which spread heights up to 20 m[1]. Usually the fresh rhizome of *C. gigantea* assorted with black pepper seeds powdered and in use orally through milk two times a day for one week in stomach in contradiction of white discharges [2].Liver is one of the significant organs of the body which shows a main part

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in the metabolism of proteins, carbohydrates, lipids. It is similarly having extensive range of functions including detoxification, storage of glycogen, vitamin A, D and B12, invention of numerous coagulation factors, growth factors (IGF-1), hormones (angiotensinogen) and biochemical necessary for digestion (bile). Hepatic damage occurs due to its multi-dimensional functions, various xenobiotic and oxidative stress leading to distortion of all of its functions [3]. Alternative plant from the equivalent genus *i.e.*, *Cyathea phalerata* Mart displayed antioxidant and hepatoprotective activities [4]. *C. gigantea* have numerous active constituents like triterpenes, sterols, saponins, flavonoids, hentriacontane, β-sitostenone, β-sitostanone, diploterol, sitosterol, hopan-29-ol and whole plant holds oleanolic acid [5]. The first study on flavonoids constituents in the genus *Cyathea* was carried out by Harada *et al*[6]. Oleanolic acid is a triterpenoid having antitumor, hepatoprotective and antiviral activity [7],[8]. Oleanolic acid is bringing into being to exhibit strong anti-HIV activity [9]. Dietary phytosterols like β-sitosterol is having anticancer activity [10, 11].

2. MATERIALS AND METHODS

Collection of plant material

The whole plants of Cyathea gigantea were collected from the Castle Rock, Karnataka India. They were identified and authenticated by the Department of Botany herbarium, Jaysingpur College Jaysingpur, Kolhapur, India

Preparation of Extract:

30 gm of air dried plant powder soaked in 300 ml organic solvents Ethanol for 24 hrs in round bottom flask for room temperature. Extract filtered through Whatman No. 1 filter paper. Filtrate allowed drying at room temperature & extracts were obtained. Condensed extracts were weighed & stored in air tight containers at 4^0C till further investigate.

GC-MS analysis:

The *Cyathea gigantea* whole plant sample using bio-activity was a selection of to implement the gas chromatography-mass spectrometry (GC-MS) analysis. The samples were prepared for GC-MS analysis by following procedure. 50g of powdered sample was dissolved in 50 mL of ethanol. One micro liter of sample was inserted into the gas chromatography (GC Thermo, Trace Ultra 5.0, Thermo MS DSQ II). Separation of compound was achieved using ZB 5 MS Column, (30 mtsX0.25 mm 0.25 micro m). The oven temperature was elevated from 70° C to 260° C at 6° C/min. The carrier gas Helium was passed over at a flow rate of 1.0ml/min. The run time was 3.15 to 43.02 minutes. The Compounds were recognized with the help of Wiley and NIST Libraries based on their molecular mass.

3. RESULTS AND DISCUSSION

Chemical composition analysis of *Cyathea gigantea* whole plant (ethanol) by GC-MS:

The main compounds of the ethanolic extract of the Cyathea gigantea were identified by GC-MS. A number of 8 spectral peaks were discovered in GC-MS analysis of Cyathea gigantea. These peaks were detected at retention time (RT) 12.794, 15.029, 15.648, 16.822, 17.059, 18.457, 18.899, 21.668 (Table I). Among these 8 peaks were identified by mass spectroscopy (MS); these compounds may responsible for antioxidant, anticancer, anti-inflammatory activity of Cyathea gigantea .The compounds were Dodecanoic acid, ethyl ester, Tetradecanoic acid, ethyl ester 3, 7, 11, 15-Tetramethyl-2-hexadecen-1-ol *n*-Hexadecanoic acid Hexadecanoic acid, ethyl ester Octadec-9-enoic acid *Octadecanoic* acid, ethyl ester Di-n-octyl phthalate. The Ethyl acetate extract of Cordia monoica leaves showed different peaks (Figure-1) and the compounds have been identified by comparing with WILEY and NIST libraries

Sr No	Name of Plant	Bioactive Compounds	Molecular Weight	Molecular Formula	CAS Value	Retention time
1.	*Cayathea gigantean*	Dodecanoic acid, ethyl ester	228	C14H28O2	106-33-2	12.794
		Tetradecanoic acid, ethyl ester	256	C16H32O2	124-06-1	15.029
		3,7,11,15-Tetramethyl-2-hexadecen-1-ol	296	C20H40O	102608-53-7	15.648
		n-Hexadecanoic acid	256	C16H32O2	57-10-3	16.822
		Hexadecanoic acid, ethyl ester	284	C18H36O2	628-97-7	17.059
		Octadec-9-enoic acid	282	C18H34O2	0-00-0	18.457
		Octadecanoic acid, ethyl ester	312	C20H40O2	111-61-5	18.899
		Di-n-octyl phthalate	390	C24H38O4	117-84-0	21.668

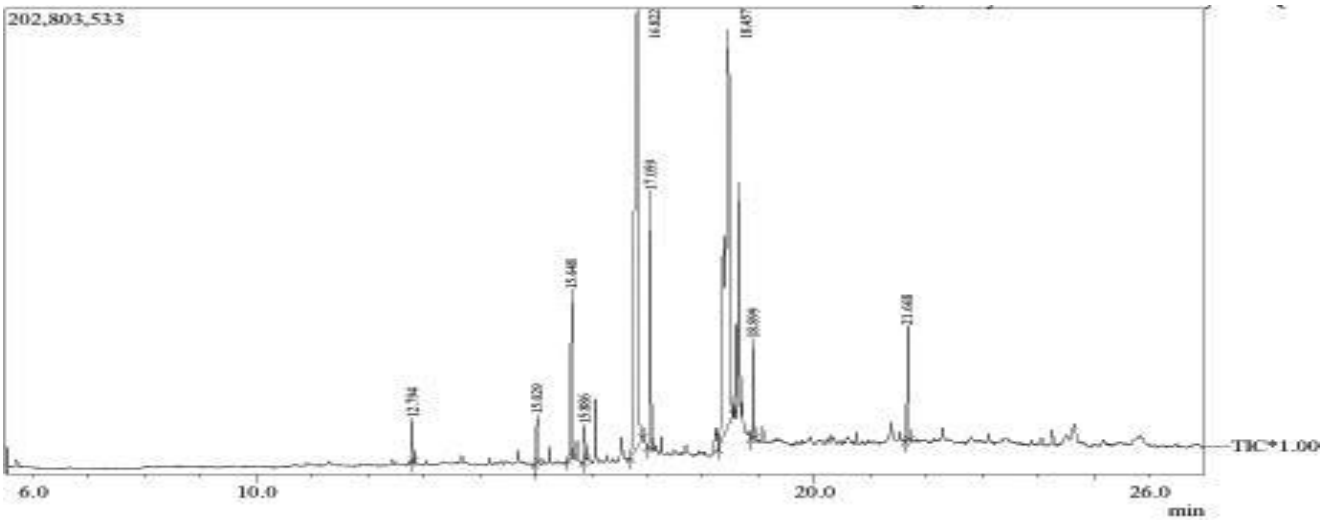

Fig. GC-MS Chromatogram of ethanolic extract of whole plant extract of *Cayathea gigantea*

4. CONFLICT OF INTEREST

The authors confirm that this article content has no conflicts of interest

5.ACKNOWLEDGEMENT

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