Original Article

“Phytochemical And Spectrophotometric Analysis Of Caralluma Adscendens Roxb. Stem Extract By Gc-Ms”

Dattaprasad N. Vikhe[1*], Shreyash K. Pardeshi[2], V. B. Ghavate[3], Prajwali Bhalerao[4]

[1*]Assistant professor of Department of Pharmacognosy, Pravara Rural College of Pharmacy, Loni Pravaranagar, Prasadvikhepatil@gmail.com
[2]Deapartment of Pharmacognosy, MES College of Pharmacy, Sonai, Maharashtra
Shreyashpardeshi29@gmail.com
[3,4]Department of pharmacognosy, Pravara Rural College of Pharmacy, loni, Pravaranagar, Maharashtra

*Corresponding Author: Mr Dattaprasad N. Vikhe

*Assistant professor, Department of Pharmacognosy, Pravara Rural Collage of Pharmacy, Loni Pravaranagar
Email id: Prasadvikhepatil@gmail.com
DOI: 10.47750/pnr.2022.13.S10.751

Abstract

The present study focuses on the morphology, microscopy and phytochemical investigation of ethanolic extract of Caralluma adscendens Roxb Stem. India has a vast variety of plants and makes effective use of them via the practice of Ayurveda. In Maharashtra, Caralluma adscendens Roxb. is sometimes referred to as Makadshingi. Caralluma adscendens. Indigenous herbal plant. Historically, the uncommon Indian medicinal herb Caralluma adscendens has been employed. Caralluma adscendens belong to Apocynaceae family. Caralluma adscendens Roxb. Various diseases, such as rheumatism, diabetes, leprosy, paralysis, and inflammation, can be treated with plant chemicals. The nutritional quantitative analysis is carried out to evaluate the nutritive factors like fats, proteins, carbohydrates, and vitamin. Result The morphological, microscopy, and phytochemical investigations of the stem of Caralluma adscendens Roxb. Were evaluated in accordance with the established pharmacognostic criteria.

Keywords: Caralluma adscendens roxb, makadshingi, Thin layer chromatography, GC-HRMS

INTRODUCTION:

India is regarded as the country that produces the most herbal medication worldwide and is aptly referred to as the world's botanical garden. Primary healthcare is still provided by the herbal plants that are connected to the old medical system. People have used plants for their medicinal benefits for ages. 85000 plants are known to be used therapeutically across the world today. (1) Traditional remedies made from plants are crucial to maintaining peoples' health all around the world. Personal care items, herbal medications, natural health products, cosmetics, and pharmaceuticals are a few significant categories of plant-derived goods. Caralluma adscendens has been used by tribal communities in Asian countries for the treatment of various disease. Apocynaceae family member Caralluma adscendens is an edible succulent cactus that grows in dry areas and is utilized by tribal Indians as "famine food" and a wild medicinal plant. It has never been linked to any negative side effects.

A species of the Caralluma genus of succulent cactus known as Yugmaphallottatna, or Caralluma adscendens in Sanskrit, has been used as an appetite suppressor. Caralluma adscendens is frequently found as a wayside shrub or boundary sign and has been consumed in rural India for millennia as a raw vegetable, a vegetable with spices, or preserved in chutneys and pickles. This plant has been researched for its wide range of biological properties, including its potential hepatoprotective, antihyperglycaemic, and hypolipidemic benefits. It is commonly used as food, an appetite suppressant, and a therapy for diabetes despite being listed by the Indian Health Ministry as a vegetable and famine food.(2) According to (WHO) estimates, about 75% of people worldwide have used herbal medicines for medicinal purposes. One of the most severe diseases that affects people is cancer, and scientists have recently discovered a number of novel natural anti-cancer drugs.(3) A perennial herb called Caralluma adscendens Roxb., an edible succulent cactus, grows in the arid regions of Tamil Nadu, India. It is a member of the Apocynaceae family and is popular among tribal populations as famine food, an appetite suppressant, and a thirst quencher. There are around 200 genera and 2500 species in the genus Caralluma.(4) An analysis was done to determine how Caralluma fimbriata extract affected adult Indian men and women's appetite, food consumption, and astrometry.(7) Under the brand name GENASLIM, a Caralluma fimbriata extract has been made available in pill form for body weight management.

MATERIALS AND METHOD

Plant material collection and authentication:

The Caralluma adscendens roxb plant was Collected from Hatti Village, Tehsil Chandwad, District Nasik, Maharashtra in the month of September. And authenticated

Chemicals, reagents and solvents

Ethanol (90%), Ethyl acetate, Benzene, Silica gel 60-120

Extraction process of leaves of Caralluma adscendens roxb.

- **Maceration:** This is an extraction method in which a container is filled with finely powdered drug material, such as leaves, stem bark, or root bark. The menstruum is then poured on top, covering the drug material entirely. After that, the container is sealed and preserved for a minimum of three days.(6)
- Take 200gm of Caralluma adscendens roxb. stem powder
- Take 400ml of 90% Ethanol and mix in stop close conical flask
- These mixtures shake after 1 hrs. these procedure repeated 3 days
- Finally filter solution and collect liquid solution for evaporation

Thin layer chromatography of Caralluma adscendens roxb Stem

Thin layer chromatography depends on separation of two or more mixture Thin layer chromatography is a chromatography technique that separates components in non-volatile mixtures. It is carried out on a TLC plate consisting of a non-reactive solid covered with a thin layer of adsorbent material. This is called the stationary phase

Principle: Due to differences in affinities between the two phases, mixture components are divided into a stationary phase that is fixed and a liquid mobile phase.
Mobile phase according to Phytoconstituent

Table no 1: mobile phase use for TLC along with ratio

Sr no.	Phytoconstituent	Mobile Phase	Ratio
1.	Alkaloids	N-buttane: H2O: Acetic acid	(1:5:4)
2.	Flavonoids	N-buttane: H2O: Acetic acid	(1:5:4)
3.	Terpenoids	Ethanol: Acetic acid	(5:5)
4.	Fatty acid	Benzene: Ethyl acetate	(3:7)

Retention Factor

$$\frac{\text{Distance Travelled by Solute}}{\text{Distance Travel by Solvent}}$$

Column Chromatography

a single chemical component can be isolated from a mixture using a technique called column chromatography. Due to the fact that different chemicals bind to the adsorbent differently and pass down the column at various speeds, chromatography may divide substances into fractions. The method may be employed with a broad variety of adsorbents (normal phase, reversed phase, or other) and solvents, making it extensively useful.

Principle: Absorption of solute from solvent with help of Chemical (Stationary Phase) after separation collect two different compound

Stationary Phase – Silica gel G (60-120)

Mobile Phase – Benzene: Ethyl acetate (3:7)

RESULT:

Thin layer chromatography of Caralluma adscendens Roxb. Bark

Sr no	Phytoconstituent	Mobile Phase	Ration	RF Value
1	Alkaloids	N-buttane:H2O:Acetic acid	(1:5:4)	1.23
2	Flavonoids	N-buttane:H2O:Acetic acid	(1:5:4)	1.47
3	Glycoside	N-buttane:H2O:Acetic acid	(1:5:4)	1.47
3	Terpenoids	Ethanol: Acetic acid	(5:5)	1.16
4	Fatty acid	Benzene: Ethyl acetate	(3:7)	2.75

Table no 2: Thin Layer Chromatography and RF Value

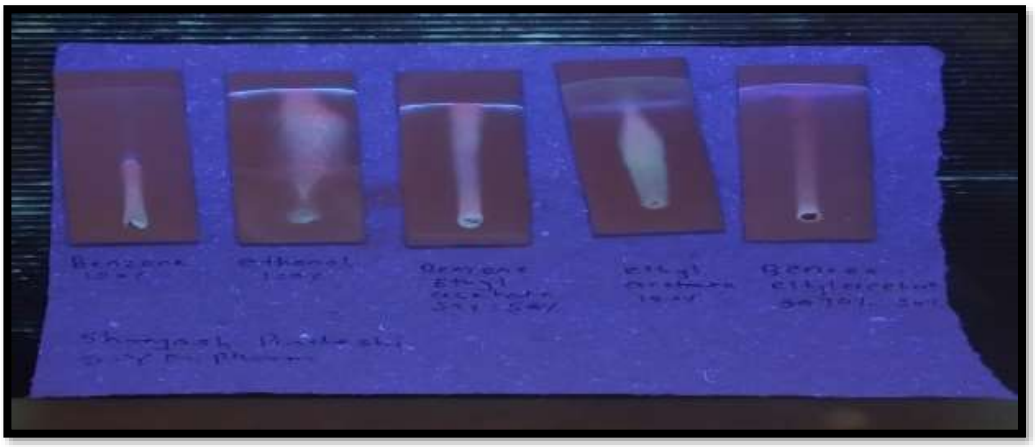

Fig no 1: TLC under UV light

2) Column chromatography of Caralluma adscendens Roxb. stem for Ethanolic Extract

The column chromatography separation technique was performed for Ethanolic extract the result shown in column chromatography for Ethanolic extract of Caralluma adscendens roxb.

Fig no 2: Column chromatography

Type of Elution: Gradient column

Size: Length 40cm, diameter 1cm

Drop/min: 2-3

GC-HRMS RESULT

Table no:4 GC-HRMS Spectral analysis of Ethanolic extract of Caralluma adscendens Roxb.

Sr no	peak	Phytoconstituent	Mol formula	Mol weight	Time	Area
1	0.1456	Zeaxanthin	C40H56O2	568.88 g/mol	39.92	1453535396.05
2	0.3050	Hexadecanoic ethyl ester	C18H36O2	284.47g/mol	26.86	63154046.85
3	0.1387	Tetradecanoic acid Ethyl ester	C16H32O2	256.42 g/mol	19.50	30689196.63
4	0.1743	Lenolic acid ethyl acetate	C18H22O2	280.44g/mol	26.26	28547716.87
5	0.0824	9, 12, 15-octadecanoic acid	C18H18O2	210.14g/mol	26.36	11078897.08
6	0.1734	Octadecanoic acid ethyl ester	C20H40O2	312.52g/mol	24.68	6919184.32
7	0.0588	Heptadecanoic acid	C17H34O2	270.45 g/mol	24.68	4307947.08
8	0.0459	Oxirane, decyl	C2H4O	44.05 g/mol	28.64	2892452.24
9	0.0452	Asarone	C12H16O3	208.254 g/mol	24.11	1174254.88

Table no 3: GC-HRMS analysis

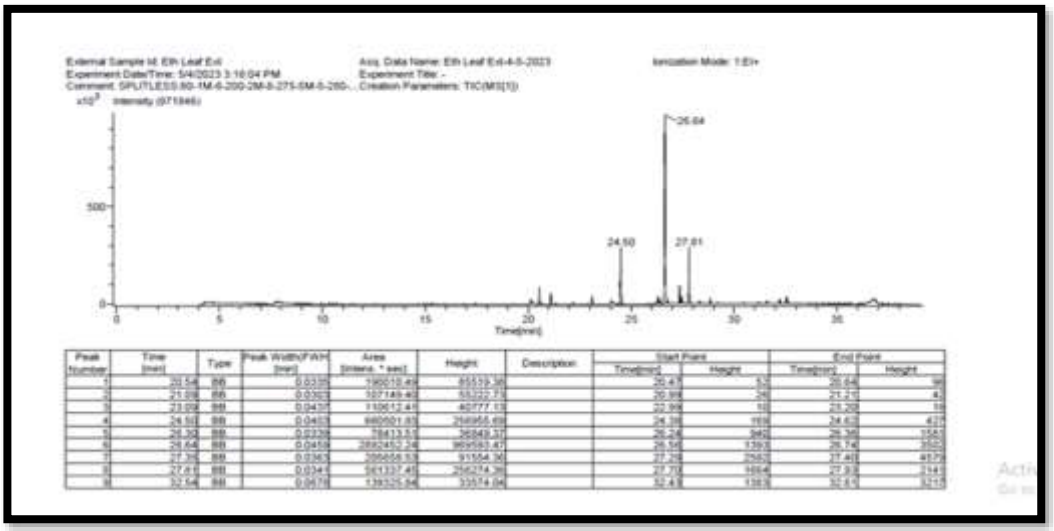

Fig no 3: GC-HRMS

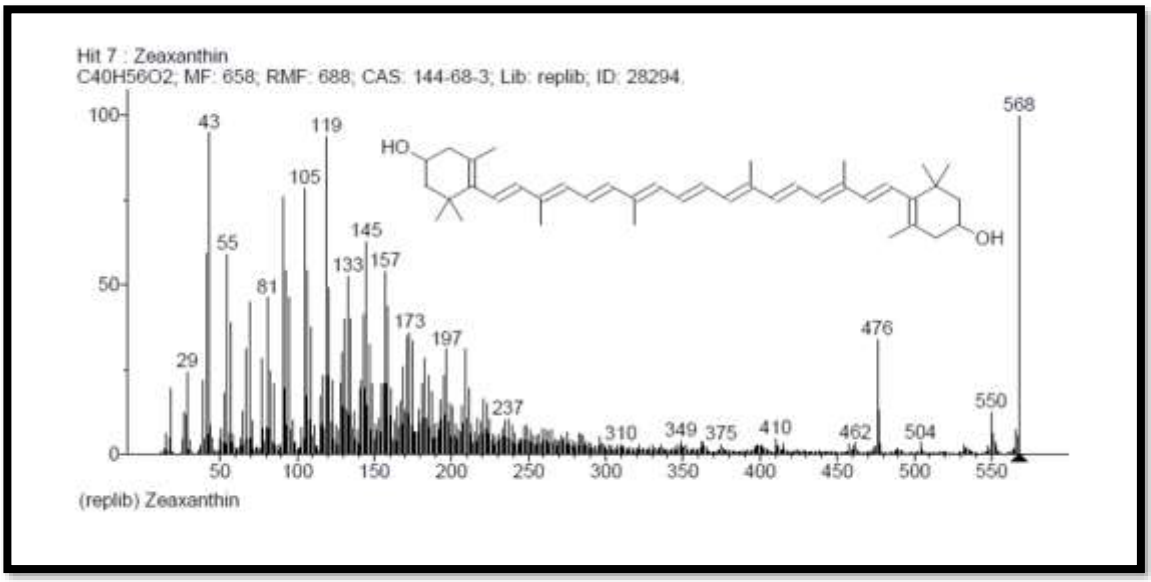

Fig no4: Zeaxzanthin

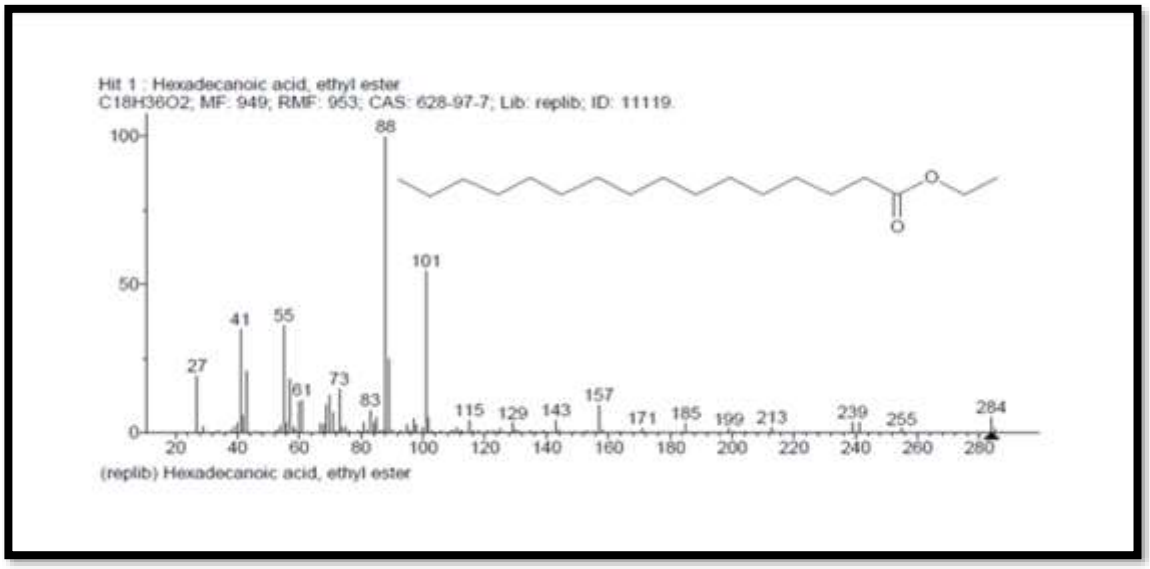

Fig no5: Hexadecanoic acid, ethyl ester

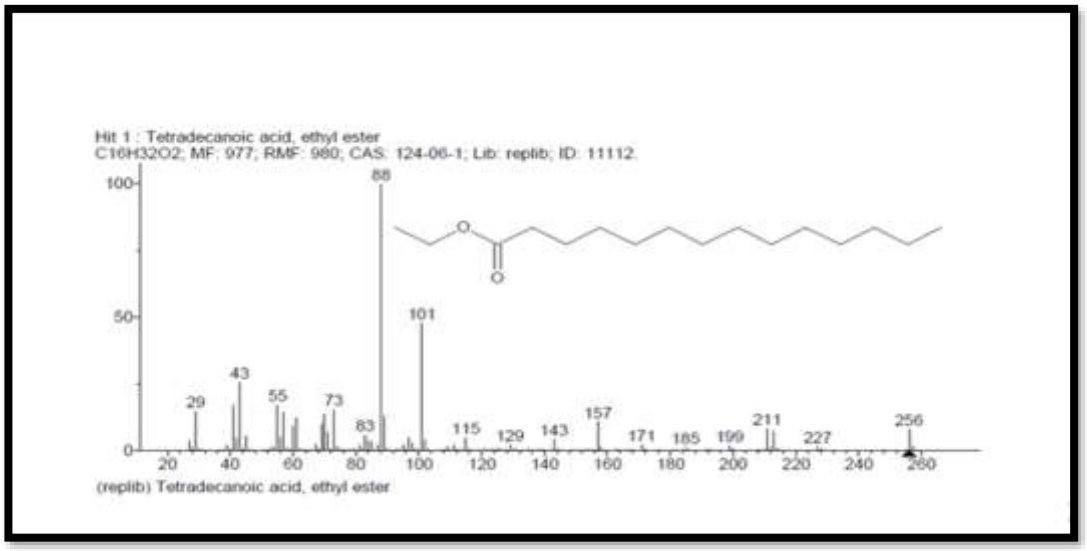

Fig no6: Tetradecanoic acid, Ethyl ester

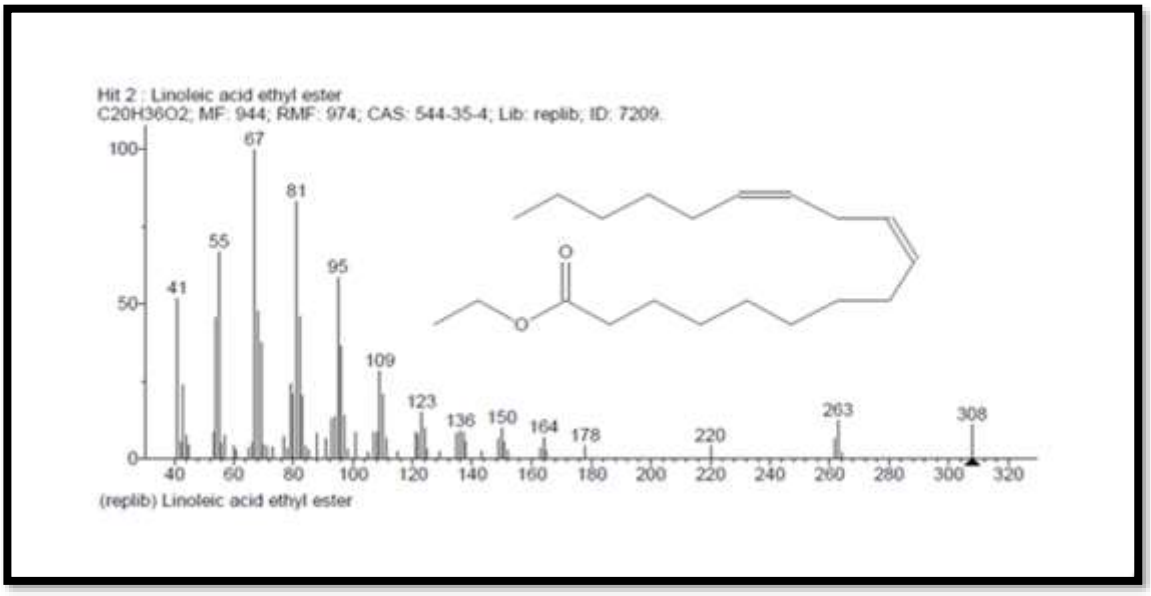

Fig no:7 Linoleic acid ethyl ester

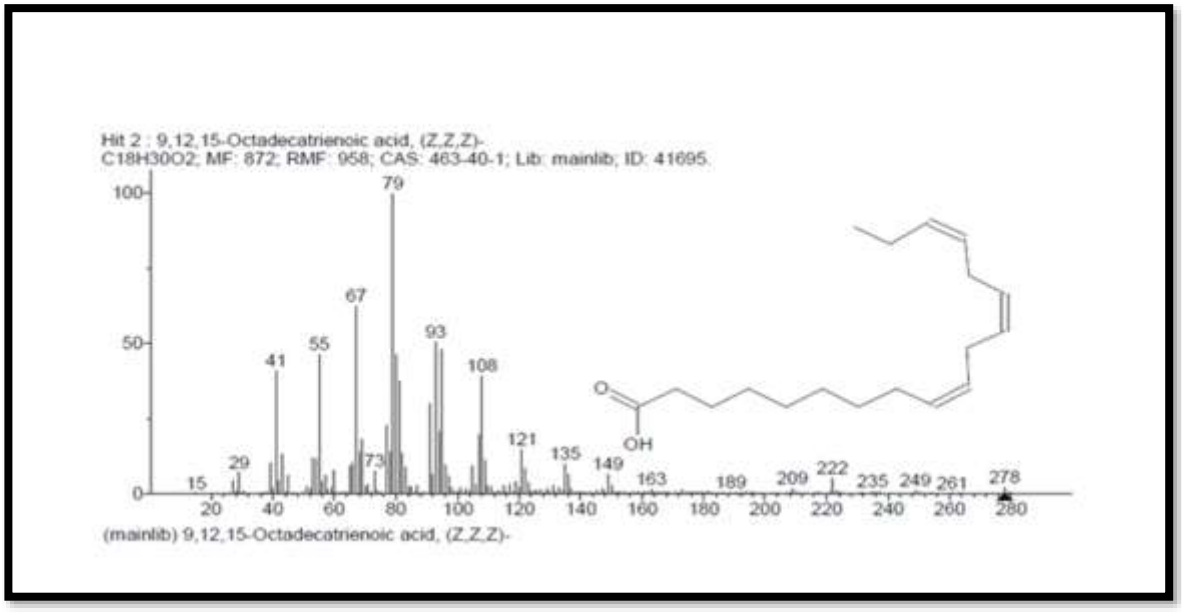

Fig no 8: 9, 12, 15-Octadecanoic acid

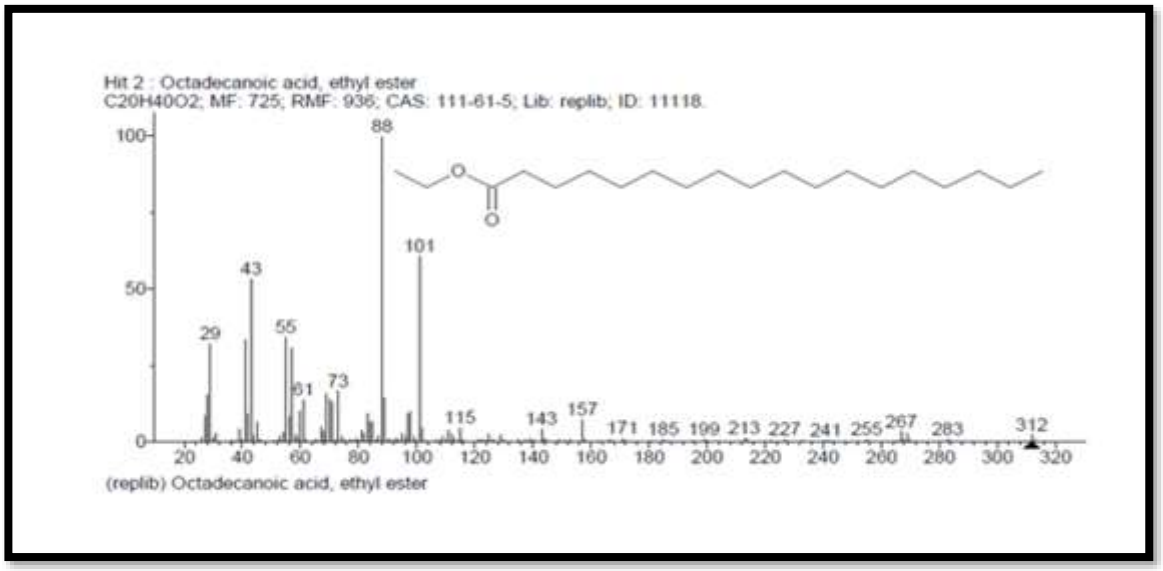

Fig no 9: Octadecanoic acid, ethyl ester

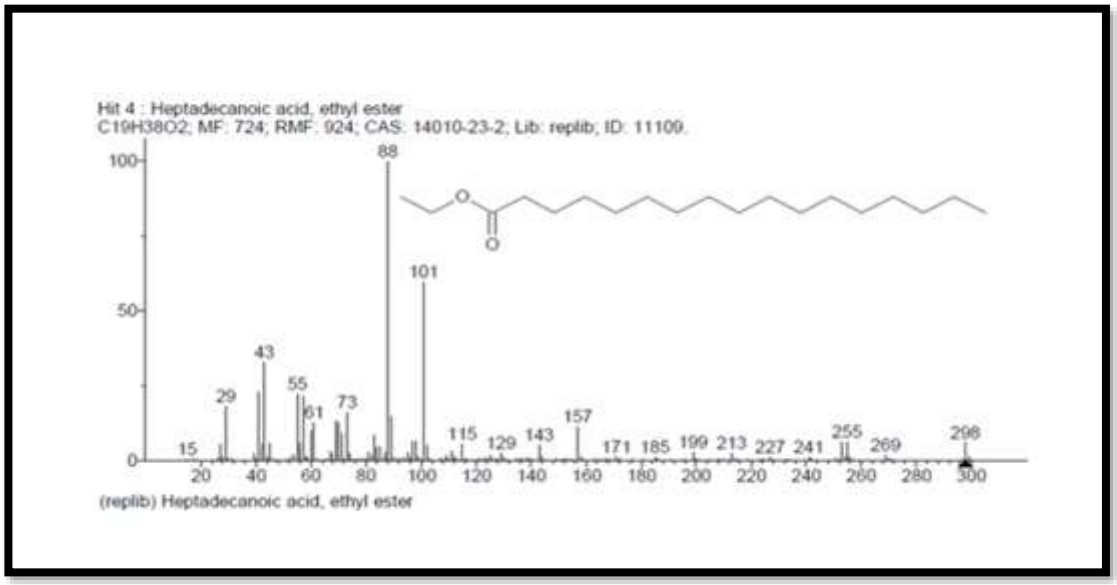

Fig no 10: Heptadecanoic acid, ethyl ester

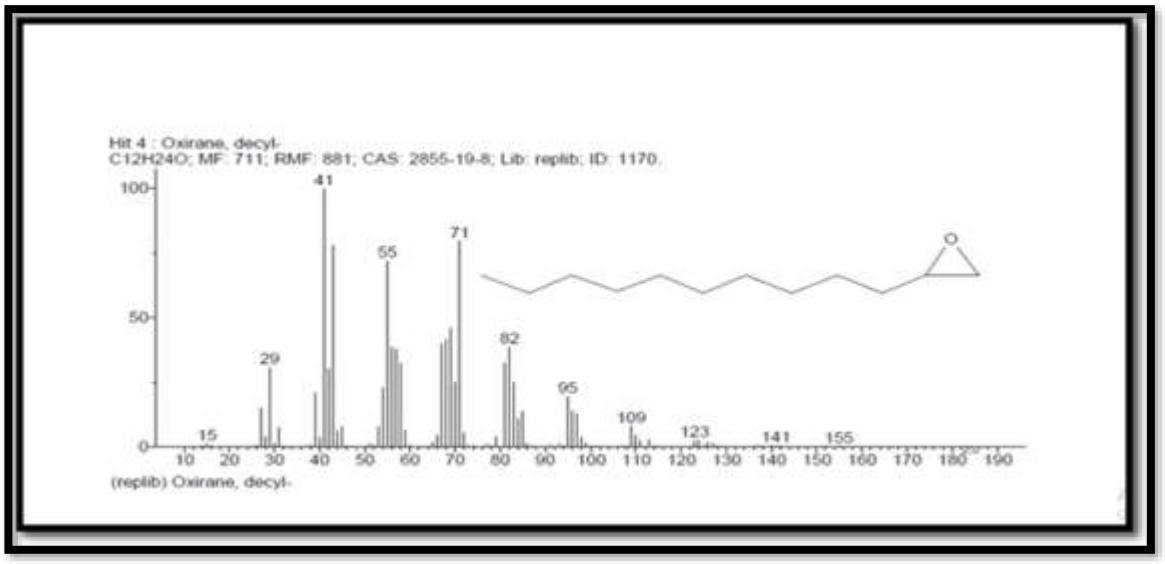

Fig no 11: Oxirane decyl-

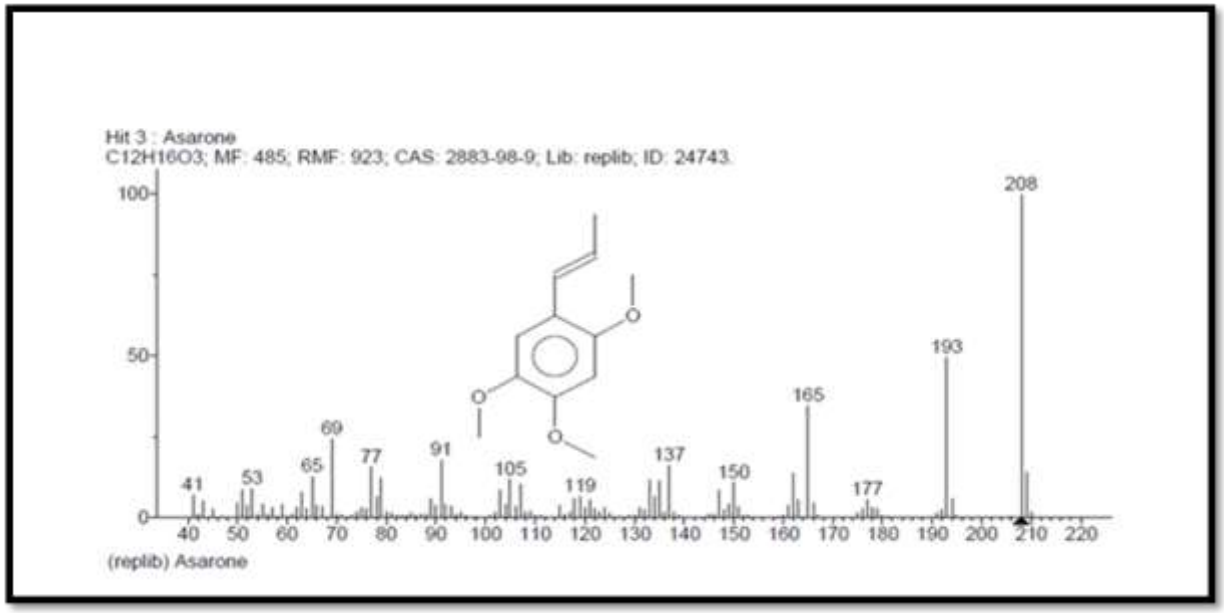

Fig no 12: Asarone

The Ethanolic extract of plant Caralluma adscendens roxb. was analyzed by Gas Chromatography high resolution mass spectroscopy (GC-HRMS) technique and were perform at SAIF IIT Bombay, India. 9 Compound were detected. The eight compound along with their retention times and peak, area and time given in the table. The first compound Zeaxanthin with C40H56O2 mol. Formula and having 1453535396.05 area. In literature survey found that this compound shown in Anti-cancer activity (7) The second compound Hexadecanoic ethyl ester with C18H36O2mol. Formula and having 63154046.85 area. In literature survey found that this compound shown in Anti-cancer activity (8). The third compound Lenolic acid ethyl acetate with C18H22O2 and having 63154046.85 area. In literature survey found that this compound shown in Anti-cancer activity (9). Third compound Tetradecanoic acid Ethyl ester with C16H32O2 and having 30689196.63 area In literature survey found that this compound shown in Anti-cancer activity (10). Fourth compound Lenolic acid ethyl acetate with C16H32O2 and having 28547716.87 area In literature survey found that this compound shown in Anti-cancer activity (11). Fifth compound Ethyl 9, 12, 15-octadecatrionate with C18H18O2 and having 11078897.08 area In literature survey found that this compound shown in Anti-cancer activity (12). Sixth compound Octadecanoic acid ethyl ester with C20H40O2 and having 6919184.32 area In literature survey found that this compound shown in Anti-cancer activity (12). Seventh compound Heptadecanoic acid with C20H40O2 and having 6919184.32 area In literature survey found that this compound shown in Anti-cancer activity (13). Eight compound Oxirane, decyl with C2H4O and having 2892452.24 area In literature survey found that this compound shown in Anti-cancer activity (14). Ninth compound Asarone with C12H16O3 and having 1174254.88 area In literature survey found that this compound shown in Anti-cancer activity (15).

DISCUSSION:

Plant Ethanolic Extract of Caralluma adscendens roxb. Stem involve Thin layer Chromatography found various phytoconstituent but compare to lipid or Fatty acid (Ethyl acetate: Benzene) (7:3) Retention factor shows sufficient value and this mobile phase used in column chromatography.in column chromatograhy find various compound shows anti-cancer activity found in this study but yet not proved

REFERENCES

1. Liu Y and Wang MW. Botanical drugs: Challenges and opportunities: Contribution toLinnaeus Memorial Symposium. Life Sci. 2008; 82:445-449.
2. Council of Scientific & Industrial Research, “Wealth of India: A Dictionary of Indian Raw Materials and Industrial Products,” Council of Scientific & Industrial Research, Delhi, 1985.
3. Kasahara S and Hemini S. Medicinal Herb Index in Indonesia, Bogor, Indonesia, P.T. Eisai Indonesia. 1998:1-2.
4. Evans WC, Trease and Evans. Pharmacognosy. 15th ed. W.B.Saunders Company, London, Toronto, Sydney; 2002.
5. Rebecca Kuriyan, Tony Raj, Srinivas SK. Effect of Caralluma fimbriata extract on appetite, food intake and anthropometry in adult Indian men and women. Appetite. 2007; 48: 338-344
6. Preparation of Medicinal Plants: Basic Extraction and Fractionation Procedures for Experimental Purposes Abdullahi R. Abubakar1 and Mainul Haque2
7. Zeaxanthin Induces Apoptosis via ROS-Regulated MAPK and AKT Signaling Pathway in Human Gastric Cancer Cells Ya-Nan Sheng,, Ying-Hua Luo, 2020 Mar 19.
8. Allium willeanum Holmboe exerts anticancer activities on metastatic breast cancer cells MCF-7 and MDA-MB-231, Ovgu Isbilen, Ender Volkan, 2021 Aug, national library of medicine
9. Anticancer activity of milk fat rich in conjugated linoleic acid against Ehrlich ascites carcinoma cells in female Swiss albino mice, Abdelrahman M. Abd El-Gawad, Diea G. Abo El-Hassan, 2021 March, vaterniry world
10. 13-Methyltetradecanoic Acid Exhibits Anti-Tumor Activity on T-Cell Lymphomas In Vitro and In Vivo by Down-Regulating p-AKT and Activating Caspase-3

11. Mechanisms of Anticancer Activity of a Fatty Acid Mixture Extracted from Hen Egg Yolks Enriched in Conjugated Linoleic Acid Diene (CLA) against WM793 Melanoma Cells, Dominik Domagała, Teresa Leszczyńska, 2021 Jul 9, Nutrient publication
12. Prediction aided in vitro analysis of octa-decanoic acid from Cyanobacterium Lyngbya sp. as a proapoptotic factor in eliciting anti-inflammatory properties, Paramasivan Manivannan, Gangatharan Muralitharan, 2017 Sep 30. National library of medicine
13. Heptadecanoic Acid, an Odd-Chain Fatty Acid, Induces Apoptosis and Enhances Gemcitabine Chemosensitivity in Pancreatic Cancer Cells, Hee Young Kim, Jeong Yong Moon, 2023 Mar;26, Pub med
14. Oxidant-based anticancer activity of a novel synthetic analogue of capsaicin, capsaicin epoxide, Anna Lewinska, Pawel Chochrek, Karolina Smolag, Ewa Rawska, Maciej Wnuk, 2014 Nov 8. Pub med.
15. β-asarone inhibits the migration, invasion, and EMT of bladder cancer through activating ER stress, Bo Liu, Weichao Dan, Yi Wei, Yan Zhang, Chi Wang, Yuzeshi Lei, 12 June 2023, weily online library