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GC-MS STUDY OF SEED OIL OF *GUIZOTIA ABYSSINICA* CASS PLANT AS A SOURCE OF VEGETABLE OILS

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ABSTRACT:

Guizotia abyssinica Cass plant as a source of vegetable oils, were subjected to Soxhlet-extraction with n-hexane and the extract analysed using a GC-MS followed by concentration in rotary evaporator. Separation of bioactive chemicals was carried out by column chromatography while studies by GC-MS which shows presence of following Hexadecane; Eicosane; n-Hexadecanoic Acid; cis-13-Octadecenoic acid; 9,12-Octadecadienoic acid (Z,Z)-. It is used as medicinal plant.

KEYWORDS: GC-MS, Soxhlet, Chemical Composition.

INTRODUCTION:

Guizotia abyssinica Cass. branched herb with erect, stout stem, commonly known as Ramtil or Niger seed. Seeds are the rich source of oil with high nutritional index. Traditionally the seed powder is used as remedy for cough, oil in cases of rheumatism. Apart from this the seeds are also used for different dishes like chutney, condiments etc. *Guizotia abyssinica* Cass. from Compositae commonly known as 'Ramtil', 'Niger seed' is widely growing plant in Deccan provinces of India¹. Being a native of Ethiopia, oil extracted from this seed is preferred as cooking oil². The black oil seeds of the plant are traditionally used in houses of South India like Karnataka, Maharashtra, Andhra Pradesh up to Madhya Pradesh to make dry chutney, as a source of edible oil and used as an accompaniment with other food articles³. The seed powder is used as remedy for cough, oil in cases of rheumatism⁴. The seeds are reported to contain nutritional components as oil 30-40%, protein factor 10-25%, sugar - 12-18%, fibre 10-20% and moisture content 10-11%. The cold pressed oil is also used as substitute for sunflower oil/ olive oil⁵. Besides cookery, seed oil also said to be having utility in the preparation of soap, paint and other lubricants. The protein-rich seed content after oil extraction is said to be used as cattle feed, manure or fuel⁶. Traditional claim suggests it as, healthy oil source, used in hot/dry climatic regions possessing rich nutritional value.

2. MATERIAL AND METHOD

2.1 Collection of plant material

The fresh seed of *Guizotia abyssinica* Cass plant were collected from Melghat region Dist-Amravati (Maharashtra) The experimental site is located between coordinates 20.91° N, 77.75°E and an altitude of 312 m in foothills of Central India experiencing the subtropical climate during winter season in the month December 2014 and the Authentication of plant was confirmed by botanist (Dr. S. R. Kadu, Department of Botany, Art, Commerce & Science College, Chikhaldara, Dist:- Amravati).

2.2 Preparation of plant extract

The plant seed crushed & dried over ambient temperature and the dried sample were grind properly and dried powder sample was extracted in Methanol at 65°C, by using soxhlet apparatus⁷ and extracts were concentrated by gradually evaporating the respective solvent on rotary evaporator. The concentrated extract was collected in sterile bottles and kept in a cool and dark place prior to analysis.

2.2.1 GC-MS Analysis seeds of *Guizotia abyssinica* Cass plant Gas Chromatography and Mass Spectroscopy:-

A JEOL GC mate II bench-top double-focusing magnetic sector mass spectrometer operating in electron ionization (EI) mode with TSS-2000¹ software was used for all analyses. Low-resolution mass spectra were acquired at a resolving power of 1000 (20% height definition) and scanning from m/z 25 to m/z 700 at 0.3 seconds per scan with a 0.2 second inter-scan delay. High resolution mass spectra were acquired at a resolving power of 5000 (20% height definition) and scanning the magnet from m/z 65 to m/z 750 at 1 second per scan.

Identification of chemical constituents:-

Identification of the chemical constituents was done on the basis of retention index (RI) using a mass spectra library search NIST and by comparing the mass spectral and retention data with literature⁸. The relative amounts of individual components were calculated based on the GC peak area (FID response) without using a correction factor⁹.

Table No 2 :- Chemical Composition of *Guizotia abyssinica* Cass seed oil

Sr. No	Retention Time	Name of chemical constituent	Molecular Formula	Peak Area %
1	12.77	Hexadecane	C ₁₆ H ₃₄	4.93
2	13.00	Eicosane	C ₂₀ H ₄₂	9.09
3	18.08	n-Hexadecanoic Acid	C ₁₆ H ₃₂ O ₂	7.40
4	19.99	cis-13-Octadecenoic acid	C ₁₈ H ₃₄ O ₂	33.17
5	20.18	9,12Octadecadienoic acid (Z,Z)-	C ₁₈ H ₃₂ O ₂	23.25

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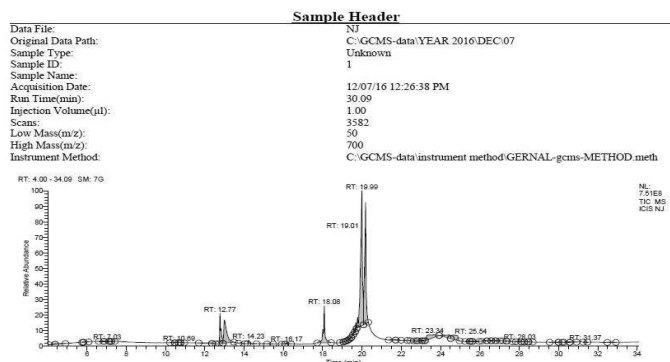
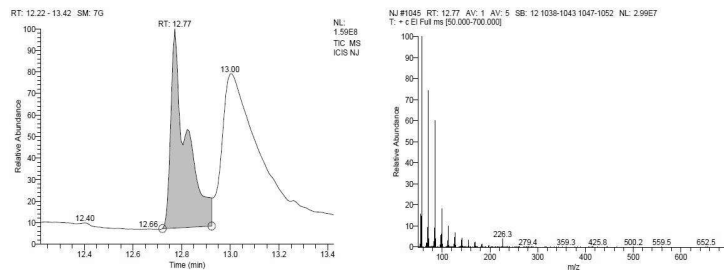


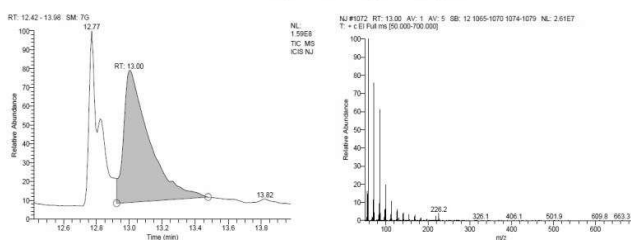
Fig 1. Gas Chromatogram of Leaves extract of *Pithecellobium dulce*



Library Search Results Table

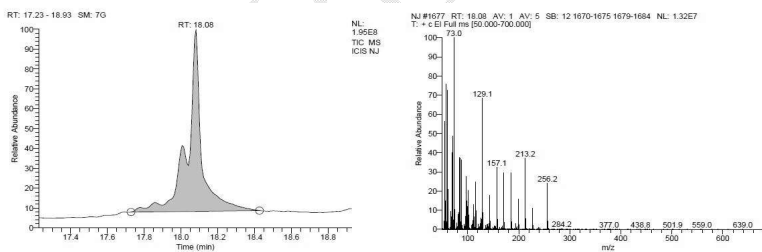
Compound Name	RT	Molecular Formula	Cas #
Hexadecane	12.77	C16H34	544-76-3
Heptadecane	12.77	C17H36	629-78-7
Eicosane	12.77	C20H42	112-95-8

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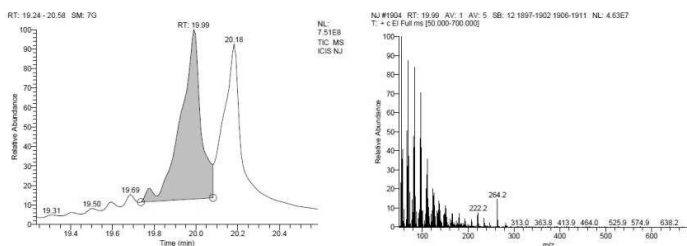
Library Search Results Table

Compound Name	RT	Molecular Formula	Cas #
Eicosane	13.00	C20H42	112-95-8
Hexadecane	13.00	C16H34	544-76-3
Pentadecane	13.00	C15H32	629-62-9



Library Search Results Table

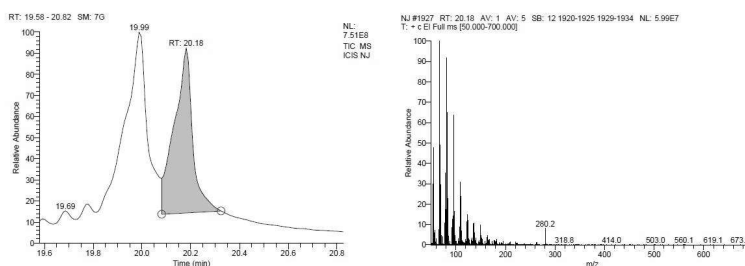
Compound Name	RT	Molecular Formula	Cas #
n-Hexadecanoic acid	18.08	C16H32O2	57-10-3
I-(+)-Ascorbic acid 2,6-dihexadecanoate	18.08	C38H68O8	28474-90-0
Pentadecanoic acid	18.08	C15H30O2	1002-84-2



Library Search Results Table

Compound Name	RT	Molecular Formula	Cas #
cis-13-Octadecenoic acid	19.99	C18H34O2	13126-39-1
cis-Vaccenic acid	19.99	C18H34O2	506-17-2
trans-13-Octadecenoic acid	19.99	C18H34O2	693-71-0

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Library Search Results Table

Compound Name	RT	Molecular Formula	Cas #
9,12-Octadecadienoic acid (Z,Z)-	20.18	C18H32O2	60-33-3
Oxacycloheptec-8-en-2-one, (SZ)	20.18	C16H28O2	123-69-3

3. RESULT AND DISCUSSION

GC-MS chromatogram analysis of the Methanolic extract of *Guizotia abyssinica* Cass seed oil Fig-1 showed major five peaks which indicating the presence of various photochemical constituents. On comparison of the mass spectra of the constituents with the NIST library. The various photochemical which contribute to the medicinal activities. The mass spectra of all the photochemical identified in the whole plant the most prevailing compounds were following n-Hexadecane (4.93%); Eicosane (9.09%) is used in cosmetic, lubricants, plasticizers; nHexadecanoic Acid (7.40%) anti-inflammatory⁹ antioxidant, hypocholesterolemic, nematocide¹⁰, pesticide, anti androgenic flavor, hemolytic, 5-Alpha reductase inhibitor, potent mosquito larvicide; cis-13-Octadecenoic acid; acidifier, acidulant (33.17%); 9,12 Octadecadienoic acid (Z,Z)- (23.25%) Anti-cancer¹¹.

4. CONCLUSION-

The present investigation conclude that the *Guizotia abyssinica* Cass seed oil possess strong medicinal value due to the presence of several bioactive principles which have lubricants, plasticizers; Antioxidant, nematocide, hemolytic, Anti-inflammatory, Antioxidant, hypocholesterolemic nematocide, pesticide, , potent mosquito larvicide, acidifier, acidulant, anti-cancer properties. The study further would like to conclude that, many major and minor compounds present in the *Guizotia abyssinica* Cass seed oil are sharing certain common biological activities and therefore the various major as well as minor phytochemicals are to be taken into consideration to account for their additive and synergistic effects. The present authors believe that the information revealed about the biologically active principles present in the *Guizotia abyssinica* Cass seed oil will be useful for researchers and scientists who are involved in new active compound profiling and development of drugs against various diseases. The study suggested isolation, characterization and purification of different bioactive compounds and to conduct necessary experiments on their biological activities for safety and confirmation.

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