

Identification and characterization of phytochemicals from the hexane extract of *Mesua ferrea* Linn. Seeds by GC- MS Analysis

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ABSTRACT

This research was designed to determine the phytochemical components and characteristics of the hexane extract of *Mesua ferrea* Linn. Seeds collected from City of Ujjain in M.P. Gas chromatography–mass spectroscopy (GC-MS) analysis showed the presence of sixteen different compounds in hexane extract of *Mesua ferrea* Linn. Seeds. This study showed that *Mesua ferrea* Linn. Seeds are a potential source of natural bioactive compounds for biological and pharmacological applications and revealed the presence of bioactive compounds that differ from each territory. The n-hexane extract was analyzed using GC–MS, which showed the presence of many biologically important volatile constituents.

Keywords: *Mesua ferrea* linn., GC-MS, Phytochemicals

1.INTRODUCTION

Mesua is a large genus consisting of about 48 species but the extensive research work has been carried out only on *M. ferrea* L. *M. ferrea* L. is locally known as Cobra's saffron (English), Nagakeshara (Hindi), Nagasampige (Kannada), Nageshwar (Assam), Nagachampakam (Tamil). The tree is found throughout Asia in tropical evergreen forests up to 1,500 m elevation (Dassanayake, 1980). Nagakesara is a medium to large sized tree that can attain a height between 18 and 30 m, with reddish-brown to grey colored bark that peels off in thin flakes, the wood is extremely hard. The leaves are simple, lanceolate, acute, and leathery, covered in a waxy bloom below, red when young, oppositely arranged, 7 to 13 cm long by 2 to 4 cm wide. The flowers are white with a floral fragrance, up to 7.5 cm in diameter, with numerous golden-colored stamens shorter than the length of the petals, the style is twice as long as the stamens, borne singly or in pairs, axillary or terminal. The fruits are ovoid

with a conical point, 2.5 to 5 cm long; with a woody pericarp that contains one to four seeds (Dassanayake, 1980).

II. PRESENT WORK

For the present work we have taken the oily fraction of *M. ferrea* L. (seeds) as isolated from the separation of hexane extract. The hexane elute of n-hexane extract of *M. ferrea* yielded a waxy fraction which was rechromatographed on silica gel column. Its hexane elutes yielded waxy liquid, which was small in amount and was not separated by column chromatography and hence was separated by GC-MS analysis which revealed the presence of several compounds.

The compounds were identified by comparing their retention time and covate indexes with that of literature and by interpretation of mass spectra.

The quantitative estimation of each peak was made by estimating peak area of the peak by computer, attached by GC-MS. The result of GC-MS analysis is given in the table.

III. EXPERIMENTAL WORK

Extraction of the seeds of *Mesua ferrea* L

The dried seeds of *Mesua ferrea* were purchased from the market of Ujjain and identified by the authorities of IEMPS, Vikram University Ujjain (M.P). The seeds were shade dried, powdered and extracted in soxhlet extractor serially with n-hexane, benzene, ethyl acetate, acetone, methanol, ethanol and water. Removal of solvent under reduced pressure afforded solid extracts.

Processing of hexane extract

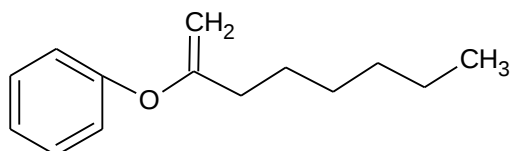
The hexane extract was fractionated on silica gel column. The column was eluted with different solvents in their increasing order of polarity. The hexane elute showed the presence of several spots on TLC examination using hexane: benzene; acetic acid (9:1:0.5, v/v) as solvent system. The solvent was removed and it was rechromatographed on silica gel column, this column eluted fraction designated as **SD1**. The compound was obtained in the form of oil and its TLC examination showed the long spots using hexane: benzene; acetic acid (9:1:0.5, v/v), as solvent system. It was small in amount and could not be separated by TLC or by column chromatography and it was decided to analyze the sample at department of chemistry, Saurashtra University, Rajkot, Gujrat. GC-MS analysis revealed the presence of several compounds from hexane fraction. The compounds were identified by comparing their retention time and covate indexes with that of literature and by interpretation of mass spectra.

IV.GC-MS ANALYSIS OF *M. FERREA* (SEEDS)

SD1

Peak-1

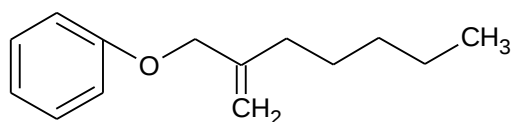
Structure and Name.



(oct-1-en-2-yloxy)benzene

Peak 2

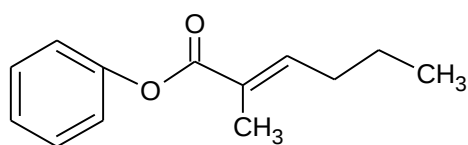
Structure and Name.



[(2-methylideneheptyl)oxy]benzene

Peak 3

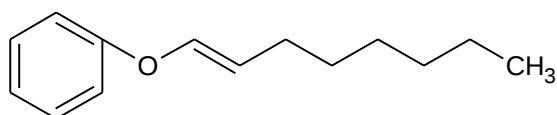
Structure and Name.



phenyl (2E)-2-methylhex-2-enoate

Peak 4

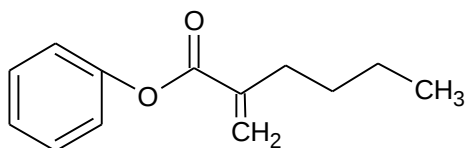
Structure and Name.



[(1E)-oct-1-en-1-yloxy]benzene

Peak 5

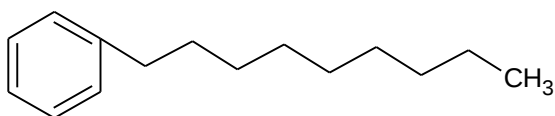
Structure and Name.



phenyl 2-methylidenehexanoate

Peak 6

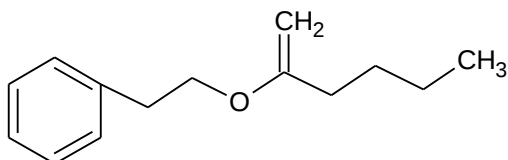
Structure and Name.



nonylbenzene

Peak 7

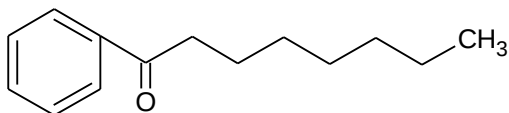
Structure and Name.



[2-(hex-1-en-2-yloxy)ethyl]benzene

Peak 8

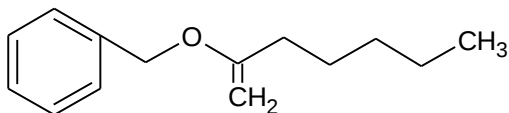
Structure and Name.



1-phenyloctan-1-one

Peak 9

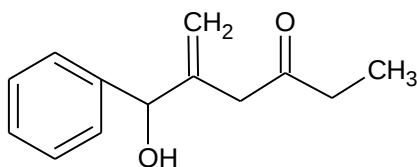
Structure and Name.



benzyl hept-1-en-2-yl ether

Peak 10

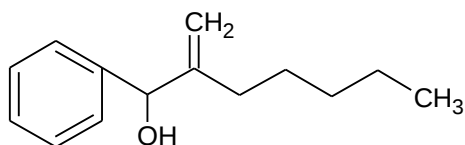
Structure and Name.



5-[hydroxy(phenyl)methyl]hex-5-en-3-one

Peak 11

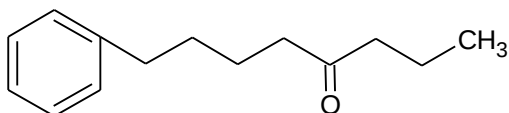
Structure and Name.



2-methylidene-1-phenylheptan-1-ol

Peak 12

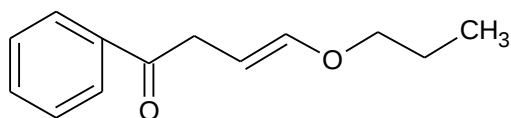
Structure and Name.



8-phenyloctan-4-one

Peak 13

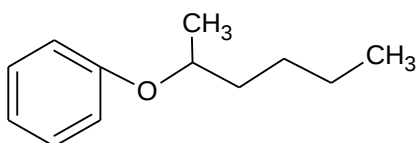
Structure and Name.



(3E)-1-phenyl-4-propoxybut-3-en-1-one

Peak 14

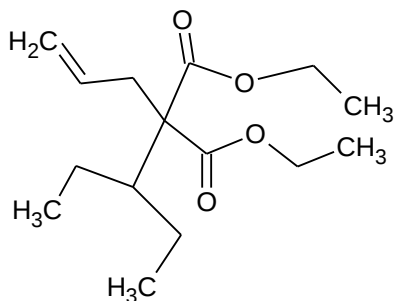
Structure and Name.



(hexan-2-yloxy)benzene

Peak 15

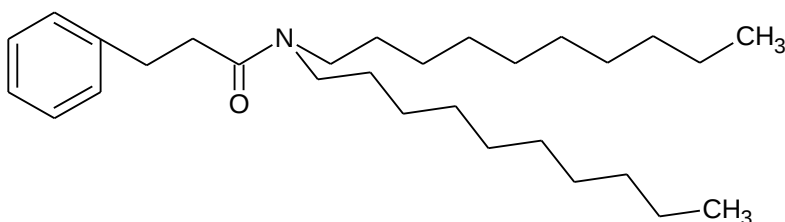
Structure and Name.



Diethyl,allyl-(1-ethyl propyl)malonate

Peak 16

Structure and Name.



Propanamide, N,N-didecyl-3-phenyl

Investigation of SD1.

Peak-1 (R. Time 10.540)

M⁺ 204, 189, 175, 161, 147, 133, 119, 105, 93, 81, 69, 55

Peak-2 (R. Time 11.345)

M⁺ 204, 189, 161, 147, 133, 119, 107, 93, 79, 69, 55

Peak-3 (R. Time 11.665)

M⁺ 204, 189, 175, 161, 148, 133, 121, 105, 93, 79, 69, 55

Peak-4 (R. Time 11.865)

M⁺ 204, 189, 161, 147, 133, 119, 105, 93, 79, 69, 55

Peak-5 (R. Time 12.580)

M⁺ 204, 189, 161, 147, 133, 121, 105, 93, 80, 67, 53

Peak-6 (R. Time 12.790)

M⁺ 204, 189, 161, 147, 133, 119, 105, 91, 79, 69, 55

Peak-7 (R. Time 13.000)

M⁺ 204, 189, 175, 161, 147, 133, 121, 105, 91, 79, 67, 55

Peak-8 (R. Time 13.110)

M⁺ 204, 189, 175, 161, 147, 133, 119, 105, 91, 79, 67, 55

Peak-9 (R. Time 13.505)

M⁺ 204, 189, 175, 161, 147, 133, 119, 107, 91, 79, 67, 55

Peak-10 (R. Time 13.760)

M⁺ 204, 189, 175, 161, 147, 133, 119, 107, 93, 79, 67, 55

Peak-11 (R. Time 13.665)

M⁺ 204, 189, 175, 161, 147, 133, 119, 107, 93, 79, 67, 55

Peak-12 (R. Time 14. 220)

M⁺ 204, 189, 176, 161, 148, 133, 119, 105, 91, 79, 69, 55

Peak-13 (R. Time 14. 425)

M⁺ 204, 189, 176, 161, 145, 134, 119, 105, 91, 81, 69, 55

Peak-14 (R. Time 16. 520)

M⁺ 177, 161, 149, 135, 121, 109, 93, 79, 69, 55

Peak-15 (R. Time 23. 725)

M⁺ 270, 253, 239, 227, 218, 207, 185, 171, 165, 143, 129, 121, 101, 87, 74, 69, 55

Peak-16 (R. Time 25. 295)

M⁺ 429, 405, 357, 348, 327, 315, 306, 281, 272, 257, 249, 229, 213, 201, 187, 175, 161, 147, 133, 125, 105, 91, 81, 69, 55

Phytochemicals identified in hexane extract of *M. ferrea* (seeds) SD1.

S.NO.	R. Time	Name of the compound
1.	10.540	(Oct-1-en-2-yloxy)benzene
2.	11.345	[(2-methylideneheptyl)oxy]benzene
3.	11.665	Phenyl(2E)-2-methylhex-2-enoate
4.	11.865	[(1E)-oct-1-en-1-yloxy]benzene
5.	12.580	Phenyl 2-methylidene hexanoate
6.	12.790	Nonylbenzene
7.	13.000	[2-(hex-1-en-2-yloxy)ethyl]benzene
8.	13.110	1-phenyloctan-1-one
9.	13.505	Benzylhept-1-en-2-ylether
10.	13.760	5-[hydroxyl(phenyl)methyl]hex-5-en-3-one
11.	13.665	2-methylidene-1-phenylheptan-1-ol
12.	14. 220	8-phenyloctan-4-one
13.	14. 425	(3E)-1-phenyl-4-propoxybut-3-en-1-one
14.	16. 520	(Hexan-2-yloxy)benzene
15.	23. 725	Diethyl,allyl-(1-ethyl propyl)malonate
16.	25. 295	Propanamide,N,N-didecyl-3-phenyl

V.CONCLUSIONS

GC-MS are useful tools for chemical analysis, especially when used together. The Gas chromatography produces highly defined separation of complex mixtures and Mass spectrometer analyzes them. Mass spectrometers are widely used to identify unknown compounds by determining their molecular mass and molecular formula, at the expense of negligible amount of sample. The Mass spectrum of a compound is given in the form of a bar graph representing the abundance of various ions with respect to their mass to charge ratio (m/z). In addition to the molecular ions, which infer molecular mass of sample, the other anions present in the mass spectrum are very characteristic of the compound. Thus the mass spectrum of a compound becomes the fingerprint of it, in most of the cases.

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