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### **Gas Chromatography –Mass Spectroscopy Analysis of ethanolic extracts of Njalipoovan banana (*musa×paradisica* L. (AB) roots**

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#### **ABSTRACT**

Banana plant is one the largest plant group in India. Cultivation of varieties of banana plant ensures proper quantity of food in worldwide. Because of its easiest availability and greater nutritional qualities it's widely accepted among all peoples across our country. Most of the population depending on its parts for food and other needs. Here selected locally cultivated and highly accepted variety njalipoovan banana for our study. The Objective of this study is to analyze ethanolic root extracts of Njalipoovan banana (*musa×paradisica* L. (AB )) using Gas Chromatography –Mass Spectroscopy method. Roots were collected from campus, Collected roots were washed with water and shade dried. The dried roots were powdered and subjected to extraction using different solvents like Petroleum ether, benzene, chloroform, acetone, ethyl acetate, ethanol, methanol and water with Soxhlet extraction method. Then selected the ethanolic extract which contains maximum phyto constituents dissolved. The ethanolic extract was selected for gas chromatography - mass spectrometry analysis.

The obtained results was found to be ethanolic root extract of Njalipoovan banana (*musa×paradisica* L. (AB)) contains phytochemicals 2,4-DITERT-BUTYLPHENOL, (-)LOLIOLIDE, 2Hexadecene, 3,7,11,15tetramethyl, [R[R\*,R\*(E)]], NEOPHYTADIENE, 2PENTADECANOL, 6,10,14TRIMETHYL, Phytol, PENTACOSANE, Squalene, Cholesta22,24dien5ol, 4,4dimethyl, gamma. Sitosterol, alpha. Amyrin, Stigmasterol, beta.-Sitosterol. They are used as as antioxidant, antimicrobial anti inflammatory antipyretic, analgesic, anticancer, anti diuretic, immune stimulatory, anti diabetic, anti diarrhoeal, antiviral properties etc.

**KEYWORDS:** Njalipoovan banana, Ethanolic extract, Phyto constituents, GC-MS analysis

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## **1.INTRODUCTION**

Fruits,vegetables,leafy vegetables and other parts of plants are important for providing nutrition forhuman life. India has very good genetic-species biodiversity system.ourancestors health wasgood enough through out there life.

We are now in a era where new diseases are emerging drastically.innovations and researches are concentrating to increase human life conditions .But environmental patterns and atmospheric conditions are changing by humans works it is affecting earths diversity and altering natural ecosystems.For minimizing life threatening diseases we have to formulate new drug varieties from natural sources.

Which should be safe,non allergic,low cost and easily available from our localities,So that it can be available for each and all for curing particular types of diseases.

We know thatoldest medical practices of ancestors shows that Plants,that are used as medicines to erase various diseases so based on this studies reasearches are going on and as a result of this many of the peoples are turning to traditional medicinal systems for preventing and curing various types of diseases that mainly composing of herbal medicinal prescriptions.herbal medicinal products;that might be natural origin,non synthetic and should be collected from plants, animals or minerals .<sup>1</sup>

Pharmacognosy, the plant science can be defined as a bioscience of morphological, chemical, and biological properties along with its history, method of cultivation& collection methods, extraction& isolation techniques, physico chemical studies, quality control parameters, along with preparation and standardization of crude drugs. The German botanist, seydlar was coined the word “Pharmacognosy”<sup>13</sup>.

About 80% of the tribal and rural peoples uses medicinal herbs and herbal preparations or indigenous system of medicine for treatment in india. Thousands of plant species were used by the herbal industries in india, and there turnover is increasing day by day. Herbal exports include various products like AYUSH medicinal products,cosmetic products,nutraceuticals which all these have a major potential in pharmaceutical export in worldwide. But it’s a considerable matter that datas shows that India’s share in global herbal export market is very less<sup>2</sup>.

Now a days pharmaceutical researchers giving more attention to medicinal plants and there realted studies.For new drug discovery and development plants are considered to be thefirst option because they are easily available and low cost. Most of the important pharmaceutical precaucers are

natural origin. cost of the treatments, types of each illness and increased side effects of allopathic drugs leads to increased use of traditional medicinal systems, as a result of this herbal drug industries growth also started.

Banana is a popular name for kelalites. It is a herbaceous plant of genus *Musa* under the family Musaceae. It is one of the common cultivated plants all over India and is one of the favorite foods produced in the world at an affordable price.

Apart from its economic-nutritional values, every part of the banana plant has different medicinal uses:

flowers- bronchitis and diabetes

plant sap- hysteria, leprosy, hemorrhages and diarrhea

young leaves - burns and skin infections

roots- digestive disorders, dysentery

banana seed - diarrhea

banana peel and pulp - Antifungal and antibiotic.

fruit-laxative<sup>3</sup>

## **2. MATERIALS AND METHODS**

### ***2.1 collection and authentication of plant***

Date of collection: 05/11/2021

Place of collection: Chemists College Of Pharmaceutical Sciences And Research, Varikoli, Ernakulam district, Kerala

Time of collection: 11 am

The fresh roots of Njalipoovan were collected from Chemists College Of Pharmaceutical Sciences And Research, Varikoli, Ernakulam district, Kerala, India and authenticated by Dr. V. B. Sreekumar, Senior scientist, Forest Botany Department, Kerala Forest Research Institute, Peechi, Thrissur.

## ***2.2 Extraction of plant material***

Njalipoovan roots were dried in a shady place for 10 days and pulverized to powder using electrical grinder. Extraction was performed using Soxhlet method. Thirty five grams (35g) of powdered sample was introduced into the extraction chamber of the soxhlet extractor using Petroleum ether, benzene, chloroform, acetone, ethyl acetate, ethanol, methanol and water as solvent systems at a temperature of 70°C for 48 hrs. At the end of the extraction .The extract was concentrated in an oven at 35°C.(12).For the study ethanolic extract was selected

## ***2.3GC-MS analysis***

GC-MS analysis was carried out on a Shimadzu Mass Spectrophotometer (model number :QP2010S) . The column used was Rxi-5Sil MS column measuring 30m × 0.25mm with a film thickness of 0.25mm. Helium was used as carrier gas at a flow rate of 0.5ml/min. sample injection volume was 1µl. The inlet temperature was maintained as 280°C. The oven temperature was programmed initially at 50°C for 4 min, then an increase to 280°C. Total run time was 42 min. The source temperature was maintained at 200°C. GC-MS was analyzed using electron impact ionization and data was evaluated using total ion count for compound identification and quantification. The spectrums of the components were compared with the database of spectrum of known components stored in the GC-MS library NIST 11 and WILEY 8. Measurement of peak areas and data processing were carried out by GC-MS SOLUTIONS software.

## **3.RESULT AND DISCUSSION**

### ***3.1GC-MS Analysis Njalipoovan banana root extract***

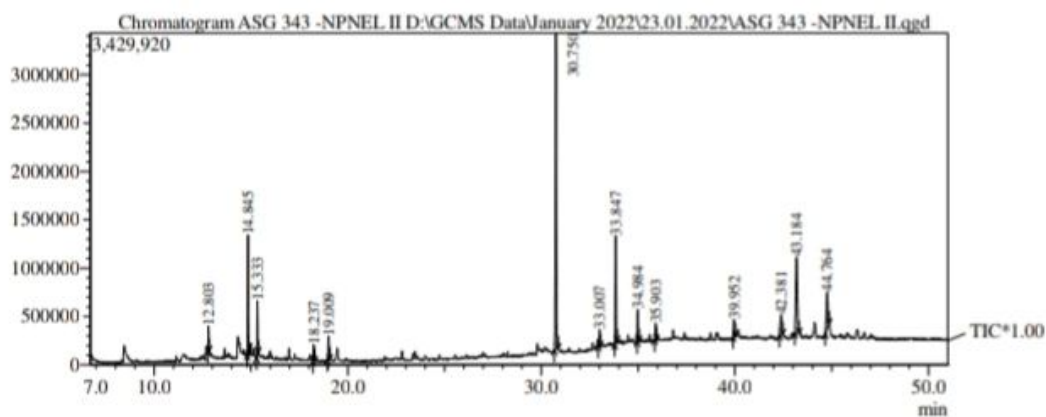


Fig. 1 : GC-MS chromatogram of ethanolic extracts Njalipoovan banana

Table 1: chemical composition of GC-MS analysis of ethanolic extracts of Njalipoovan roots

Peak#	R.Time	Area%	Height%	Name	Base m/z
1	13.815	0.13	0.42	2,4-DITERT-BUTYLPHENOL	191.15
2	16.982	0.15	0.36	(-)-LOLIOLIDE	111.10
3	17.514	0.20	0.54	2-Hexadecene, 3,7,11,15-tetramethyl-, [R[R*,R*-(E)]]-	70.10
4	17.585	6.77	18.60	NEOPHYTADIENE	68.10
5	17.638	1.03	2.18	2-PENTADECANOL,6,10,14TRIMETHYL-	70.10
7	20.307	15.97	38.24	Phytol	71.10
8	23.083	12.69	6.51	PENTACOSANE	57.05
10	29.063	7.06	7.60	Squalene	69.10
11	29.759	9.15	3.19	Cholesta-22,24-dien-5-ol, 4,4-dimethyl-	55.05
12	33.229	14.21	4.73	gamma.-Sitosterol	55.05
13	33.959	7.77	4.03	HEXATRIACONTANE	57.05
14	36.299	2.29	1.45	alpha.-Amyrin	218.20
16	39.707	4.05	3.09	Stigmasterol	55.05
17	41.513	5.66	3.68	beta.-Sitosterol	55.05

**Table 6 :Activity of GC-MS analysis of ethanolic extracts of Njalipoovanbabnana roots**

Peak	R.Time	Name of the compound	Activity
1	13.815	2,4-DITERT-BUTYLPHENOL	Antioxidant(4)
2	16.982	(-)-LOLIOLIDE	Cytotoxic(5)
3	17.514	2-Hexadecene, 3,7,11,15-tetramethyl-,[R[R*,R*-(E)]]-	Antimicrobial ,Antiinflammatory(6)
4	17.585	NEOPHYTADIENE	Antipyretic, Analgesic, Anti-inflammatory, Antimicrobial, Antioxidant(7)
5	17.638	2PENTADECANOL6,10,14TRIMETHYL-	Antibacterial(10)
6	20.307	Phytol	Antimicrobial, Anticancer, Anti-inflammatory, Antidiuretic, Immunostimulatory(7)
7	23.083	PENTACOSANE	Pheremone(11)
8	29.063	Squalene	Antiinflammatory, Anti-atherosclerotic, Antineoplastic(7)
9	29.759	Cholesta-22,24-dien-5-ol, 4,4-dimethyl-	Antibacterial, Trypanocidal activity(8)
10	33.229	gamma.-Sitosterol	Anti-diabetic, Anticancer, Antimicrobial, Anti-inflammatory, Antidiarrhoeal, Antiviral(7)
11	36.299	alpha.-Amyrin	Anti-diabetic, Anti-inflammatory, Anti-arthritic Activity, Anticancer(7)
12	39.707	Stigmasterol	Anti-inflammatory, inhibit tumor promotion, Anti-inflammatory(7)
13	41.513	beta.-Sitosterol	Used for heart diseases(9)

Different techniques are now available for identification of each components of multiple mixtures of phytochemicals. GC-MS method is one of the most demanding method for obtaining phytochemical composition in plants, which allows the identification and optimization of the each natural compounds

found in a plant extract by comparing their relative retention times and indices and their mass spectra. In this study almost 13 compounds were identified which are having high therapeutic value.

The result shows that ethanolic root extract of Njalipoovan banana (*Musa paradisiaca* L. (AB)) contains almost 13 phytochemicals 2,4-DITERT-BUTYLPHENOL, (-)-LOLIOLIDE, 2Hexadecene, 3,7,11,15tetramethyl, [R[R\*,R\*(E)]], NEOPHYTADIENE, 2PENTADECANOL, 6,10,14TRIMETHYL, Phytol, PENTACOSANE, Squalene, Cholesta22,24dien5ol, 4,4dimethyl, gamma.Sitosterol, alpha.Amyrin, Stigmasterol, beta.-Sitosterol. Each phytoconstituent has different therapeutic actions. They are used as antioxidant, antimicrobial, anti-inflammatory, antipyretic, analgesic, anticancer, anti-diuretic, immune stimulatory, anti-diabetic, anti-diarrhoeal, antiviral properties etc.

Banana plant is a well known plant for everyone and all researches reveal that it has a potent role in biological activities to prevent and cure various diseases. All parts are important because of its medicinal properties. This has been used from primitive era as food, medicine etc. Scientific data shows that most of the studies were performed on banana plant. But in case of root it is noted that data are less. More studies are still needed to evaluate its biological activities.

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