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## RESEARCH ARTICLE

### PRELIMINARY PHYTOCHEMICAL AND GC- MS ANALYSIS OF BIOACTIVE COMPOUNDS FROM *MORINGA CONCANENSIS* NIMMO LEAVES FAMILY: MORINGACEAE

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#### ABSTRACT

**Purpose:** To screening of phytochemicals and identify the bioactive compounds from the methanol extract of *Moringa concanensis* Nimmo (Family: Moringaceae) using for Gas chromatography and Mass spectrometry analysis.

**Methods:** The methanol extract of the *Moringa concanensis* nimmo leaves powder using soxhlet extraction and bioactive compounds was analyzed using Gas chromatography and Mass spectrometry (Gc- Ms) techniques.

**Results:** Preliminary phytochemical analysis water, methanol, ethanol and Petroleum ether extracts showed that the presence of alkaloids, carbohydrates, flavonoids, steroids and tannins. Nine major bioactive compounds were identified that 2-amino-2- thiazoline-4-carboxylic acid(4.262%), Benzene(6.15%), Tetracosonic acid(3.91%), Trimethylsilyl esters N- Hexadeconic acid(28.9%), Phytol(4.55%), Ethyl 9-cis-11-trans-octade dienote(34.93%), Vitamin- E(44.79%), Gamma-Sistosterol(7.60%), Fucosterol(5.36%) presents.

**Conclusion:** The result shows that major bioactive Vitamin- E and N- Hexadeconic acid. This is using for antioxidant, antimicrobial, antitumor and anti-diabetic activities.

#### INTRODUCTION

The traditional medicine plants contain more phytochemicals and bioactive constituents are present. This type of study provides the health application at affordable cost. (Savithramma et al (2011). According to World Health Organization (WHO) medicinal plants should be the best source to obtain a variety of drugs. From the developed countries about 80% of individuals are using traditional medicine, which has compounds derived from medicinal plants (Ellof, 1998). The plant species *Moringa concanensis* Nimmo is a tree belongs to the family Moringaceae. The plant is locally called as Kattumurungai by tribal peoples of Nilgiris hills in the region of Tamil Nadu state. The leaves are highly nutritious, rich in vitamins A and C and E act as a good source of natural antioxidants inflammation, cardiovascular, gastrointestinal, and hematological and hepatorenal renal. Leaves of *M. concanensis* help to reduce blood pressure, anti-inflammatory, jaundice, constipation, analgesic, splenomegaly, antipyretic, menstrual pain, skin tumour, anti-inflammatory, diabetes, tonic, analgesic potential antitumor activities (Anbazhakan et al (2007). Gas Chromatography and Mass Spectrometry is a combination of two different analytical techniques with the use of internal standards, provides a identification of multidimensional drug and quantisation procedure that is the leading Confirmation method for forensic drug testing.

Application of the Gc- MS is mainly using for Environmental Monitoring, Food, Beverage, Flavour and fragrance analysis, Biological and pesticides detection, Forensic and criminal cases, Clinical toxicology, Medicine and pharmaceutical and hydrocarbons analysis (Ashish chaunan et al (2014). Thus, as the experimental plant species possess highly medicinal properties, so the aim of the present study is to identify the biochemical compounds of *Moringa Concanensis* Nimmo by using the methanolic extract through Gas chromatography-Mass spectrum analysis

#### MATERIALS AND METHODS

##### Plant collection and identification

*Moringa concanensis* Nimmo was collected from Madukkarai hills, Coimbatore District, Tamil Nadu in India, during the session of July to September. The plant was identified and authenticated by Botanical survey of India (BSI), Coimbatore. (BSI/SRC/5/23/2015/Tech/861)

##### Preparation of powder and extraction

Fresh leaves of *Moringa Concanensis* nimmo shade dried and grind to powder in a mechanical grinder. 5g of leaf powder was packed in Soxhlet apparatus and extracted with 300ml of methanol. The methanol extracted was evaporated using rotary vacuum evaporator. The dried extract was used for GC-MS analysis.

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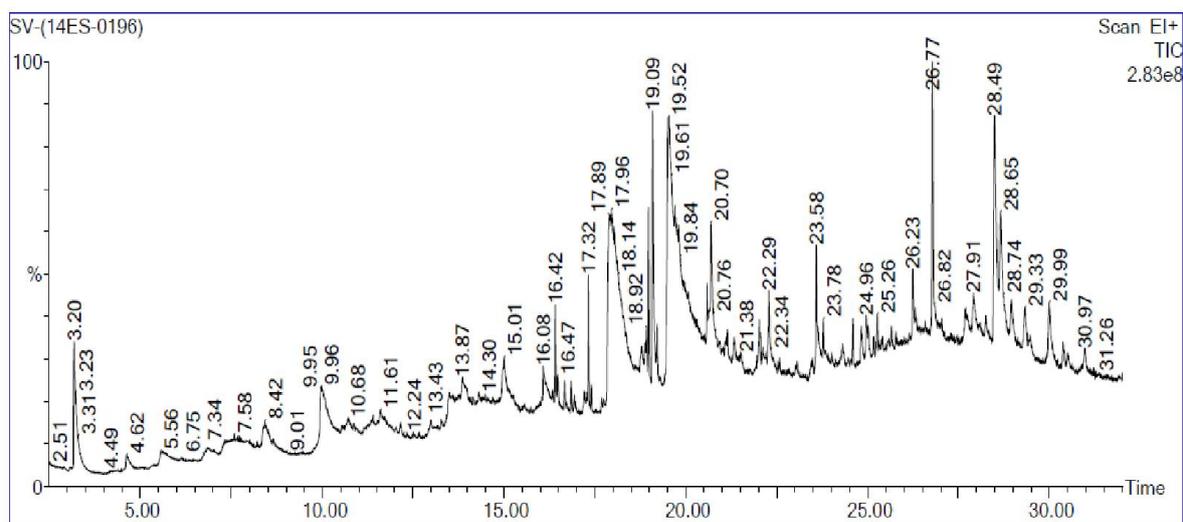
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**Table 1. Phytochemical screening of different extract of Moringa Concanensis Nimmo**

Phytochemical Constituents	Water	Methanol	Ethanol	Petroleum ether
Alkaloids	+	+	+	+
Carbohydrate	+	+	+	-
Glycosides test	+	-	-	+
Phytosterols	+	+	-	-
Flavonoids	+	+	+	-
Proteins	+	-	-	+
Tannins test	+	+	+	+
Diterpines test	-	+	+	-
Reducing Sugars	+	+	+	-
Steroids	-	+	+	+

**Table 2. Bioactive Components identified and their activity in Leaf Ethanol extract of Moringa Concanensis Nimmo by GC MS study**

RT	Name of the compound	Molecular formula	MW	Peak Area %	Compound nature	Activity
3.199	2-amino-2-thiazoline-4-carboxylic acid	C4H6O2N2S	146	4.262	succinic acid	natural antibiotic, powerful anti oxidant, bolster the immune system
9.971	benzene, (ethenylxy)	C8H8O	296	6.152	Diterpene	Anticancer Antioxidant Anti-inflammatory Diuretic
15.013	Tetracosanoic acid, trimethylsilyl ester	C27H56O2Si	440	3.911	Trimethylsilyl ester	Antioxidant, Antimicrobial, Insecticidal activity
17.960	N- Hexadecanoic acid	C17H34O2	256	28.978	Palmitic acid ester	Antioxidant, Hypcholesterolemic Nematicide, Anti-androgenic, Flavor, Hemolytic
19.085	Phytol	C20H40O	296	4.559	Diterpene	Anticancer Antioxidant Anti-inflammatory Diuretic
19.540	Ethyl 9.cis.,11.trans.-octadecadienoate	C20H36O2	308	34.935	Linolenic acid ester	Anti-inflammatory, Anti-coronary, Cancer preventive, Nematicide, Antihistaminic Antieczemic, Hepatoprotective, Antiacne, Antiarthritic, Hypcholesterolemic
26.773	Vitamin E	C29H50O2	430	44.79	Vitamin-E compound (Alpha- tocopherol)	Antioxidant, Analgesic, Anticancer, Hepatoprotective, Antileukemic, Antitumor, Antidiabetic Anti-inflammatory, Antispasmodic Antidermatitic, Anti-diabetic, Anti-angeogenic, Anticancer, antimicrobial, anti-inflammatory, anti-diarrhoeal and antiviral
28.94	Gamma.-sitosterol	C29H50O	414	7.605	sterol	Anticancer, antimicrobial, anti-inflammatory, anti-diarrhoeal and antiviral
28.649	Fucosterol	C29H48O	412	5.336	Glycosides	Anticancer and anti-proliferative agent



**Figure 1. GC-MS spectra of Metanolic extract of Moringa Concanensis nimmo**

## GC– MS Instruments

The GC – MS analysis of methanol extract *Moringa concanensis* was carried out from VIT University by using a Perkin Elmer-Clarus 680 model.(Sample ID is SV-14ES-0196) Gas Chromatograph equipped and coupled to a mass detector Turbo mass gold – Perkin Elmer Turbomass 5.1 spectrometer with an Elite– 1, 30m x 0.25 mm ID x 250µm of film thickness, specific column. The instrument was set to an oven initial temperature of 60<sup>0</sup>C, and maintained at this temperature for 2 min. At the end of this period the oven temperature was rose up to 300<sup>0</sup>C, at the rate of an increase of 10<sup>0</sup>C/min, and maintained for 6 min. Injection port temperature was ensured as 250<sup>0</sup>C. Helium flow rate as one ml/min at 70eV ionization voltage and 10:1 ratio of samples were injected in split mode. Mass spectral scan range was set at 50 to 600Da. Using computer searches on a National Institute Standard and Technology (NIST) with Ver.2.1 Mass Spectrum (MS) data library and comparing the spectrum obtained through GC –MS compounds present in the plants sample were identified.

## RESULTS

The phytochemical analysis results that water, methanol, ethanol and petroleum ether extracts shows to presents of alkaloids, carbohydrates, glycosides, phytosterols, flavanoides, proteins, tannins terpenoids, diterpines, reducing sugars and steroids. The leaf of the *Moringa Concanensis Nimmo* methanolic extract by GC-MS analysis shows to presence of nine major compounds. The active principles with their retention time (RT). Molecular weight (MW), molecular formula, and concentration are presented in Table-2. Figure-1 shows that GC-MS chromatogram presence of the nine major peaks of the compounds detected. The compounds identified by the mass spectroscopy were presented. The results revealed that 2-amino-2-thiazoline-4-carboxylic acid(4.2%), Benzene(6.15%), Tetracosanoic acid(3.91%), trimethylsilyl ester N-Hexadecanoic acid(28.9%), Phytol(4.5%), Ethyl 9.cis.,11.trans octadecadienoate (34.9%), Vitamin E(4.2%), Gamma -sitosterol(7.6%) and Fucosterol (5.3%).

## DISCUSSION

Phytol having Antioxidant, Anti-inflammatory, Anticancer and Diuretic properties (Sheela and Uthayakumari, 2013). Phytosterols was used indirectly as a dietary supplement and directly in tissue culture media. It was inhibit the growth and metastasis of prostate cancer PC-3 cells. (Awad et al (2001). Palmitic acid displays antioxidant properties and can help atherosclerosis, Tricosanoic acid, docosadienoic acid, tetracosanoic acid, docosa-hexaenoic acid having Insecticidal and antimicrobial properties. Dr. Duke's Ethnobotanical and phytochemical Databases were reported as Hexadecanoic acid, Ethyl and iso-allocholate ethyl ester compounds are with antioxidant properties. Vitamin E is the main lipid soluble antioxidant in the body. The most common role of vitamin E is its antioxidant effect, protecting molecules and tissues from removing free radicals. Biosynthesis of various biologically active steroids necessary for the normal essential activity of plants starts from phytosterols, as well as stigmasterol (Panda et al (2009). Vitamin E acts in cell membrane where prevents the free radical reaction and prooxidant activity (Herrera and Barbas, 2001). Vitamin- E (Alpha-tocopherol) has most

important anti-oxidant with day today life. Daily supplements of 50 mg of alpha-tocopherol given in smokers it reduction of 34% is observed in the incidence of prostate cancer. Heinonen et al, (1998) suggest that association with a supplement alpha-tocopherol use 15% lower risk of prostate cancer. Campesterol, β-sitosterol, fucosterol, stigmasterol, fatty acids, 6-(2-methoxy-Z-vinyl)-7-methylpyranocoumarin and 9, 19-cycloarlane triterpenoid as an anticancer (Weiping and Hongming, 1997) and anti-proliferative agent

## Conclusion

This is the first GC- MS report to leaves of *Moringa Concanensis Nimmo*. From this study important bioactive compounds identified through preliminary phytochemical test and GC-MS analysis and relate their applications in folklore medicine. These active principles provide inspiration for future investigation to achieve lead molecules in the discovery of novel herbal drugs.

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