JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

GC-MS ANALYSIS OF BIOACTIVE CONSTITUENTS OF *COMMIPHORA WIGHTTI ARNOTT* (BURSERACEAE).

Dr. Rupali Subhashrao Kaikade
Assistant Professor
Department of Botany
Amolakchand Mahavidyalaya, Yavatmal.
Maharashtra
India

Abstract: GCMS is normally used for direct analysis of component existing in traditional medicines and medicinal plants. A knowledge of the chemical constituents of plants is desirable not only for the discovery of therapeutic agents, but also because such information may be of great value in disclosing new sources of economic phytocompounds for the synthesis of complex chemical substances and for discovering the actual significance of folkloric remedies. Hence in the present study we selected a traditional medicinal plant *Commiphora wightti* Arnott belonging to the family Burseraceae found from northern Africa to central Asia. Traditionally the plant is used to treat rheumatism, obesity and atherosclerosis and has very subtle and penetrating qualities and because of this is considered a *yogavahi*, meaning that it is often employed specifically to carry other substances deep into the tissues but scientific relevance behind this is still unknown. Thus further studies can be conducted to investigate the unexploited potential of *Commiphora wightti*. Eight compounds were identified and they were reported as dibutyl phthalate, Phthalic acid, 1,2- benzenedicarboxylic acid, Bis (2- methyl propyl) ester, Diisooctyl phthalate, Trans-Geranylgeraniol, Thunbergol, 6-epi-shyobunol

Index Terms: GC-MS, Phytochemicals, Commiphora wightti, dibutyl phtalate.

Introduction:

Plants have been used for health and medical purposes for several thousands of years. The number of higher plant species on earth is about 250000. It is estimated that 35000 to 70000 species have, at one time or another, been used in some cultures for medicinal purposes. A majority of the world's population in developing countries still relies on herbal medicines to meet its health needs. According to the World Health Organization (WHO) in 2008, more than 80% of the world's population relies on traditional medicine for their primary healthcare needs (Pierangeli *et al*., 2009). Higher plants as sources of bioactive compounds continue to play a dominant role in the maintenance of human health. Reports available on green plants represent a reservoir of effective chemo-therapeutants, these are non-phytotoxic, more systemic and easily biodegradable (Vyas, 1999; Kaushik *et al*., 2002; Chaman Lal and Verma, 2006). Also, plants are a rich source of secondary metabolites with interesting herbal medicines are often used to provide first-line and basic health service, both to people living in remote areas where it is the only available health service, and to people living in poor areas where it offers the only affordable remedy. Even in areas where modern medicine is available, the interest on herbal medicines and their utilization have been increasing rapidly in recent years. Medicinal plants are important sources for pharmaceutical manufacturing. Also medicinal plants and herbal medicines account for a significant percentage of the pharmaceutical market.

Hence, a knowledge of the chemical constituents of plants is desirable not only for the discovery of therapeutic agents, but also because such information may be of great value in disclosing new sources of economic phyto-compounds for the synthesis of complex chemical substances and for discovering the actual significance of folkloric remedies.

Hence in the present study we selected a traditional medicinal plant *Commiphora wightti* Arnott belonging to family Burseraceae found from northern Africa to central Asia. Traditionally the plant is used to treat rheumatism, obesity and atherosclerosis and has very subtle and penetrating qualities and because of this is considered a *yogavahi*, meaning that it is often employed specifically to carry other substances deep into the tissues (Pole, 2006) but scientific relevance behind this is still unknown. Thus further studies can be conducted to investigate the unexploited potential of *Commiphora wightti*. The aim of the present study is to identify the phytocomponents of this plant and subjecting the methanol extract of the aerial part to Gas chromatography – Mass Spectrum analysis. In the present study, volatile organic matter of the aerial part sample of plant was analyzed for the first time. This work will help to identify the compounds, which may be used in body products or of therapeutic value.

Review of Literature:

Plants produce a great array of secondary metabolites as a result of metabolic activities. These compounds either alone or in combination are being responsible for specific physiological changes or the therapeutic action in the human body when administered as a medicament or a health supplement. Hence, it will be practical to subject the individual herb for testing of these compounds. The more precise information in qualitative analysis can be obtained by gas chromatography coupled with mass spectrometry (GC-MS). It has been seen that most of the work has been done on its antimicrobial activity, but very less information is available regarding the phytochemical analysis through GCMS method.

Materials and methods:

Collection of Plant Material: The plant- *Commiphora wightti* collected from the college garden of RDIK and NKD College, Badnera, Maharashtra, India.

Dry Powder Preparation: The sample was dried at room temperature and ground into fine powder.

Sample Preparation for GCMS Analysis: About 15g of powdered material of plant was taken in a clean flat-bottomed glass container and soaked in 150ml of methanol. The container with its content was sealed and kept for 24 hours. The whole mixture then underwent a coarse filtration by a piece of clean, white cotton material. Then it was filtered through Whattman filter paper. The filtrate (methanolic extract) obtained for the plant was evaporated under ceiling fan.

GCMS Analysis:

The GCMS analysis was conducted at the Central Instrumentation Laboratory, Punjab University at Chandigarh. 2µL aliquot was injected into a fisons GC8000 series coupled to a TSQ8000 MS (Triplequadrapole) mass analyzer .The chromatography was performed by using the DB5-MS column. Injection temperature was 230°C. Helium flow was 1mL/min. After a 5 min solvent delay time at 70°C; the oven temperature was increased at 5°C/min to 310°C, 1min isocratic and cooled to 70°C, followed by the additional 5min delay. The ion trace integration was done using the mass lab find target method for the characteristic fragment of assigned peaks.

Identification of Components:

Interpretation of mass spectrum GCMS was conducted using data base of the Central Instrumentation Laboratory (CIL) spectra Libraries. Spectrum of the unknown component was compared with the spectrum of known components stored in the CIL. The molecular weight, molecular formula and the number of hits used to identify the name of the compound from CIL spectra Libraries were recorded.

Results and Discussion:

GCMS is one of the best techniques to identify the constituents of volatile matter, long chain, branched chain hydrocarbons, alcohols, acids, esters etc. GCMS analyzed results which include the active principles with their molecular formula are presented in Table 1. Here eight compounds were identified

and they are reported as dibutyl phthalate, Phthalic acid, 1,2- benzenedicarboxylic acid, Bis (2- methyl propyl) ester, Diisooctyl phthalate, trans-Geranylgeraniol, Thunbergol, 6-epi-shyobunol. On further study of each compound, it was found that they individually have its own biological importance.

The more precise information in qualitative analysis can be obtained by gas-chromatography coupled with mass spectrometry (GCMS). The GC-MS analysis of *Commiphora wightti* revealed the presence of eight compounds. The identified compounds possess many biological properties. For instance 1, 2- benzenedicarboxylic acid and diisooctyl phthalate are known to possess antimicrobial and antifouling activity. Dibutyl phthalate also possess antimicrobial and antifouling properties.

Thus each compound identified in methanol extract of *C.wightti* has its own biological importance and further study of this plant phytochemical can prove its medicinal importance in future and can be an effective and efficient drug source in cheaper rate as it has higher biomass availability.

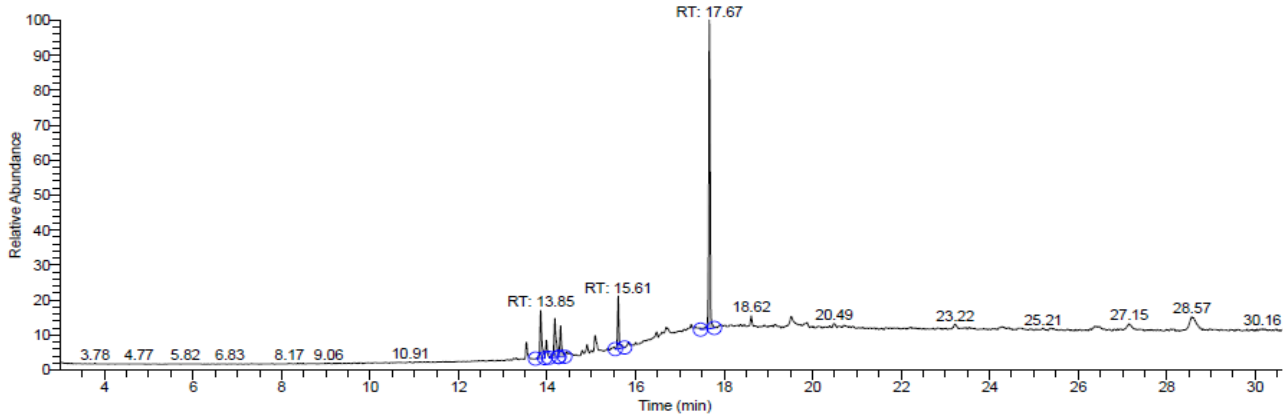

Figure: Spectra of Gas Chromatography of aerial parts of *C. wightti* in methanol extract.

Table 1: List of expected compounds and their activity

Sr. No.	Name of Compound	Formula	Molecular Activity
1	Dibutyl phthalate	$C_{16}H_{22}O_4$	Antimicrobial and Antifouling
2	Phthalic acid	$C_{18}H_{26}O_4$	Antimicrobial
3	1,2- benzenedicarboxylic acid	$C_{16}H_{22}O_4$	Antimicrobial and Antifouling
4	Bis (2- methyl propyl) ester	$C_{16}H_{22}O_4$	-
5	Diisooctyl phthalate	$C_{24}H_{38}O_4$	Antimicrobial and Antifouling
6	Trans- Geranylgeraniol	$C_{20}H_{34}O$	-
7	Thunbergol	$C_{20}H_{34}O$	Antimicrobial
8	6-epi shyobunol	$C_{15}H_{26}O$	-

Conclusion

The fundamental reason of quality control of herbal medicines is based on the concept of phytoequivalence of herbs, and then to use this conception to identify the real herbal medicine and the false one and further to do quality control. Therefore, GCMS method is a direct and fast analytical approach for identification of phytoconstituents. The importance of the study is due to the biological activity of some of these compounds. The present study, which reveals the presence of components in the extract suggest that the contribution of these compounds on the pharmacological activity can be further evaluated.

Research Highlight:

- GCMS analysis of aerial part of *Commiphora wightti* will be helpful in standardization of the plant.
- Scientific relevance behind the medicinal properties of the plant will be known.
- Biological activity of the evaluated compounds will be known.

Acknowledgement:

Author acknowledge the valuable help rendered by Scientist of Central Instrumentation Laboratory (CIL), Punjab University, Chandigarh for this analysis and validation of the results.

References:

Pierangeli, G. Vital, G. and Rivera, W. (2009) Antimicrobial activity and cytotoxicity of *Chromolaena odorata* (L. f) King and Robinson and *Uncaria perrottetii* (A. Rich) Merr Extracts. J. Medicinal Plants Res; 3(7): 511-518.

Vyas, G.D. (1999). Soil Fertility Deterioration in Crop Land Due to Pesticide. Journal of Indian Botanical Society; 78: 177-178.

Kaushik, J.C.; Arya, Sanjay, Tripathi; N.N. Arya S. (2002). Antifungal properties of some plant extracts against the damping off fungi of forest nurseries. Indian Journal of Forestry; 25: 359-361.

Chaman Lal and Verma L.R. (2006). Use of certain bio-products for insect-pest control. Indian Journal of Traditional Knowledge; 5(1): 79- 82.

Pole, Sebastian (2006).Ayurvedic Medicine: The Principles of Traditional Practice. Churchill Livingston Elsevier; 191-192, 304-311.