Available online on www.ijppr.com
International Journal of Pharmacognosy and Phytochemical Research 2015; 7(5); 991-994

ISSN: 0975-4873

Research Article

Phytochemical Constituents of Leaves of *Spatholobus parviflorus* a Rare Threatened Climber of South India

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Available Online:11th September, 2015

ABSTRACT

The present investigation was carried out to determine the possible bioactive components of tuber of *Spatholobus parviflorus*(Roxb. ex DC.) Kuntze belonging to the family FABACEAE using GC-MS analysis. Nine compounds were identified. The compounds in the ethanol leaves extract of S.*parviflorus* were identified as 3,7,11,15-Tetramethyl-2-hexadecen-1-ol, 2-Tridecnol-1-ol[E], n-Hexadecanoic acid,Phytol,9,12-Octadecadienoic acid (Z,Z), 1,2-Benzenedicarboxylic acid,diisooctyl ester, Cholestan-3-ol,2-methylene-,(3a,5a) ,Lupeol,1-Heptatriacotanol. This is the first report of documentation of active constituents from leaves of *S.parviflorus.* The results of the present study reveal that the leaves of *S.parviflorus have* effective potential bioactive compounds, which may be leads to the formulation of new drugs to treat various diseases.

Keywords: *Spatholobus parviflorus* , GC-MS, Bioactive compounds, Lupeol.

INTRODUCTION

Plants play an important role in traditional medicine and are widely consumed as home remedies. The WHO supports the use of traditional medicine, they are proven to be efficacious and safe (WHO, 1985). Over three quarters of the world population relies mainly on plants and plant extracts for health care. It is well known that plant produce these chemicals to protect them, but recent research demonstrate that they can also protect the humans against diseases. These drugs are derived either from whole plant or from different plant organs. These phytochemicals or drugs play an important role as antioxidants and also involved in hormonal action, stimulation of enzymes, interference with DNA replication, antibacterial effect etc[1]. The primary benefits of using plant derived medicines are that they are relatively safer than their synthetic alternatives offering profound therapeutic benefits and more affordable treatment[2]. Hence there is a need to validate the ethanomedicinal use of herbal medicine subsequently isolate and characterize the compounds[3]. A knowledge of chemical constituents of plants is desirable not only for the discovery of therapeutic agents ,but also because such information may be 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[4]. Very few medicinal plants are analyzed for phytochemical property, much remain to be explored.

SPATHOLOBUS PARVIFLORUS (Roxb. ex DC.) Kuntze belongs to the family FABACEAE and sub FAMILY: FABOIDEAE in the class MAGNOLIOPSIDA. This plant is a rare endemic threatened climber which is less evaluated for its medicinal properties. These Woody climbers are widely distributed in a wide geographic range from Nepal, Bhutan and India through south-east Asia to southern China and Indonesia. In northern Thailand the leaves and stems of this species are boiled, with Dicranopteris, and used as a liquid to apply to broken bones as an analgesic[5]. In Kerala, a leaf paste is used to treat conjunctivitis[6]. Gum extracted from the wood, fibre from the bark and oil from the seeds is reputed to have economic use in Bangladesh[7].

The main objective of the present study is to evaluate the bioactive constituents of *Spatholobus parviflorus* through GC-MS studies. Mass Spectrometry coupled with chromatographic separations such as GC MS is normally used for direct analysis of components existing in traditional medicines and medicinal plants[8]. GC MS is a method of Gas Chromatography Mass Spectrometry a method that combines the features of gas liquid chromatography and mass spectrometry to identify different substances within a test sample. GCMS can provide meaningful information for components that are volatile non-inonic and thermally stable and have relatively low mol.wt. The aim of the present study is to analyse the bioactive components present by GC MS analysis.

MATERIALS AND METHODS

The plant was collected from the RET Garden of St.Mary's college Thrissur. The fresh leaves collected were shade dried and grinded to fine powder. The shade dried leaves were grinded to powder and extract was prepared in ethanol and analysed through GC-MS for identification of different compounds. GC MS analysis was carried out using the procedure of Kumaravel et al 2010[9]. Analysis

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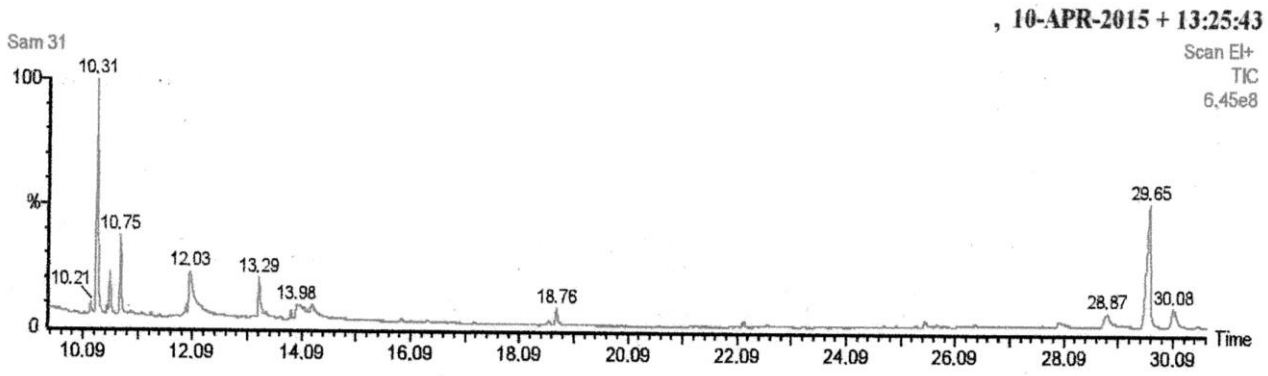

Fig 1. GC-MS chromatogram of the ethanol leaves extract of *Spatholobus parviflorus*

Table 1: Components identified in the leaves extract of *Spatholobus parviflorus*

No	Name of the Compound	Mol. For	MW	RT	Peak area %
1	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	$C_{20}H_{40}O$	296	10.31	21.36
2	2-Tridecnol-1-ol[E]	$C_{13}H_{26}O$	198	10.75	7.37
3	n-Hexadecanoic acid	$C_{16}H_{32}O_2$	256	12.03	20.02
4	Phytol	$C_{20}H_{40}O$	296	13.29	5.51
5	9,12-Octadecadienoic acid (Z,Z)	$C_{18}H_{32}O_2$	280	13.98	4.55
6	1,2- Benzenedicarboxylic acid,diisooctyl ester	$C_{24}H_{38}O_4$	390	18.76	1.99
7	Cholestan-3-ol,2-methylene-,(3a,5a)	$C_{28}H_{48}O$	400	28.87	5.10
8	Lupeol	$C_{30}H_{50}O$	426	29.65	28.70
9	1-Heptatriacotanol	$C_{37}H_{76}O$	536	30.08	5.39

Table 2: Activity of Phytocomponents identified in the leaf extract of *Spatholobus parviflorus*

No	Name of the Compound	Group	Property	References
1	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	Terpene alcohol	Antimicrobial, Anti-inflammatory, Anticancer, Diuretic Cosmetics, Antioxidant, Cancer preventive, Nematicide, Lubricant Hypocholesterolemic	11,12
2	2-Tridecnol-1-ol[E]	Alcoholic compound	Antifungal, Flavour and Fragrance agent	13
3	n-Hexadecanoic acid	Palmitic Acids	Anti inflammatory, antioxidant, Hypocholesterolemic, Nematicide, Pesticide, Lubricant, Antiandrogenic, Flavor, Hemolytic	11,12,13
4	Phytol	Diterpene	Antimicrobial, Anticancer, Cancer preventive, Diuretic, Antiinflammatory antioxidant	11,13
5	9,12-Octadecadienoic acid (Z,Z)	Linoleic acid	Antiinflammatory, Nematicide, Insectifuge, Hypocholesterolemic, Cancer preventive, Hepatoprotective, Antihistaminic, Antiacne,Antiarthritic, Antieczemic,	10,14
6	1,2- Benzenedicarboxylic acid,diisooctyl ester	Plasticizer Compound	Antimicrobial, Antifouling	15,14
7	Cholestan-3-ol,2-methylene-,(3a,5a)	Steroid compound	Antimicrobial, anticancer, diuretic, antiasthma, antiarthritic	11
8	Lupeol	Triterpenoid	Antibacterial, Antioxidant, Antitumor, Cancer preventive, Immunostimulant, Chemo preventive, Lipoxygenase-inhibitor, Pesticide Antimicrobial, Antiinflammatory, Antioxidant, Antiarthritic	15,14
9	1-Heptatriacotanol	Alcoholic compound	antimicrobial activity	11

was carried out on a GC Clarus 500 Perkin Elmer system comprising a gas chromatograph interfaced to a mass spectrometer instrument employing the following conditions Column Elite 5MS (30x0.25mmx0.25mm df) composed of 5% Diphenyl /95% dimethyl polysiloxane operating on a electron impact mode at 70eV . Helim (99.999%) was used as the carrier gas at a constant flow of 1ml/min on an injection volume of 2 ml (split ratio 10:1)

Injector temperature 250° C, ion source temperature 280°C .The oven temperature was programmed from 110° C isothermal for 2 min with an increase of 10° C/min to 200°C then 5°C /min to 280°
ending with 9 min isothermal at 280° C The Mass spectra was taken at 70 eV scan interval 0.5s and fragments from 45 to 450 Da ,total running time was 36 minutes Software adopted was Turbomass 5.2. Analysis were carried out at IICPT Thanjavur.
Identification of Bioactive compounds: Interpretation on mass spectrum GC-MS was conducted using the database of National Institute Standard and Technology (NIST) having more than 62,000 patterns. The spectrum of the unknown component was compared with the spectrum of the known components stored in the NIST library. The name, molecular weight and structure of the components of the test materials were ascertained.

RESULTS AND DISCUSSIONS

A large number of therapeutic agents used today have been isolated and derived from plant sources. Plants produce two types of metabolites primary and secondary metabolites. Secondary metabolites are considered products of primary metabolites and not involved in metabolic activity.These secondary metabolites are major sources of pharmaceuticals food additives, fragrances and pesticides[10].
The compounds present in the ethanol extract of leaf samples of *Spatholobus parviflorus* was identified by GC MS (Fig 1). The active principles with their molecular formula, molecular weight (MW), retention time (RT) and Con % in the ethanol extract of leaves are presented in Table 1. Nine compounds are identified in the ethanol extract of *Spatholobus parviflorus*. The results reveal that Lupeol (28.70%) as the major component followed by the Hexadecanoic acid (20.02%). The biological activities of the compounds identified in the ethanol extract of *Spatholobus parviflorus* presented in Table 2. It is very clear that the lupeol which forms the major conmpound is a well known anti cancer agent.

CONCLUSION

The results evidently shows that ethanolic leaf extract of *S. parviflorus* contains various bioactive compounds. These compounds have various medicinal properties which can cure many diseases. However, there is the need for the isolation of individual phytoconstituents and studying its biological activity. Therefore, the plant is recommended as a plant of phytopharmaceutical importance further studies will definitely yield fruitfull results.

ACKNOWLEDGEMENT

We would like to place on record our sincere thanks to Mr. S.Kumaravel, Senior Scientist, Indian Instituteof Crop Processing Technology (Ministry ofFood Processing Industries, Government of India), Tanjavore, and Tamil Nadu for providing all the facilities and support used to carry out the work.

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