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PHYTO-CHEMICAL PROFILING OF *ABUTILON HIRTUM* (LAM.) SWEET. LEAF EXTRACTS USING GC-MS ANALYSIS

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ABSTRACT

Abutilon hirtum (Lam.) Sweet belongs to the Malvaceae family, commonly known as '*Vadathuthi*' is used in our traditional system of medicine for healing various diseases. Present research describes the simplest method of identification of phytochemicals terpenoids, glycosides, and alkaloids from the ethanolic leaf extract of *A. hirtum*. By using gas chromatography coupled to mass spectrometry (GC-MS) phenols, flavonoids, tannins, terpenoids and Phytosterols were identified. These are reported for the first time in *A. hirtum*.

KEY WORDS: Abutilon, GCMS, Vadathuthi, phytosterols.

INTRODUCTION

Plant play a vital role in medicine and essential and integral part in complementary and alternative medicine and due to develop the ability for the formation of secondary metabolite like flavonoids, alkaloids, steroids and phenolic substance which turns used to restore health and heal many diseases. Phytochemicals are non-nutritive plant chemicals that have protective or disease preventive properties. Plant produces the chemicals to protect itself but recent research demonstrates that many phytochemicals can protect humans against various diseases. Above the last decade there has been a growing interest in drugs of plant origin in contrast to the synthetics that are regarded as unsafe to human and environment.[1] The emerging worldwide interest in adopting and studying traditional systems and exploiting their potential based on different health care systems, the evaluation of the rich heritage of traditional medicine is essential.[2 In India different parts of medicinal plants have been used for curing various diseases from ancient times.[3] The genus *Abutilon* belonging to the Malvaceae family, comprises about 100–150 species and is distributed in the tropics and subtropics. A small shrub of the *Abutilon hirtum* (Lam.) Sweet. (vadathuthi*)* [Synonym:

Abutilon graveolens (Roxb. Ex Hornem.) *Wight & Arn*.] a perennial herb. It is commonly called as Belabenda, Indian mallow, and Florida Keys etc. In Malaysia, *A. hirtum* is used as a poultice to ease the pain of kidney gravel and often mixed with glutinous rice and applied to ulcers. The leaves or flowers are applied to abscesses.[4] In Kenya the fruits are eaten raw, while the leaves are browsed by goats and camels. Water extract of the bark is given to ease childbirth in Kenya and Uganda. The seeds are an oil source. Nutritional analysis shows that it has crude protein 16-20% and calcium 2.6%.[5] In India, traditionally the leaves are used as demulcent diuretic and to treat diarrhoea. The decoction of the leaves is used as mouth wash and to cure bladder inflammations, wounds and ulcers.[6,7,8] Since alkaloids are reported from the roots of the plant.[9,10] The leaf aqueous extract of *A. hirtum* possess hepatoprotective activity.[11] To our knowledge, there are no such scientific reports of phytochemical (GC-MS) analysis for this plant. So the present investigation was designed to evaluate the *in vitro* phytochemical screening of *Abutilon hirtum.*

MATERIALS AND METHODS

Plant materials

The flowering plants of *A. hirtum* (Lam.) Sweet. was collected from the district of Tiruchirappalli, Tamilnadu situated in the southern region of India during the month of May 2014. It was identified and authenticated by the Botanical Survey of India, Southern Regional Centre, Coimbatore and RHT, Tiruchirappalli (Figure I).

Preparation of the extracts: The plant materials were dried at room temperature, chopped into small pieces, ground into powder and was placed into the extractor of a Soxhlet. The extraction was carried out by using solvent of ethanol. At the end of the extraction the respective solvents was concentrated by evaporation. The obtained extracts were stored in a refrigerator at 4^{o}C until use.

GC- MS Analysis: GC-MS analysis was carried out by Agilent-7890A GC instrument coupled with MS-5975 inert MSD and triple axis mass selective ion detector. The DB-5MS column with dimensions of 30m x 0.2mm capillary column was used for the analysis. The initial temperature was kept at 150° C and the maximum of 300° C. One ìL of sample was injected with split mode (10:1). Helium gas used as a carrier gas at flow rate of 0.8 ml/min and the total run time was 22 mins. GC-MS for identification of phytocomponents were conducted using the database of National Institute Standard and Technology MS library (NIST- MS library).

RESULTS

Figure: I Abutilon hirtum (Lam.) Sweet

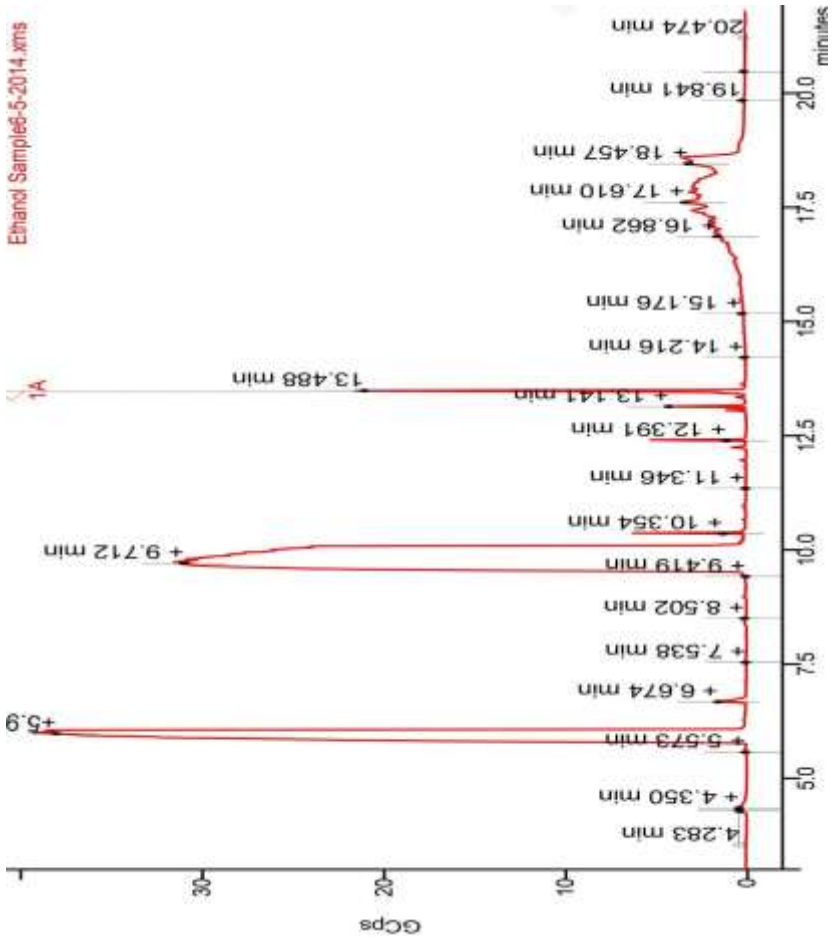

Figure: II :Chromatogram of Ethanolic Extract of Abutilon hirtum (Lam.) Sweet

The phytocompounds present in all the crude extracts of *A. hirtum* were identified by GC–MS analysis. The GC–MS chromatograms showed the presence of most important

phytocompounds with highest concentrations (*Figure. II*). Phytocompounds with their retention time (RT), molecular formula and molecular weight (MW) in the leaf extract (*Table I*).

Table I: Phyto-components in ethanolic extract of *A. hirtum* by GC-MS:

S.NO	RT	NAME OF THE COMPOUND	MOLECULAR FORMULA	MW	PEAK AREA %
1	5.916	Methyl salicylate	$C_8H_8O_3$	152	28.767
2	6.680	Benzoic acid, 2-hydroxy-ethyl ester	$C_9H_{10}O_3$	166	0.283
3	9.810	Phthalic acid, di-(1-hexen-5-yl) ester	$C_{20}H_{26}O_4$	330	49.744
4	10.391	Benzoic acid, 2-(1-oxopropyl-)	$C_{10}H_{10}O_3$	178	0.251
5	12.245	n- Hexadecanoic acid	$C_{16}H_{32}O_2$	256	0.489
6	12.318	Desulphosinigrin	$C_{10}H_{17}NO_6S$	279	0.361
7	13.060	9,12,15- Octadecatrienal	$C_{18}H_{30}O$	262	0.471
8	13.136	Phytol	$C_{20}H_{40}O$	296	0.103
9	13.373	9,12,15- Octadecatrienoic acid	$C_{18}H_{30}O_2$	278	2.573

DISCUSSION

Plant products including phenols, flavonoids, tannins, terpenoids and Phytosterols in the plant extracts have been reported to be inhibitors activity 4-8. The compounds identified by GC-MS in Ethanolic extract are medicinally valuable and possess various pharmaceutical applications. The identified phytocomponents needs further research on microbial activity aspects to develop safe drug in human beings.

CONCLUSION

From the present study, it is concluded that the maximum extraction of phytochemicals was observed in ethanolic extract shows that A. hirtum is highly valuable in medicinal and traditional usage for the treatment of various human ailments.

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