Available online at http://www.journalijcrls.com

International Journal of Current Research in Life Sciences
Vol. 07, No. 12, pp. 2920-2923, December, 2018

ISSN: 2319-9490

RESEARCH ARTICLE

GC-MS ANALYSIS AND PHYTOCHEMICAL PROFILE OF METHANOLIC LEAF EXTRACT OF *WALSURA TRIFOLIOLATA* (A.JUSS.) HARMS, (MELIACEAE) FROM KARUKKAI SACRED GROVE, TAMILNADU BY GC-MS ANALYSIS

Senthilkumar, E. and Saravanakumar, K.

[1]Research and Development Centre, Bharathiar University, Coimbatore, Tamilnadu, India
[2]Department of Botany, Annamalai University, Annamalainagar-608002, Tamilnadu, India

Accepted 24th November, 2018; Published Online 30th December, 2018

ABSTRACT

Walsura is a plant genus of the family Meliaceae. *Walsura* have high medicinal importance and theselected species W. trifoliolatais used traditionally to treat various diseases. In the present study was undertaken to analyze the chemical composition, the crude methanolic leaf extract of *W. trifoliolata* was subjected to phytochemical screening for the presence of various phytochemicals. About 22different compounds were identified using GC-MS. From the present findings Lupenol an active phytocompound identified and it is having the qualities of anti-inflammatory, anti-diarrheal and anti-cancer and correlated with earlier studies. Isolation of Lupenol from the *W.trifoliolata* which were fascinating manyscientists to work on this group of plants.

Keywords: *Walsura trifoliata,* phytochemical investigation, GCMS

Citation: Senthilkumar, E. and Saravanakumar, K. 2018. "GC-MS analysis and phytochemical profile of methanolic leaf extract of *Walsura trifoliolata* (a.juss.) harms, (meliaceae) from Karukkai sacred grove, Tamilnadu by GC-MS analysis" *International Journal of Current Research in Life Sciences*, 07, (12), 2920-2923.

INTRODUCTION

Walsura trifoliata arare and robust evergreen tree belongs to Meliaceae family and distributed widely in the tropical areas of South Asian countries (Chetty *et al*., 2008, and Murthy and Nagamani, 2008). The leaves and bark of the plant used to treat various ailments such as skin allergies, astringent and diarrhea (Murthy and Nagamani, 2008). A rich source of triterpenoids in the genus Walsura (Suri Appa Rao *et al*., 2015) and the species W. trifolioata is used to treatvarious ailments such as skin allergies, astringent and diarrhea (The wealth of India, 1976). Presence of triterpenoids few members of Meliaceae showed various biological activities including antifeedant activity against important insect pests (Omar *et al*., 2007, Tan and Luo, 2011; Luo *et al*., 2000 and Appa Rao *et al*., 2012). Therefore The present study is focused to investigate the phytochemical analysis of leaves of W. trifolioata *W. trifolioata* a medium sized tree bark brittle; branchlets pubescent. Leaves trifoliate, leaflets oblong, ovate-lanceolate, apex obtuse or emarginate, glossy below. Inflorescence axillary or terminal corymbs; flowers white; calyx lobes five, ovate, pubescent; petals five oblong, lanceolate; staminal tube pubescent, deeply lobed, lobes bifid; anthers between the teeth, exserted; ovary 2-celled, pubescent, stigma turbinate. Fruit a globose berry; seeds solitary.

Corresponding author: Senthilkumar, E.,
Research and Development Centre, Bharathiar University, Coimbatore.

MATERIALS AND METHODS

Collection of plant materials and preparation of the extract. The fresh leaves of *W. trifoliata* were collected from the sacred grove of Karukkai (Lat, 11.38 ºN, Long, 79.37 ºE), Ariyalur District, Tamil Nadu, India. The specimen was botanically identified and confirmed by Rapinat Herbarium, St. Joseph's College, Tiruchirappalli. The preserved plant specimens were submitted to the Department of Botany, Annamalai University, Annamalai nagar, Tamilnadu for further reference. The leaves were chopped into small pieces, shade-dried and coarsely powdered by using a pulverizor. The powdered leaf were then subjected to successive extraction with organic solvents such as hexane chloroform and ethanol by Soxhlet method (Ingle *et al*., 2017). The extracts were then collected and distilled off on a water bath at atmospheric pressure and the last trace of the solvents was removed in vacuum and stored at 4˚C. They were used for GC-MS analysis. Preliminary Phytochemical screening: Phytochemical Screening: The chemical tests were performed on the n-hexane, chloroform, ethyl acetate and methanolic leaf extracts of *W. trifoliata*using standard procedure to identify the constituents as described by Sofowora(1993), Trease and Evans (1983)and Harbourne (973). Alkaloids: About 0.2 g of each of extract was warmed with 2% H, S04, for two minutes. Then they were filtered and a few drops of Dragendrors reagent were added to each filtrate. No orange red precipitate indicated the absence of alkaloids.

Fig.1. Morphology of *W. trifoliolataa.* flowering, b fruiting stage

Tannins: **A** small quantity of each extract was mixed with water and heated on water bath and then filtered. A few drops of ferric chloride were added to each of the filtrates. A dark green solution indicated the presence of tannins.

Anthraquinones: About 0.5 g of each extract was boiled with 10 % HCl for few minutes in water bath, filtered and allowed to cool. Equal volume of CHCl3 was added to the filtrates. Few drops of 10% ammonia was added to the mixtures and heated. Formation of rose-pink color indicated the presence of annum quinones.

Table 1. Phytochemical screening of the leaf extracts of *W. trifoliata*

Chemical components	Extracts			
	n-hexane	Chloroform	Ethyl acetate	Methanol
Alkaloids	-	-	-	-
Steroids	+	+	-	+
Terpenoids	-	-	+	+
Flavonoids	-	-	-	-
Anthraquinones	-	-	-	-
Tannins	-	-	+	+
Saponins	--	--	-	-
Glycosides	-	-	-	+
Reducing sugars	-	-	-	+

Table 2. GC-MS profiles of methanolic leaf extract of W. Trifoliate

S.No.	Peak Name	Mol. formula	Mol. weight	Retention Time (min)	Peak Area	% Peak area
	2H-Azepin-2-one, hexahydro-1-methyl-	C7H13NO	127	4.63	28472	0.0981
	3,4-Furandiol, tetrahydro-, cis-	C4H8O3	104	6.34	137293	0.4731
	2-Propyl-1-pentanol	C8H18O	130	6.55	1730087	5.9762
	2-Octanone	C8H16O	128	6.94	513712	1.7761
	5,9-Dodecadien-2-one, 6,10-dimethyl-, (E,E))-	C14H24O	208	7.92	333419	1.1512
	1,2-Benzenediol	C6H6O2	110	10.93	384382	1.3267
	Hydroquinone	C6H6O2	110	12.88	673163	2.3261
	2-Methoxy-4-vinylphenol	C9H10O2	150	13.11	179714	0.6217
	Phenol, 2,6-dimethoxy-	C8H10O3	154	13.96	42343	0.1460
	1,2,3-Benzenetriol	C6H6O3	126	15.08	1183134	40.8838
	Propanedioic acid, propyl-	C6H10O4	146	17.69	44426	0.1527
	D-Allose	C6H12O6	180	21.78	9668276	33.4015
	1,3,5-Benzenetriol, dihydrate	C6H6O3	126	22.54	904500	3.1212
	4-((1E)-3-Hydroxy-1-propenyl)-2-methoxyphenol	C10H12O3	180	24.18	49303	0.1723
	n-Decanoic acid	C10H20O2	172	24.52	291202	1.0054
	Hexadecanal	C16H32O	240	26.32	316314	1.0922
	3-t-Butyl-oct-6-en-1-ol	C12H24O	184	26.96	153248	0.5304
	2,6,10-Trimethylundeca-1,3-diene	C14H26	194	27.41	94118	0.3255
	Tridecanoic acid, methyl ester	C14H28O2	228	28.56	132174	0.4573
	n-Hexadecanoic acid	C16H32O2	256	29.67	420392	1.4533
	Squalene	C30H50	410	45.94	853212	2.9416
	Lupenone	C30H48O	427	47.78	862314	2.9522

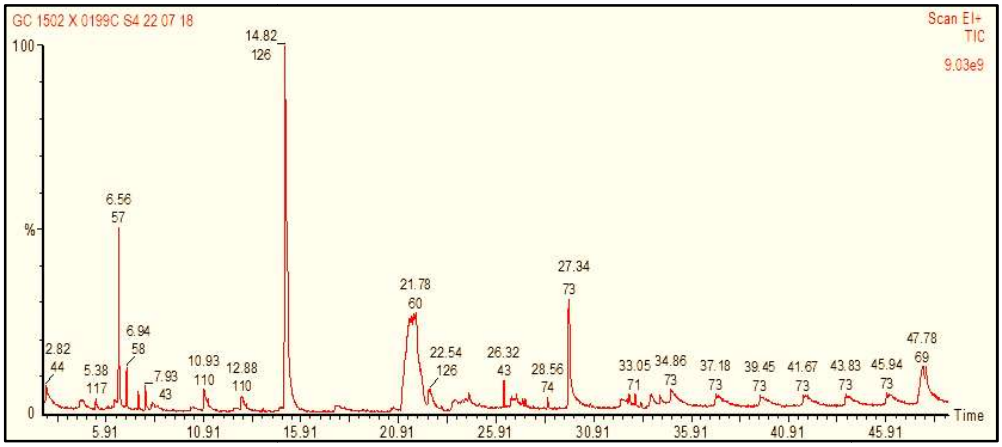

Fig. 2. GC-MS chromatogram of methanolic leaf extract of W. trifoliolata

Glycosides: The extracts (0.5 g) were hydrolyzed with HCl and neutralized with NaOH solution. A few drops of Fehling's solution A and B were added. No red precipitate indicated the absence of glycosides.

Reducing Sugars: The extracts were shaken with distilled water, filtered and boiled with few drops of Fehling's solution A and B for few minutes. No orange/red color indicates the absence of reducing sugars.

The chemical constituents identified by the GC-MS analysis on various extracts of the leaves of *W. trifoliata* were enumerated along with Molecular Formula (MF), Molecular Weight (MW), Retention Time (RT), and Peak area and Peak area (%) is presented in Table-2. Among the phytocompounds identified from GC-MS, the Lupeola major and important compound showed a triterpenoid and biologically active dietary is found in many medicinal plants and different fruits such as olives, mangoes, and strawberries (Bapat *et al*., 2008, Verma and Bansal 2012). A variety of medicinal plants such as *Betula alnoides*, *Vernonanthura ferruginea* and *Zanthoxylum rhoifolium* have also been reported lupeol as an active constituent (Han *et al* 2012 & 2013 and Hou Li *et al*., 2013). Lupeol reported various pharmacological activities including anti-inflammatory and anti-oxidant activity (Sichaem *et al*., 2012, Nugroho *et al*., 2013 and Sichaem *et al*., 2014). Lupeol and its hybrids showed anti- diabetic (Zhou *et al*., 2008), anticancer, anti-inflammatory (Yin *et al*., 2007). hypercholesterolemia (Chen *et al*., 2013 and Gopalakrishnan *et al*., 2013) and so forth. Wide range of biological activity, it was used tocure diarrhea (The wealth of India 1976)in tribal peoples. A second major phytocompound identified as Squalene is a triterpene that carries oxygen independent of the hemoglobin and it can carry oxygen directly to cell membranes throughout the body and reach the regions having low oxygen supply. Squalene has been reported to have an inhibitory effect on cancer promotion and a high anti-tumor activity (Gunes 2013, Senbagalakhsmi, 2019).

CONCLUSION

The presence of *triterpenoids* in the methanolic leaf extract of *W. trifoliolata* showed chemotaxonomic significance and isolation of these compounds may serve as a chemical marker. In addition, these extensive medicinal properties, it is necessary to undertake a thorough examination of the chemical constituents will get a novel drug in future.

REFERENCES

Alfarius, E. Nugroho., Maho Okuda., Yukari Yamamoto., Yusuke Hirasawa., Chin-Piow Wong., Toshio Kaneda., Osamu Shirota., Hamid, A. Hadi. 2013. Hiroshi Morita. Walsogynes B–G, limonoids from Walsura chrysogyne Tetrahedron, 69, 4139-4145.

AppaRao, M.S., Suresh, G., Ashok Yadav., P RajendraPrasad, K ., Naik, VL., Ramakrishna, S *et al*. 2012. Novel apo-tirucallane triterpenoids from *Walsura trifoliata*. Tetrahedron Lett. 2012; 53:6241.

Awang, K., Yusoff, M., Mohamad, K., Chong, S.L.and Ng, S.W. 2009. 3-Oxoolean-1-en-28-oic acid–n-hexane– water (4/1/1) from the bark of Walsura pinnata Hassk. *Acta Cryst.* E65, 1166.

Balakrishna, K., E. Sukumar., Connolly, J. D. 2003. Piscidenone and Piscidinol G, Two New Protolimonoids from *Walsura piscidia*. Natural Product Sciences2003, 9, 192-194.

Bapat, V. A., Yadav, S. R., Dixit, G. B. 2008. Biodiversity Conservation with Special Reference to Medicinal Climbers: Present Scenario, Challenges, Strategies, and Policies. Nat. *Acad. Sci. Lett.* 31, 201.

Chen, H.L, Ma, S.G, Fang, Z.F, Bai J, Yu S.S, Chen, X.G, Hou, Q, Yuan, S.P. Chen, X. 2013. Tirucallane triterpenoids from the stems of Bruceamollis. Chem Biodivers. Apr;10(4):695-702.

Chetty, K.M., Sivaji, K., Rao, K.T. 2008. Flowering Plants of Chittor District, Andhra Pradesh, India, 1st ed., Students Offset Printers: Tirupati, 64.

Gopalakrishnan G., Pradeep Singh, N.D., Kasinath V., Malathi R., Rajan, S.S. 2000. Photooxidation of cedrelone, a tetranortriterpenoid from Toona ciliata. *Photochem Photobiol.* Oct; 72(4):464-6.

Govindachari, T.R., Krishna Kumari, G.N., and Suresh, G., 1995. Triterpenoids from Walsura piscidia. *Phytochemistry* 39, 167–170.

Gunes, S.E. 2013. Medical use of squalene as a natural antioxidant. *Journal of Marmara University Institute of Health Sciences*, 3(4):221-229.

Han, M.L., Zhang, H., Yang, S.P and Yue, J.M. 2012. Walsucochinoids A and B: New Rearranged Limonoids from Walsura cochinchinensis. Organic Letters, 14, 486.

Han., M.L., Shen, Y., Wang, G. CLeng, Y. Zhang, H; and Yu, J.M 2013. 11 β-HSD1 inhibitors from Walsura cochinchinensis. *J. Nat. Prod.* 76, 1319.

Harbourne, J.B. 1973. Phytochemical Methods – A guide to modern technique of Plant analysis. *Chapman and Hall.* pp. 271.

Hou Li.., Tang Gui-Hua., Zhang Yu., Hao Xiao-Jiang., Zhao Qing., HeHong-Ping. 2013. A new carotanesesquiterpene from Walsura robusta. *Chinese Journal of Natural Medicines* 11, 84-86.

Ingle KP, Deshmukh AG, Padole DA, Dudhare MS, Moharil MP, Khelurkar VC. 2017. Phytochemicals: Extraction methods, identification, and detection of bioactive compounds from plant extracts. *J Pharmacogn Phytochem.* 6:32–6.

Jirapast Sichaem, Suttira Khumkratok, Pongpan Siripong, 2014. Santi Tippyang. New cytotoxic apotirucallanes from the leaves of Walsura trichostemon*. J. Nat. Med.,* 68, 436-441.

Jirapast Sichaem., Thammarat Aree., Suttira Khumkratok., Jonkolnee Jong-aramruang, Santi Tip-pyang. 2012. A new cytotoxic apotirucallane from the roots of Walsura trichostemon. *Phytochemistry Letters,* 5, 665.

Kozhiparambil. K., Purushothaman. KalyaniDuraiwamy., Joseph, D. Connolly and David S. Rycroft. 1985. Triterpenoids from Walsura piscidia. *Phytochemistry,* 24, 2349.

Luo, X.D., Wu S.H., Ma Y.B., and Wu, D.G. Tetranor triterpenoids from Walsura yunnanensis. *J. Nat. Prod.,* 2000; 63:947–51.

Luo, X.D., Wua, D.G., Cai, X.H, and Kennelly, E.J. 2006. New Antioxidant Phenolic Glycosides from Walsura yunnanensis. *Chemistry & Biodiversity,* 3, 224-230.

Mohamad, K., Hirasawa, Y, Lim, CS., Awang, K.,Hamid, A. Hadi, A., Takeya, K, Morita, H.Ceramicine A and walsogyne A. 2008. Novel limonoids from two species of Meliaceae. Tetrahedron Letters 49, 4276-4278.

Mohamad, K., Yusuf, M., Awang. K., Ahmad, K. and Ng, S.W. 2009. Pinnatane A from the bark of Walsura pinnata Hassk. *Acta Cryst.* E65, 1317.

Murthy, KS.R. and Nagamani, KJ. 2008. Toxicol. 3:267.

Omar, S, Marcotte, M, Fields, P, Sanchez, PE, Poveda, L., Mata, R. *et al*. 2007. Antifeedant activities of terpenoids isolated from tropical Rutales. *Journal of Stored Products Research.* 43:92.

Senbagalakshmi, P. Muthukrishnan, P.S., Jebasingh, T., Senthil Kumar, T., Rao, M. V. 2019. Squalene, Biosynthesis and its role in production of bioactive compounds, a Proper *Scientific Challenge-A Review.* 6, 2, 505-526.

Sheng Yin, Xiao-Ning Wang, Cheng-Qi Fan, Shang-Gao Liao, and JianMin Yue* 2007. The First Limonoid Peroxide in the Meliaceae Family: Walsuronoid A from Walsura robusta. Org. Lett., 9 (12), pp 2353–2356.

Sofowora, A. 1993. Phytochemical Screening of Medicinal Plants and Traditional Medicine in Africa Edition. Spectrum Books Ltd., Nigeria, 150-156.

Tan, Q.G., Luo, X.D. 2011. Meliaceous Limonoids: chemistry and biological activities. Chem. Rev., 111:7437.

The Wealth of India (Raw Materials). Publication and Information Directorate, CSIR, New Delhi. 1976; X:562.

Trease, E, C. and Evans, W.C. 1983. Evans Textbook of Pharmacognosy, 12th edn. Balliese Tindall and Company Publishers, London, 343-383.

Zhou, Z.W., Yin, S,; Zhang, H.Y, Yan Fu, Y. Yang, S.P. 2008. Walsucochins A and B with an unprecedented skeleton isolated from Walsura cochinchinensis. Org. Lett., 10 (6), pp 465–468.

****