WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 5.045
Volume 4, Issue 4, 1855-1859. Research Article ISSN 2277– 7105

GC-MS/MS ANALYSIS OF PHYTOCHEMICALS IN MUNTINGIA CALABURA L, ANTIMICROBIAL ASSAY

M. Krishnaveni*, C. Ragina Banu[2], M. Kalaivani[2] and G.Krishnakumari[2]

[*1]Assistant Professor, Department of Biochemistry, School of Bio-Sciences, Periyar University, Salem.

[2]M.Phil Students, Department of Biochemistry, School of Bio-Sciences, Periyar University, Salem.

Article Received on
10 Feb 2015,

Revised on 05 March 2015,
Accepted on 30 March 2015

***Correspondence for Author**
M. Krishnaveni
Assistant Professor, Department of Biochemistry, School of Bio-Sciences, Periyar University, Salem.

ABSTRACT

The plant *Muntingia calabura* an economically important plant, used by common people for general purpose. Since, this plant is of beneficial, its phytochemical analysis is important to explore its therapeutic significance. In the present study, the leaf of *Muntingia calabura* was shade dried, powdered, and extracted with ethanol for the analysis of GC-MS/MS and also for its antimicrobial activities. According to our results, the plant *Muntingia calabura* leaf showed highest peak area for Propane, 1, 1-diethoxy- compared to other 11 compounds identified. Likewise, the leaf extract of *Muntingia calabura* showed more zone of inhibition with fungus *Aspergillus niger*. This shows its antiseptic nature which might have been induced because of the components present.

KEYWORDS: Chromatography, Ethanol, Leaf, Mass spectrometry, *Muntingia calabura*.

INTRODUCTION

Natural antioxidants in fruits, vegetables slows the oxidative damage. Cherries are rich in anthocyanin, quercetin, hydroxycinnamates, potassium, fiber, vitamin C, carotenoids, melatonin and very low in calorie content. The *Muntingia calabura* leaves have been reported for its antibacterial, free radical scavenging, anti-nociceptive, anti-pyretic, anti-inflammatory, anti-staphylococcal, antihypertensive, antiulcer activity.[1-4] Plants rich in bioactive compounds are essential in food, research industry as it reduces oxidation of lipids, aids in improving the nutritive value of the food. Hence, the present study was planned to know the

phytochemicals present in the ethanol extract of *Muntingia calabura* leaf and also its antimicrobial activity.

MATERIALS AND METHODS

Sample collection

Fresh *Muntingia calabura* leaf samples were collected, shade dried, and powdered. 25grams of powdered leaf sample was used for ethanol extraction. The extracted sample was used for phytochemical analysis through GC-MS/MS, anti-microbial activity. The plant was authenticated by Dr. A. Balasubramanian. The authentication number was AUT/PUS/068 dated 17/12/2014.

Analytical method

GC-MS/MS was performed on a Scion 436-GC Bruker carrying Triple quadruple mass spectrophotometer with fused silica capillary column BR-5MS (5% Diphenyl95% Dimethyl poly siloxane), 30m x 0.25mm ID x 0.25m df. The column oven temperature program was as follows: 80°C hold for 2 min, Up to 160°C at the rate of 20°C/min-No hold, Up to 280°C at the rate of 5°C / min-No hold, Up to 300°C at the rate of 20°C/min-10 min hold, Injector temperature 280°C, Total GC running time was 41 min. The inlet temperature was set at 280°C, source temperature 250°C; ionization mode, ionization at 70-eV ionization energy; For single scan analysis, the scan range was set from m/z 40 to 600; Solvent Delay: 0-3.5 min; and the injection volume was 2µl. The GC-MS/MS was performed by Institute of crop processing technology, Tanjavur.

Antimicrobial assay

The antimicrobial activity was assessed by means of Kirby- Bauer technique.[5]

RESULTS AND DISCUSSION

The results of compounds identified are shown in Table.1.

Table.1 shows the result of photochemicals identified in *Muntingia calabura* leaf. Totally 12 compounds were identified in the ethanol extract of *Muntingia calabura* leaf. The identified compounds were as follows: Propane, 1,1-diethoxy- (RT 4.76, Molecular formula C7H16O2, MW 132, Peak area % 60.67), Cyclohexasiloxane, dodecamethyl- (RT 6.63, Molecular formula C12H36O6Si6, MW 444, Peak area % 4.08), 3-Isopropoxy-1,1,1,7,7,7-hexamethyl-3,5,5-tris(trimethylsiloxy)tetrasiloxane (RT 8.25, Molecular formula C18H52O7Si7, MW 576, Peak area % 2.93), 3,4-Dihydroxy-α-(isopropylaminomethyl)-

benzyl alcohol –isoproterenol (RT 10.34, Molecular formula C11H17NO3 , MW 211, Peak area % 4.08), Tetradecanoic acid (RT 12.73, Molecular formula C14H28O2, MW 228, Peak area % 1.41), Dodecanoic acid, ethyl ester (RT 16.34, Molecular formula C14H28O2, MW 228, Peak area % 2.09), 6-Methyloctahydrocoumarin (RT 19.32, Molecular formula C10H16O2, MW 168, Peak area % 1.60), Cyclononanone (RT 20.08, Molecular formula C9H16O, MW 140, Peak area % 0.47), t-Butyl hydrogen phthalate (RT 25.19, Molecular formula C12H14O4, MW 222, Peak area % 0.79), Stigmasteryl tosylate (RT 31.70, Molecular formula C36H54O3S, MW 566, Peak area % 7.85), Stigmastan-3,5-diene (RT32.34, Molecular formula C29H48, MW 396, Peak area % 5.90), Stigmasterol (RT 34.29, Molecular formula C29H48O, MW 412, Peak area % 9.97). The components identified in *Muntingia calabura* contribute for its pharmacological properties. The antioxidant activities[6,9] and air pollution tolerance index,[7,9] qualitative,[8] phytonutrient[8] analysis of plant leaves were reported by Krishnaveni et.al.

Table.1. Components in ethanol extract of *Muntingia calabura* leaf.

S.No	RT	Name of the compound	Molecular Fomulae	MW	Peak area %
1.	4.76	Propane, 1,1-diethoxy-	C7H16O2	132	60.67
2.	6.63	Cyclohexasiloxane, dodecamethyl-	C12H36O6Si6	444	4.08
3.	8.25	3-Isopropoxy-1,1,1,7,7,7-hexamethyl-3,5,5-tris(trimethylsiloxy)tetrasiloxane	C18H52O7Si7	576	2.93
4.	10.34	3,4-Dihydroxy-α-(isopropylaminomethyl)-benzyl alcohol (isoproterenol)	C11H17NO3	211	2.25
5.	12.73	Tetradecanoic acid	C14H28O2	228	1.41
6.	16.34	Dodecanoic acid, ethyl ester	C14H28O2	228	2.09
7.	19.32	6-Methyloctahydrocoumarin	C10H16O2	168	1.60
8.	20.08	Cyclononanone	C9H16O	140	0.47
9.	25.19	t-Butyl hydrogen phthalate	C12H14O4	222	0.79
10.	31.70	Stigmasteryl tosylate	C36H54O3S	566	7.85
11.	32.34	Stigmastan-3,5-diene	C29H48	396	5.90
12.	34.29	Stigmasterol	C29H48O	412	9.97

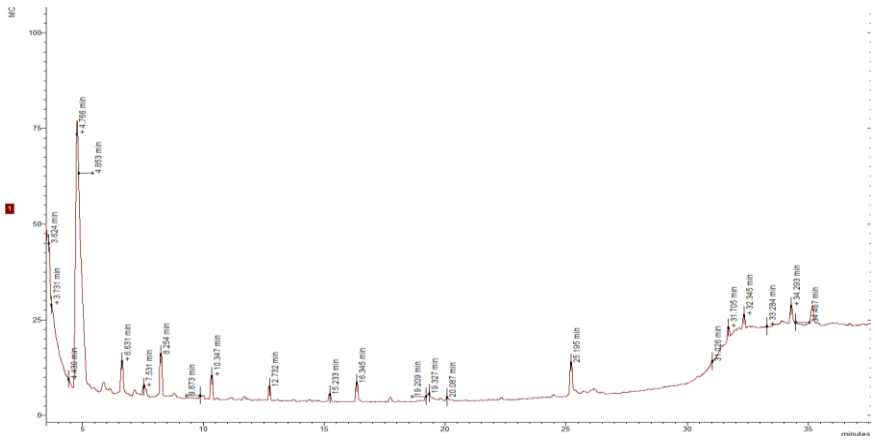

Fig. 1 shows the GC- Chromatogram of ethanol extract of *Muntingia calabura* leaf.

Table. 2 Antimicrobial activity of ethanol extract of *Muntingia calabura* leaf

Plant used	Microbes tested	Zone of inhibition (mm)
Muntingia calabura leaf	*Escherichia coli*	-
	Staphylococcus aureus	08
	Aspergillus niger	15
	Candida albicans	12

The results of antimicrobial activity of ethanol extract of *Muntingia calabura* leaf was shown in Table.2. The sensitivity of the extract was studied using bacteria, fungi as well as with fungi. The bacteria used were *Escherichia coli, Staphylococcus aureus* and the fungi used were *Aspergillus niger*, *Candida albicans*. The extract of *Muntingia calabura* leaf was found to act against fungi rather than bacteria. The zone of inhibition observed was 8mm for *Staphylococcus aureus* while no zone was observed for *Escherichia coli*. The zone of inhibition observed with fungi was 15mm for *Aspergillus niger*, 12mm for *Candida albicans.*

CONCLUSION

The plant *Muntingia calabura* offers many health benefits. The results of the present study also says that it might be a good source of antiseptic as it acts against microbes. This property might be attributed due to the presence of phytochemicals present in the *Muntingia calabura* leaf.

ACKNOWLEDGEMENT

The author wishes her thanks to Honorable Vice-chancellor Dr. C. Swaminathan Avl, and Registrar Dr. K. Angamuthu Avl, Periyar University, Salem for their administrative support and excellent infrastructure facilities provided and also co-ordinator, School of Bio-Sciences, Periyar University, Salem, Dr. A. Balasubramanian, ABS Botanical garden, Salem for his help in authenticating plants, Director Dr. K. Alagusundaram and Dr. S. Kumaravel, senior scientist, Indian Institute of Crop Processing Technology, Thanjavur for analyzing the samples. The author would like to express her gratitude to her dedicated teachers.

REFERENCES

1. Zakaria HZ, Henie EFP, Mat JAM, Kasthuri D, Thenamutha M, Othman FW, Nazaratulmawarina R,.Ftimah CA. The invitro antibacterial activity of *Corchorus olitorius* and *Muntingia calabura* extracts. J. pharmacol, toxicol, 2006; 1(2): 108-114.
2. Zainul AZ. Free radical scavenging activity of some plants available in Malaysia. IJPT, 2007; 6: 87-91.
3. Zakaria Z, Nor HN, Zaid S, Ghani M, Hassan M, Gopalan H, Sulaiman M. Antinociceptive, anti-inflammatory and antipyretic effects of *Muntingia calabura* aqueous extract in animal models. J. Nat Med, 2007; 61(4): 443-448.
4. Zakaria ZA, Mat Jais AM, Mastura M, Mat Jusoh SH, Mohamed AM, Mohd NS, Jamil M, Rofiee MS, Sulaiman MR. *In vitro* Antistaphylococcal Activity of the Extracts of Several Neglected Plants in Malaysia. Int. J. Pharmacol, 2007; 3(5): 428-431.
5. Bauer AW, Perry DM, Kirby WMM, Single disc antibiotic sensitivity testing Staphylococci, AMA Arch Intern Med, 1959; 104: 208–216.
6. M.Krishnaveni, Mahesh P, Ponraj K, Kalimuthu R, Lavanya K, Jasbin Shyni G. A comparative study on antioxidant activities of selected from road side plants, Salem, Tamil nadu, India, International Journal of Pharmaceutical Sciences Review and Research, 2014; 26(2): 112-116**.**
7. Krishnaveni M, Magesh P, Air pollution tolerance index induced by biochemical components in plants. International Journal of Pharmacy and Pharmaceutical Sciences, 2014; 6(5): 362-364.
8. Krishnaveni M, Dhanalakshmi R. Qualitative, Quantitative analysis of phytochemicals in *Muntingia calabura* L. leaf and fruit. World Journal of Pharmaceutical Research, 2014; 3(6): 1687-1696.
9. Krishnaveni M and Jasbin Shyni George. Comparative study on APTI, antioxidant status of plants & soil health. Lambert academic publishing, 2014; 978- 3-659-52656-5, 1-94.