WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 7.523
Volume 6, Issue 11, 663-667. Research Article ISSN 2277– 7105

ANTIMICROBIAL ACTIVITY OF MUTINGIA CALABURA L

M. Vasanth*, S. Selvaraju, R. Muralidharan and R. Rajarajan

Dept. of Plant Biology and Plant Biotechnology, D. G. Vaishnav College (Autonomous), Chennai- 600 106, Tamil Nadu, India.

Article Received on
25 July 2017,
Revised on 14 August 2017,
Accepted on 03 Sept. 2017
DOI: 10.20959/wjpr201711-9537

***Corresponding Author**
M. Vasanth
Dept. of Plant Biology and Plant Biotechnology, D. G. Vaishnav College (Autonomous), Chennai-600 106, Tamil Nadu, India.

ABSTRACT

The aim of the present study was to determine the in vitro antimicrobial activity of various solvent extracts of Muntingia calabura L. leaves against selected microorganism. It was observed that Ethyl acetate crude extract of 30 µL showed maximum inhibitory activity against Escherichia coli. Similarly, the minimum inhibitory activity showed in aqueous crude extract about 10 µL concentration.

KEYWORDS: in vitro – Antimicrobial – Mutingia calabura L. - Inhibitory activity.

1. INTRODUCTION

Muntingia calabura L. (Family: Mutingiaceae), is a flowering plant native to southern Mexico, the Caribbean, Central America, and western South America.

M. calabura L. tree is a small fast growing evergreen tree having floppy branches with leaf varying range of 2.5 cm to15cm long and 1 cm to 6.5 cm wide, small flowers white in color, light red color fruit of 1cm to 1.5 cm. The fruits are edible, sweet, juicy and inside the fruit lots of tiny yellow color seeds are available.

The fruits are used in the preparation of jam, syrup, juice and they are rich in Water, Carbohydrate, Calcium, Vitamin-C, Fiber, Iron and lesser amount of Fat, Protein, Riboflavin, Niacin, Carotene.

Presence of M. calabura plant in soil aids conditioning of soil. According to the Peruvian folklore, its leaves can either be boiled or steeped in water to provide relief from gastric ulcer or to reduce swelling of the prostate gland, while the strips of its bark are boiled and washed

to reduce the swelling in the lower extremities.[12] The leaves, in particular, have been used to treat pain associated with gastric ulcers, headache, and cold or to attenuate the prostate gland swelling.[3,4]

Scientifically, the leaves of M. calabura have been reported to possess antitumour[5,6], anti-inflammatory and antipyretic[12,7], antibacterial[8] and antiproliferative and antioxidant[9] activities.

This paper focuses the antibacterial activity of the Aqueous and Ethyl Acetate crude extracts from the leaves of M. calabura against the bacterium Escherichia coli.

2. MATERIALS AND METHODS

2.1 Plant Collection

The healthy leaves of *M. calabura* were collected at D.G. Vaishnav College, Chennai on 12-07-2017. Voucher specimen of the collected sample was deposited in the department herbarium (Voucher No: PB-01).

2.3 Preparation of crude extract

The fresh leaves were cleaned thoroughly with normal tap water followed by sterile distilled water. The leaves were shade dried and then kept in an oven 40^{o}c for 24 hr. Using the pestle and mortar, the leaves were ground to fine powder. After that, the powder weighing about 100 g was dissolved in Aqueous and Ethyl acetate at a ratio of 1:4 (w/v) for 72 h. The mixture was then decanted and filtered through a Whatman No. 1 filter paper and stored in fridge for further bioassays.

2.4 Tested Microorganism

Microorganism tested in the study was Escherichia coli.

2.5 Antimicrobial activity

All the extracts were dissolved in their respective solvents at the concentration of 2 mg/mL. Further, the extracts were loaded into sterile filter paper discs at the range of 10 µl, 20 µl and 30 µl respectively. The respective solvents (Distilled water and Ethyl acetate) were used as a control. The antimicrobial activity was assessed by Kirby and Bauer technique.[2]

3. RESULTS AND DISCUSSION

The results of our study indicate that *M. calabura* may be a potential alternative source of antibacterial agents against E. coli (The results of antimicrobial activity was shown in Table - I).

Phytochemical analysis of M. calabura revealed the presence of sterols, flavonoids, alkaloids, saponins, glycosides, and tannins in the leaf ethanolic extract and triterpenes in the stem ethanolic extract. The plant secondary metabolites of these plant have been reported to exhibit medicinal and physiological activities.[11]

The Ethanol extract of M. calabura fruit was tested for its antimicrobial property against selected bacteria and fungi. The bacteria - Escherichia coli, Staphylococcus aureus and fungi - Aspergillus niger, Candida albicans was selected for the assay. The results were confirmed with the zone of inhibition developed by particular organism. The Escherichia coli showed no zone of inhibition, Staphylococcus aureus showed 9 mm as zone of inhibition. Likewise, the fungi Aspergillus niger showed 11mm as zone of inhibition, Candida albicans 9mm as zone of inhibition. Among the microbes studied, Aspergillus niger was showing more zone of inhibition compared to other microbes tested. The antimicrobial nature of the Muntingia calabura fruit was mainly due to the phytochemicals present in it.[11]

Findings by Zakaria et al.,[7] have demonstrated the presence of flavonoids, triterpenes, saponins steroids and tannins in M. calabura leaves. The ability of tannins to form chelates with metal ions, particularly iron, which lead to the disruption of the S. aureus membrane, could be one of the possible factors that contribute to its antimicrobial activity.[1]

Fig- I: A plant twig bears fruits and flower.

Table- 1: Antibacterial activity of various crude extract of M. calbura L. Leaves.

S. No.	Tested Micoorganism	Solvent	Crude Extract Concentration (µL)	Control	Zone of Inhibition (mm)
1.	Escherichia coli	Distilled Water	10	-	04
			20	-	11
			30	-	15
2.		Ethyl acetate	10	-	14
			20	-	20
			30	-	25

mm – millimeter

4. CONCLUSION

Our findings suggest that the crude extracts of leaves of Muntingia calabura L. has a potential source of antimicrobial compound. Further studies are being planned in our laboratory to identify the various Biochemical and Nutritional analysis of this plant.

5. REFERENCES

1. Akiyama H, et al., Antibacterial action of several tannins against Staphylococcus aureus. Journal. Antimicrob. Chemother, 2001; 48: 487-491.
2. Bauer A.W, Perry D. M, Kirby W. M. M. Single disc antibiotic sensitivity testing Staphylococci. AMA Arch Intern Med., 1959; 104: 208–216.
3. Morton. J. F, "Jamaica cherry", in fruits of warm climates, USA, 1987; 65-69.
4. Jensen. M, "Trees commonly cultivated in south East Asia: an illustrated field guide.'' In FAO Corporate Document Repository, Craftsman Press, Bangkok, Thailand, 2nd Edition, 1999.
5. Kaneda N.J. M, et al. "Plant anticancer agents, XLVIII. New cytotoxic flavonoids from Muntingia calabura roots". J Natural Prod., 1991; 54: 196-206.
6. Su. B.N.E, et al, Activity-guided isolation of the chemical constitutents of Muntingia calabura using a quinone Reductase induction assay. Phytochemistry, 2003; 63: 335-341.
7. Zakaria Z.A, et al., ''Effects of various nonopioid receptor antagonists on the antinociceptive activity of Mutingia calabura extracts in mice,'' Methods and findings in experimental and clinical Pharmacology, 2007; 29(8): 515-520.
8. Zakaria Z.A, et al., The in vitro antibacterial activity of Muntingia calabura extracts. Int J Pharmacol., 2006; 2(4): 439-442.
9. Zakaria Z.A, et al., In vitro antiproliferative and antioxidant activities of the extracts of Muntingia calabura leaves," American Journal of Chinese Medicine, 2011; 39(1): 183-200.

10. Krishnaveni. M, et al., GC-MS/MS Analysis of Mutingia calbura L. fruit, Antimicrobial activity, World J. of Pharma Res., 2015; 4(6): 1300-1305.
11. William Patrick Cruiz Buhian, et al., Bioactive metabolite profiles and antimicrobial activity of ethanolic extracts from Muntingia calabura L. leaves and stems, Asian Pac. J. Trop. Biomed, 2016; 6(8): 682-685.
12. Zakaria. Z. A, Mustapha. S, M. R. Sulaiman, Mat Jais. A. M, Somachit. M. N and Abdullah. F. C, ‘‘The antinoceptive action of aqueous extract from Mutingia calabura leaves: the role of opioid receptors,” Medical Principles and Practice, 2007; 16(2): 130-136.