IJPSR (2014), Volume 5, Issue 9 **(Research Article)**

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 14 March 2014; received in revised form, 13 June 2014; accepted, 01 July 2014; published 01 September 2014

EVALUATION OF ANTIMICROBIAL POTENTIAL OF *BAUHINIA BLAKEANA* FLOWERS

D. Viji Saral Elezabeth and P. Ramachandran *

PG & Research Department of Chemistry, Nehru Memorial College, Puthanampatti, Tiruchirappalli - 621007, Tamil Nadu, India.

Keywords:

Bauhinia blakeana, phytochemicals, Agar well diffusion method, Antimicrobial, Soxhlet extraction

Correspondence to Author:
P. Ramachandran

Ph.D., Research Scholar,
PG & Research Department of Chemistry, Nehru Memorial College, Puthanampatti, Tiruchirappalli - 621007, Tamil Nadu, India.

E-mail: Psrchandran47@gmail.com

ABSTRACT: In this study, the phytochemicals and their antimicrobial potential of flowers of *Bauhinia blakeana* of Fabaceae Family were evaluated. The selected microbes for the antimicrobial study were *E. coli*, *Enterobacter sp.*, *Proteus sp.*, and *Klebsiella sp.* Ethanolic extract was prepared by continuous hot percolation method using Soxhlet extractor, and Antimicrobial activity was tested by Agar well diffusion method using Streptomycin as reference. The phytochemicals present in *Bauhinia blakeana* flowers were screened by standard method. The phytochemical evaluation revealed the presence of Alkaloids, Flavonoids, Glycosides, Terpenoids, Anthocyanins, Phytosterols, Tannins, Carbohydrates, Saponins, and Phenols. Among the phytochemicals, the Alkaloids and Flavonoids were showed strong results in the phytochemical screening. The Antimicrobial investigation revealed the extract of the flower showing significant Antimicrobial potential against the selected microbes. It showed maximum mean zone of inhibition of 12mm against *Klebsiella sp.* and a minimum of 7mm against *Enterobacter sp.* Further research on this plant flowers is to be emphasized.

INTRODUCTION: Plant-derived drugs are playing a vital role in the modern medicinal world. The importance of the plants in the medicinal world is increased day-by-day significantly. The cause for their medicinal value is the presence of secondary metabolites such as alkaloids, terpenoids, tannins, flavonoid, and phenolic compounds. *Bauhinia blakaena* is an evergreen tree commonly present in India shown in **Fig. 1**. Phytochemical investigations showed that Acetone, Petroleum Ether and Methanolic extracts of *Bauhinia blakaena's* flowers have antimicrobial activity against the Gram-positive and Gram-negative microbes.

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.5(9).3932-35

This article can be accessed online on www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.5(9).3932-35

FIG. 1: TREE AND FLOWERS OF *BAUHINIA BLAKAENA*

The present study was aimed to evaluate the phytochemicals and antimicrobial potential of Ethanolic extract of flowers of *Bauhinia blakaena* against the selected microbes.

MATERIAL AND METHODS:

Collection and Identification of Plant Material: The fresh part of the plant (flowers) was collected from Cholan Nagar, Tiruchirappalli District, Tamil Nadu State, India. The collection was under the

supervision of a Horticulturist. This plant *Bauhinia blakaena* was authenticated by State Horticulture Farm, Mudhalaipatti (Village), Trichy Karur Road, Karur (District), Tamil Nadu.

The flower of *Bauhinia blakaena* was thoroughly washed and dried under shade for 4 weeks, segregated, pulverized by a mechanical mixer grinder to the fine powder before analysis. **Fig. 2** was showing the pulverized plant material of *Bauhinia blakaena* flowers.

FIG. 2: PULVERISED PLANT MATERIAL OF *BAUHINIA BLAKAENA*

Preparation of Extracts: This sample (1:10 w/v) was successively extracted with Ethanol by hot continuous percolation method in Soxhlet apparatus shown in **Fig. 3.**

The extracts were concentrated by using a rotary vacuum evaporator and subjected to dryness to yield a crude residue. These residues were used for preliminary phytochemical screening of secondary metabolites and antimicrobial evaluation.

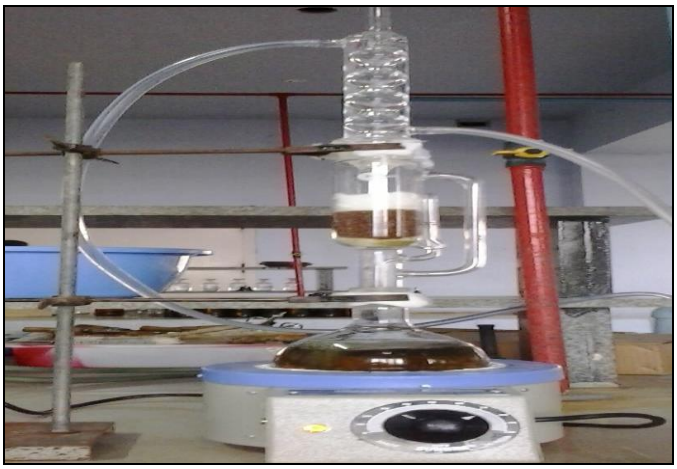

FIG. 3: SOXHLET EXTRACTION OF PLANT MATERIAL

Phytochemical Screening: The flower extracts of *Bauhinia blakaena* were analyzed for the presence of phytochemicals according to standard methods [1]. The methods of phytochemical analysis are given in **Table 1.**

TABLE 1: PHYTOCHEMICAL SCREENING METHODS

Phytochemicals	Name of the test	Procedure	Result
Alkaloids	Dragondroff's test	Extract + Conc. H_2SO_4+reagent	Red – Orange precipitate
	Mayer's test	Extract + Conc. H_2SO_4+reagent	Yellow precipitate
Flavonoids	Lead acetate test	Extract + reagent	Yellow precipitate
	Alkaline reagent test	Extract + NaOH + dil. HCl	Yellow to colorless
Carbohydrates	Molisch's test	Extract + reagent	Violet ring formation
	Fehling's test	Extract + dil. HCl + NaOH + Heating with (A+B) reagent	Red precipitate
Saponins	Froth test	Extract + distilled H_2O + shaking	Foam (1cm)
	Foam test		Foam (10minutes)
Phytosterols	Libermann Burchard's test	Extract + $CHCl_3$ + $(CH_3CO)_2O$ + Conc. H_2SO_4	Brown ring formation
	Salkowski's test	Extract + $CHCl_3$ + Conc. H_2SO_4 + Shaking	Golden yellow colour formation
Cardiac Glycosides	Legal's test	Extract + Sodium Nitroprusside in pyridine + NaOH	Pink to blood red color
Terpenoids	Chloroform test	Extract + $CHCl_3$ + Conc. H_2SO_4	Reddish brown ring formation
Steroids	Acetic anhydride test	Extract + $(CH_3CO)_2O$ + Conc. H_2SO_4	Violet to bluish green
Proteins	Xanthoproteic test	Extract + Conc. HNO_3	Yellow colour
Phenols	Ferric chloride test	Extract + $FeCl_3$	Bluish black colour
Tannins	Ferric chloride test	Extract + distilled H_2O + Heating + $FeCl_3$	Dark green colour
Amino acids	Ninhydrin test	Extract + reagent	Purple, blue color
Anthocyanin	Sodium hydroxide test	Extract + NaOH	Bluish green color

Microbial Strain: The microbial strains were collected from the Biotechnology Laboratory of Bishop Heber College, Tiruchirappalli (Ref. No.: BHC-BT-CTS04/2014/NMC) as pure cultures and used for the evaluation. The gram-positive and gram-negative bacteria's namely *E. coli*, *Proteus* sp., *Enterobacter* sp. and *Klebsiella* sp. were taken for the test and they were cultured on Nutrient Agar (Hi-Media) Slants at 4 ºC.

Standard Antibiotic: Streptomycin (100µg/mL) was used as a reference standard against the pathogens.

Antibacterial Assay: The antibacterial activity assay of flower extracts was performed by agar well diffusion method. 20mL of sterile Muller Hinton agar (Hi-Media) was poured in sterile Petri dishes. The plates were allowed to solidify and used. 10mL of sterilized Muller Hinton agar medium (Seed Agar) was seeded with organisms (about 0.2mL according to 0.5 McFarland's standard), in semi-hot conditions and was poured uniformly on the base agar. 8mm bores were made each equal distance from one another on the medium using sterile borer, and 100µL of different urine preparation were added to respective bore. The plates were incubated at 37 °C for 24 h, and the zone of inhibition was measured. For each test, three replicates were performed. Here an attempt was made to compare the antibacterial efficiency of flower extracts along with the activity of a standard antibiotic.

RESULT AND DISCUSSION: Fig. 4 was showing the result of the phytochemical evaluation of the plant extract.

FIG. 4: PHYTOCHEMICAL SCREENING OF PLANT MATERIAL

The results of preliminary phytochemical screening of acetone, petroleum ether, and methanol extracts of the flowers of *Bauhinia blakeana* are presented in **Table 2.**

TABLE 2: RESULT OF PHYTOCHEMICAL SCREENING OF ETHANOLIC EXTRACT OF *BAUHINIA BLAKEANA* FLOWERS

Phytochemicals	Name of the test	Result
Alkaloids	Dragondroff's test	+
	Mayer's test	+
Flavonoids	Lead acetate test	+
	Alkaline reagent test	+
Carbohydrates	Molisch's test	+
	Fehling's test	+
Saponins	Froth test	+
	Foam test	+
Phytosterols	Libermann Burchard's test	+
	Salkowski's test	+
Cardiac Glycosides	Legal's test	+
Terpenoids	Chloroform test	+
Steroids	Acetic anhydride test	-
Proteins	Xanthoproteic test	-
Phenols	Ferric chloride test	+
Tannins	Ferric chloride test	+
Amino acids	Ninhydrin test	-
Anthocyanin	Sodium hydroxide test	+

+: Indicates the presence of phytoconstituents
-: Indicates the absence of phytoconstituents

The phytochemical evaluation of ethanolic extracts of the flowers of *Bauhinia blakeana* revealed the presence of Alkaloids, Flavanoids, Terpenoids, Carbohydrates, Saponins, Phytosterols, Cardiac Glycosides, Phenols, Tannins, and Anthocyanins. **Fig. 5** was showing a photograph of the mean zone of inhibition of *Bauhinia blakeana* against the selected microbes.

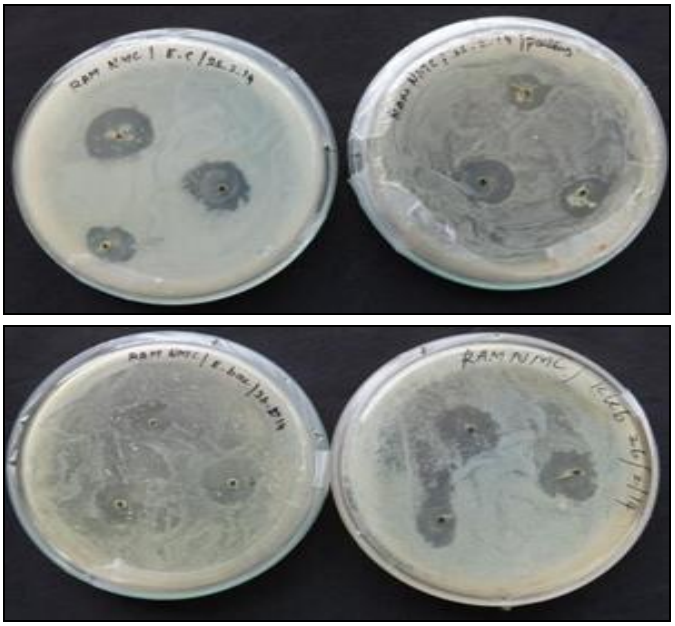

FIG. 5: ANTIMICROBIAL POTENTIAL OF ETHANOLIC OF PLANT MATERIAL AGAINST THE SELECTED MICROBES

The results of Antimicrobial activity of flower extracts of *Bauhinia blakeana* are furnished in **Table 3**.

TABLE 3: RESULT OF ZONE OF INHIBITION OF ANTIBACTERIAL ACTIVITY OF ETHANOLIC EXTRACTS OF *BAUHINIA BLAKEANA* FLOWER

Name of the bacteria	*E. coli*	*Enterobacter sp.*	*Proteus sp.*	*Klebsiella sp.*
Mean Zone of Inhibition in mm	9	7	11	12

The ethanolic extracts of *Bauhinia blakeana* flowers were exhibited different degrees of antimicrobial potential against the selected microbes. The antimicrobial potential against *Klebsiella* sp. (12mm) was more effective when compared with other microbes such as *E.coli*, *Enterobacter* sp., and *Proteus* sp.

CONCLUSION: It has been concluded that the flower extracts of the *Bauhinia blakeana* showed the presence of secondary metabolites such as Alkaloids, Flavanoids, Terpenoids, Carbohydrates, Saponins, Phytosterols, Cardiac Glycosides, Phenols, Tannins, and Anthocyanins. This investigation also concluded that the ethanolic extracts of the plant showed significant antimicrobial potential against the gram-positive and gram-negative bacteria's by Agar well diffusion method. These studies are encouraged to isolate the active constituents of the plant.

ACKNOWLEDGEMENT: The Authors would wish to acknowledge the Management and Principal of Nehru Memorial College for providing research facilities and encouragement.

CONFLICT OF INTEREST: Nil

REFERENCES:

1. Harborne JB: Phytochemical methods. Chapman and Hall Ltd., London, 1973: 49-188.
2. Aiyelaagbe OO and Osamudiamen PM: Phytochemical screening for active compounds in *Mangifera indica* leaves from Ibadan, Oyo State. Plant science Research 2009; 2(1): 11-13.
3. Rajan M, Kumar VK, Kumar PS, Venkatachalam T and Anbarasan V: Pharmacognostical and phytochemical studies of the leaves of *Albizia odoratissima* (L.F) Benth. International Journal of Pharmacognosy and Phytochemical Research 2011; 3(3): 47-55.
4. Ramanath B and Kumar GA: A phytochemical and antimicrobial activity of leaf extracts of *momordica cymbalaria hook fenzl*. International Journal of Pharmacognosy and Phytochemical Research 2012; 4(3): 99-103.

How to cite this article:
Elezabeth DVS and Ramachandran P: Evaluation of antimicrobial potential of *Bauhinia blakeana* flowers. Int J Pharm Sci & Res 2014; 5(9): 3932-35. doi: 10.13040/IJPSR.0975-8232.5(9).3932-35.