



ISSN Print: 2394-7500  
 ISSN Online: 2394-5869  
 Impact Factor: 8.4  
 IJAR 2023; 9(4): 05-07  
[www.allresearchjournal.com](http://www.allresearchjournal.com)  
 Received: 04-01-2023  
 Accepted: 09-02-2023

**Sudhir Singh Chandel**  
 Research Scholar, Department  
 of Botany, S.G.S. Govt. P.G.  
 College, Sidhi, Madhya  
 Pradesh, India

**M Salim**  
 Retired Professor and Head,  
 Department of Botany, S.G.S.  
 Govt. P.G. College, Sidhi,  
 Madhya Pradesh, India

**IP Kumhar**  
 Professor and Head,  
 Department of Botany, S.G.S.  
 Govt. P.G. College, Sidhi,  
 (Madhya Pradesh, India)

**Corresponding Author:**  
**Sudhir Singh Chandel**  
 Research Scholar, Department  
 of Botany, S.G.S. Govt. P.G.  
 College, Sidhi, Madhya  
 Pradesh, India

## Phytochemical and antimicrobial study of *Peristrophe bicalyculata* nees of family acanthaceae

Sudhir Singh Chandel, M Salim and IP Kumhar

### Abstract

*Peristrophe bicalyculata* is a straight, hispid herb 70 to 180 cm tall, found in forests and waste lands almost across the country. The species is herbaceous plant, with two-lipped flowers. *Peristrophe bicalyculata* (Acanthaceae) is up to 60-180 cm in height and established almost throughout Sidhi district (M.P.). *Peristrophe bicalyculata* is commonly known as kakajhanga in Sanskrit and kali aghedi in Hindi. The herb is used for its anti-bacterial properties like snake poison, in bone fracture, cold, cough, fever, sprain and for ear and eye treatments. The chemical constituents of the dried aerial parts be seen 14-methyl-tritriacont-14-en-15-ol and 35-hydroxynonatriacontanol. Extract of this plant possess various pharmacological parameters such as antimicrobial, antioxidant, anti-diabetic, anti-inflammatory, enzyme inhibitory activities without any side effects. The diverse parts of this plant has been widely used in treating various skin infections. Pioneer work was done by our Shushrut, Saints Charak and several others, which was collected in the form of vedas (Rigveda, Ayurveda) Samhita, Nighantu and Aryabhishak. *Peristrophe bicalyculata* (Retz-Nees) is reported to be the useful remedy for the treatment of T.B, Antiseptic, Jaundice, Menorrhagia, and Anti-venom agent in indigenous system of medicine. In this review we have studied the detailed phytochemical of stem and leaf as well as physiochemical parameters, phytochemical screening and leaf or seed constant. The solvent extract is used in checking antimicrobial activity against all the clinically isolated microorganisms.

**Keywords:** *Peristrophe bicalyculata*, bioactive compounds, solvent extract, anti-microbial activity, skin treatment

### Introduction

Major population in developing world is now raising awareness in raising living standard and decreasing poverty and improving healthcare. Nowadays, almost 80% of the population is indirectly dependent on medicinal plants for their health. Green leafy vegetables are a major source for nutrition because they possess rich quantities of fibers, vitamins and minerals. Some of these leafy vegetables are widely used in preparing soups in various countries such as West Africa and Nigeria. They are been used as medicinal plants since ages and possess various antimicrobial properties. Some of the plants are also used for flavoring and spicing. The wide variety of nutrients and medical properties of plant has created awareness amongst people in increasing knowledge in antimicrobial, phytochemical, antioxidant, anti-inflammatory properties of food (Chinmma and Igyor, 2007) <sup>[1]</sup>. The plants which contains green leafy vegetables possess rich sources of ascorbic acid, folic acids, carotene, riboflavin and minerals like iron, calcium and phosphorus (Fasuyi, 2006) <sup>[2]</sup>.

The researchers has made a great contribution in discovering various new antibacterial compounds. Acanthaceae is mostly used in traditional medicine. *Peristrophe bicalyculata* is used to treat various diseases like typhoid fever, cholera, tuberculosis. The ethanolic extract of this plant is more effective against *E. coli* and *S. typhi*. By distillation, yellow-brown colour essential oil can be extracted. The plant *P. bicalyculata* is used as antidote for snake poison, cough, cold, asthma, bone fracture, etc. The leaves of this plant are used for many skin problems like wound healing, bee-forage.

The plants that shows phytochemical properties may determine antimicrobial properties too. These are the basis of plant's odour, colour, flavour, and are disease resistant. Liu (2004) <sup>[3]</sup> stated that phytochemicals contains bio-actives which helps in reduction of various degenerative health disorders.

Anderson (2004) [4] mentioned phytochemicals as chemicals directly derived from plants which are beneficial to the health of human and prevention of diseases.

The report signifies that fruits and vegetables are greatest source of phytochemicals (Onyeka and Uwambeke, 2007) [5]. Most of the human diet in Africa constitute green leafy vegetables. Mostly nursing mothers postpartum include green vegetables in their daily diet because most of them are cheap and inexpensive and grow almost all over the western countries. In the early years, Ayurveda medicine used medicinal plants for the repairment and healing of wounds. Bioactive components extracted from these plants allows demonstration of antimicrobial and anti-inflammatory activities leading to synthesis of more useful drugs with no harmful effects (Onyeka and Uwambeke, 2007) [5].

This research aimed at determining phytochemical presence and to check antimicrobial properties of ethanolic extracts of *P.bicalyculata* against some microorganisms to determine its use in medical field.

### Distribution

It is often found in various parts of India. This plant is dispersed mainly in Sidhi district (M.P.) and widely used in India.

### Materials and Methods

#### Collection of plant material and extract preparation:

The plant material was collected from Sidhi, (M.P.) during the month of November, 2020. The parts of the plant were separated first followed by drying under shade. Then, the plant parts were extracted using ethyl acetate, methanol, alcohol and ethanol. These were concentrated to dryness using rotavapor.

#### Phytochemical Analysis

Phytochemical analysis were carried out for ethyl acetate, methanol, ethanol and alcohol for stem, leaves and flowers separately to detect the presence of various phytochemical constituents like steroids, tannins, alkaloids, flavonoids etc. using standard protocols.

#### In vitro anti-oxidant activity

For antioxidant activity, the extract of *P. bicalyculata* was dissolved in Dimethyl Sulphoxide (DMSO). The percentage inhibition was calculated. And each value was studied in blank in every assay of activity.

#### Anti-oxidant activity

In this study ethyl acetate, methanol, ethanol and alcohol were tested to evaluate concentration dependent free radical on DPPH free radicles.

#### In Vitro Anti-Fungal Activity

When the fungal isolates were allowed to grow in the extract containing solvent containing PDA medium, inhibition percentage was obtained against selected pathogens.

#### In Vitro Anti-Bacterial Activity

Different solvent extracts expressed different antibacterial activity against various strains of test organisms. Fresh leaves of *Peristrophe bicalyculata* and pure strains of test organisms, are needed.

### Extraction of plant material

The fresh leaves (100 gm) were extracted with 95% ethanol solution for 24 hours at room temperature. The extract was filtered and evaporated to dry over water bath.

### Determination of Alkaloids

A minimal amount of the sample was dispensed into 10% acetic acid in ethanol to form 1:10 ratio. It was then allowed to stand for 4 hours at 28 °C. Later it was filtered with filter paper and the solution was treated with drop wise addition of NH<sub>4</sub>OH until alkaloid was precipitated and washed with 10% ammonia solution and dried in an oven at 80 °C.

### Determination of Flavonoids

5 grams of the sample was boiled in 50 ml of 2M HCl solution for 30 minutes. It was then allowed to cool and was filtered by filter paper and the solution was treated with equal volume of ethyl acetate.

### Determination of Tannin

5 grams of the sample was dispensed in 50ml of distilled water and mixed. It was allowed to stand for 30 minutes at 28 °C. 2 ml of the extract was dispensed into 50 ml flask. Similarly, 2 ml of standard solution and 2 ml of distilled water were put in separate flask. Then the reagent was added to each flask and 2.5ml of saturated Na<sub>2</sub>CO<sub>3</sub> was also added. The total volume was made to 50ml by distilled water and incubated at 28 °C for 90 minutes. A spectrophotometer at 260 nm wavelength was set to measure the absorbance using blank.

### Determination of Steroid

A minimal amount of the sample was dispersed in 100 ml distilled water and homogenized. It was then filtered and was eluted with ammonium hydroxide solution of pH 9. 2 ml of elute was put into the test tube and was mixed with 2 ml of chloroform. 3 ml of acetic anhydride was added to the mixture in the flask and 2 drops of conc. H<sub>2</sub>SO<sub>4</sub> were added to cool down. Spectrophotometer at 420 nm was used to measure the absorbance.

### Antimicrobial Screening

The crude extracts of leaves were put into screening for antimicrobial activities against some pathogens using Agar diffusion methods. The organisms to be tested were prepared by sub culturing them in media and incubated in nutrient broth at 37 °C for 3 hours. *E.coli* was inoculated using steak method. Water was used as a standard.

### Conclusion

The leaves of *P. bicalyculata* is very effective against various respiratory infections. The methanolic extract of this plant showed effective antioxidant activity.

The different parts of the plant extract of *P. bicalyculata* can effectively be able to cure bacterial diseases as well as other fungal diseases. By therapeutic efficiency of the plant, a detailed research of parts of the plant can contribute a lot in drug discovery for various other diseases.

This investigation gives a detailed explanation to the use of *P.bicalyculata* as a natural antioxidant, in developing new drugs and in the treatment of various respiratory and skin diseases.

### **Acknowledgement**

Authors are highly thankful to authorities of SGS Govt. P.G. College, Sidhi for providing necessary facilities to carry out this work.

### **References**

1. Chinmma CE, Igyor MA. Micronutrients and anit-nutritional content of selected tropical vegetables grown in South-East, Nigeria. *Nigeria Food Journal*. 2007;25:111-115.
2. Fasuyi AO. Nutritional potentials of some tropical vegetable meals, chemical characterization and functional properties. *Africa Journal of Biotechnology*. 2006;5(1):49-53.
3. Liu RH. Potential synergy of phytochemical in cancer prevention: mechanism of action. *Journal of Nutrition*. 2004;134:34795-34855.
4. Anderson GD. Phytochemicals. *Dynamic Chiropractics*; c2004, 2(1).
5. Onyeka EU, Uwambeke IO. Phytochemical profile of some green leafy vegetables in South East of Nigeria, *Nigeria Food Journal*. 2007;25:0189-7241.