



**ANTI-MICROBIAL POTENTIAL OF HYDROALCOHOLIC
EXTRACT OF *BAUHINIA PURPUREA* AGAINST SOME SELECTIVE
MICROBES**

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ABSTRACT

Medicinal plants have therapeutic potential and are used worldwide to treat various diseases. *Bauhinia purpurea* (Leguminosae) is a medium sized deciduous tree, sparingly grown in India. This plant is used traditionally in dropsy, pain, rheumatism, convulsions, delirium, and septicemia. These active constituents have been attributed the therapeutic activity of the plant. In this study, *Bauhinia purpurea* have been investigated for their Phytochemical analysis and antimicrobial potential. The hydroalcoholic extracts of *Bauhinia purpurea* leaves exhibited significant and dose-dependent antioxidant activity including electron-donation ability. To analyze the antimicrobial activity, hydroalcoholic extracts of *Bauhinia purpurea* was tested by a well diffusion method against four selected strain and which shows significant inhibitory action against all the tested strain.

Keywords: *Bauhinia purpurea*, Phytochemical Analysis, Antimicrobial, Antidiabetic Activity.

***Article History:**

Received: 18/10/2019

Revised: 27/10/2019

Accepted: 07/12/2019

INTRODUCTION

Natural products, mostly from plants, have begun to gain worldwide interest for promoting healthcare and have been used as conventional or complementary medicines due to toxicity and side effects of synthetic drugs (Zhang et al., 2013). In addition, natural products are known not only as a rich source of structurally diverse substances with a wide range of biological activities, but also as a

primary source for synthesized drugs (Maiti et al., 2011). The well-known and well established genus *Bauhinia* comprises of trees and shrubs that grow in warm climate. It is rare in southern most districts, 5-7m tall tree in deciduous forests which is often planted in gardens along roadside for its large purple beat flowers. The leaves are 10–20 cm long and broad, rounded, alternate and bilobed at the base and apex. The flowers are

conspicuous, pink, and fragrant, with five petals. The fruit is a pod 30 cm long, containing 12 to 16 seeds and have long seeds as pea. Flowers and fruits appear in the month of December. Synonyms/Common names of plant *Bauhinia purpurea*-Purple Orchid tree, Mandaram, etc. (Kirtikar and Basu, 1991). Geographical distribution- *B. purpurea* is native to South China (which includes Hong Kong) and South-eastern Asia and it is found throughout India, ascending to an altitude of 1300m in Himalaya (Tekeshwar and Chandrashekar, 2008). The different species of *Bauhinia* viz., *B. reticulata*, *B. rufescens* and *B. variegata* have been traditionally used to treat roundworm infections, conjunctivitis, anthrax, ulcerations, dysentery, blood-poisoning, leprosy, lung and skin diseases in Africa; while in India, extracts of the bark of *B. variegata* is used for treatment of cancer. Leaves are used as a plate for food and fodder during lean period (Brain *et al.*, 1975), bark used as fibre, in dyeing and tannin extraction and its decoction is used in diarrhoea. The decoction of root is used for expelling gases, flatulence and gripping pain from the stomach and bowels. The decoction of flower works as a maturant for boils and abscesses. Root bark of *Bauhinia purpurea* L. contains flavones glycoside (Brain *et al.*, 1975). Hence, the present investigation was performed to find

the phytochemical constituent and antimicrobial activity of the *Bauhinia purpurea* extract with intention of motivation for usage of plant parts with less adverse implications for the survival of the plant species.

MATERIALS AND METHODS

Plant material

The leaves of *Bauhinia purpurea* was collected from local area of Bhopal (M.P). The leaves were separated and washed with sterile distilled water to remove the adhering dust particles and other unwanted materials. The leaf was air dried under room temperature. The dried plant samples were cut and grinded to make it in powder form. The powdered samples were stored in clean, dry and sterile container for further use.

Chemical reagents

All the chemicals used in this study were obtained from Hi Media Laboratories Pvt. Ltd. (Mumbai, India), SD Fine- Chem. Ltd. (Mumbai, India) and SRL Pvt. Ltd. (Mumbai, India). All the chemicals used in this study were of analytical grade. Quercetin and gallic acid was kindly provided by Scan Research Laboratories, Bhopal (India).

Extraction procedure

The shade dried material was coarsely powdered and subjected to extraction with

petroleum ether by maceration. The extraction was continued till the defatting of the material had taken place. 100 gm of dried plant material were exhaustively extracted with hydroalcoholic solvent (ethanol: water: 70:30 v/v) using maceration method. The extracts were evaporated above their boiling points and stored in an air tight container free from any contamination until it was used. Finally the percentage yields were calculated of the dried extracts Mukherjee (2007).

Qualitative phytochemical analysis of plant extract

The *Bauhinia purpurea* extracts obtained was subjected to the preliminary phytochemical analysis following standard methods by Khandelwal (2005) and Kokate (1994). The extract was screened to identify the presence or absence of various active principles like phenolic compounds, carbohydrates, flavonoids, glycosides, saponins, alkaloids, fats or fixed oils, protein and amino acid and tannins.

Antimicrobial activity

The well diffusion method was used to determine the antibacterial activity of the extract prepared from the *Bauhinia purpurea* using standard procedure of Bauer *et al* [20]. The drug used in standard preparation was ciprofloxacin of IP grade. The antibacterial activity was performed by using

24hr culture of *Bacillus subtilis*, *Escherichia coli*, and *Candida albicans*. There were 3 concentration used which are 25, 50 and 100 mg/ml for each extracted phytochemicals in antibiogram studies. It's essential feature is the placing of wells with the antibiotics on the surfaces of agar immediately after inoculation with the organism tested. Undiluted over night broth cultures should never be used as an inoculums. The plates were incubated at 37°C for 24 hr. and then examined for clear zones of inhibition around the wells impregnated with particular concentration of drug. The diameter of zone of inhibition of each wall was recorded (Bauer 1996).

RESULTS AND DISCUSSION

The crude extracts so obtained after the maceration extraction process, extracts was further concentrated on water bath for evaporate the solvents completely to obtain the actual yield of extraction. To obtain the percentage yield of extraction is very important phenomenon in phytochemical extraction to evaluate the standard extraction efficiency for a particular plant, different parts of same plant or different solvents used. The yield of extracts obtained from sample using Pet ether and hydroalcoholic as solvents are depicted in the Table 1.

Table 1 % Yield of plant material

S. No.	Solvents	<i>Bauhinia purpurea</i>
1	Pet ether	0.89%
2.	Hydroalcoholic	6.85%

Phytochemical analysis of hydroalcoholic extracts of leaf sample of *Bauhinia purpurea* showed the presence of flavonoid, phenols, amino acid, protein, saponins and diterpines while, alkaloid and carbohydrate were not detected. From methanolic flower extract which exhibited the presence of flavonoid, phenols, amino acid, protein and saponins but glycosides and diterpins were reported to be absent (Table 2).

Table 2 Phytochemical screening of extract of *Bauhinia purpurea*

S. No.	Constituents	Hydroalcoholic extract
1.	Alkaloids	
	Mayer's Test	+ve
	Wagner's Test	+ve
	Dragendroff's test	-ve
	Hager's test	-ve
2.	Glycosides	
	Modified Borntrager's Test	-ve
	Legal's test	-ve
3.	Flavonoids	
	Lead acetate Alkaline test	+ve +ve
4.	Phenolics	
	Ferric Chloride Test	+ve

5.	Proteins and Amino acids	
	Xanthoproteic test	+ve
	Ninhydrin Test	-ve
6.	Carbohydrates	
	Molisch's Test	+ve
	Benedict's Test	+ve
	Fehling's test	+ve
7.	Saponins	
	Froth Test	+ve
	Foam test	-ve
8.	Diterpins	
	Copper acetate test	-ve

In this study, screening for antimicrobial activity showed that the hydroalcoholic leaves extract of *Bauhinia purpurea* exhibited maximum inhibitory zone 17 ± 1 against *Escherichia coli*. It was found that hydroalcoholic leaves extract of *Bauhinia purpurea* was inhibitory to *Bacillus Subtilis* and *Candida albicans* with increase in dilution, zone of inhibition were increased Table 3 & 4.

Table 3 Antimicrobial activity of standard drug against selected microbes

S. No.	Name of drug	Microbes	Zone of inhibition		
			10 µg/ml	20 µg/ml	30 µg/ml
1	Ciprofloxacin	<i>Bacillus Subtilis</i>	11±2	14±1	16±1
2		<i>Escherichia coli</i>	13±1	15±1	18±1
3	Fluconazole	<i>Candida albicans</i>	8±1	10±0.5	13±0.5

*(n=3, mean ± SD)

Table 4 Antimicrobial activity of hydroalcoholic extract of *Bauhinia purpurea* against selected microbes

S. No.	Name of microbes	Zone of inhibition		
		Hydroalcoholic extract of <i>Tinospora crispa</i>		
		25mg/ml	50 mg/ml	100mg/ml
1.	<i>Bacillus Subtilis</i>	9±0.5	13±1	15±0.5
2.	<i>Escherichia coli</i>	12±0.0	14±1	17±1
3.	<i>Candida albicans</i>	8±0.5	10±1	12±0.5

*(n=3, mean ± SD)

Conclusion

In this study, we analyzed the phytochemical screening and antimicrobial activities of *Bauhinia purpurea*. The overall results of the present study suggest that the hydroalcoholic leaf extract of *Bauhinia purpurea* could be useful as a source of natural antioxidant agents. In addition, the leaf extract of *Bauhinia purpurea* was shown to possess notable antimicrobial activities, indicating that *Bauhinia purpurea* should be considered as a useful source for herbal medicine.

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