

PHYTOCHEMICAL SCREENING AND ANTIBACTERIAL ACTIVITY OF *BUCHANANIA LANZAN* SPRENG.

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Buchanania lanzan spreng is extensively used in Indian traditional and folklore medicine to cure various human ailments. Phytochemical screening of the plant revealed the presence of tannins, flavanoids, alkaloids, lipids and sterols. Antibacterial activity of aqueous and methanol extracts of leaf were investigated by paper disc diffusion method against two gram negative bacteria *Vibrio cholerae* and *Klebsiella pneumoniae*. This study depicts that methanol extract of leaves was more effective against gram negative bacteria and study scientifically validates the use of plant in traditional and ethno botanical uses.

Keywords: Antibacterial activity; *Buchanania lanzan* Spreng; *Klebsiella pneumoniae*; *Vibrio cholerae*.

Introduction

The forest is referred to as God's own pharmacy. Many medicinal plants are used in modern medicine where they occupy a very significant place as raw material for important drugs. Plants used in traditional system of medicine and pharmaceutical houses are collected from wild sources¹. Phytochemical is a natural bioactive compound found in plants, such as vegetables, fruits, flowers, leaves and roots that work with nutrients and fibers to act as defense system against disease or more accurately, to protect against diseases. Phytochemicals are divided into two groups, primary and secondary. Primary metabolites comprise of common sugars, amino acids, proteins and chlorophyll while secondary metabolites include alkaloids, terpenoids and phenolic compounds² and many more such as flavanoids, tannins and so on. Plants are also the natural reservoir of many antimicrobial, anticancer agents, analgesics, anti-diarrhoea, antibacterial as well as various therapeutic activities³. The effects of plant extracts on bacteria have been studied by a very large number of researchers in different parts of the world⁴. *Buchanania lanzan* Spreng. is native to Southeast Asia mostly India and Burma. Commonly occurring at large scale in Chindwara district of M.P. and also in drier parts of India and Indochina, especially in mountainous region. It is widely cultivated throughout India, ascending to 1000 m in Northwestern India and Nepal, spreading towards Malaysia and Thailand. Various plant parts are used in inflammation of gums, in fever, burns, dysuria, cholera, phthisis, bronchitis and asthma⁵. They are commonly used

in sweets in India however, they are also made into powder and are used for thickening of sauces and flavorings butters. Wood is used for making small beams, match boxes, musical instruments and yields gum suitable for dressing textiles and for tanning. Leaves are used as fodder⁶.

Material and Method

Plant extraction : Fresh fruits and leaves of *Buchanania lanzan* were collected from the Payli region of Jabalpur. Some fresh fruit and leaves were grounded separately with 15 ml of solvent in mortar & pestle and were filtered. The filtrate and the crude extract were used for phytochemical screening. Different extracts of fruits and leaves were prepared in acetone, ether, methanol and water as solvent.

Phytochemical screening : Chemical tests were carried out on the aqueous extract of fresh leaves and fruits using standard procedures to identify the phytoconstituents⁷⁻¹⁰.

Test Organism : Bacterial culture of *Vibrio cholerae* and *Klebsiella pneumoniae* were obtained from Aeroallergen and Immunology Lab, Department of Biological science, Rani Durgavati Vishwavidyalaya, Jabalpur, (M.P) and were used for antimicrobial test. The stock cultures were sub cultured in nutrient broth for 24 hours and maintained at 37°C.

Antibacterial activity: The antibacterial assay of aqueous and methanolic extracts was performed by sterile paper disc diffusion method¹¹. Sterile media (NAM) was poured into the sterile Petri plates. The plates were allowed to solidify for half an hour, then bacterial broth culture was spread on the solidified media plate with the help of

Table 1. Results of Phytochemical analysis of *Buchmania lanzan* Leaves.

S.No		Test	Aqueous	Ether	Acetone	Methanol
1.		ALKALOIDS				
	a.	Mayer's test	-	-	-	-
	b.	Dragendoff's test	+	-	-	-
	c.	Wagner's test	+	-	-	+
2.		CARBOHYDRATE				
	a.	Benedict test	-	-	-	+
	b.	Fehling test	+	-	+	-
	c.	Tollens test	-	+	-	-
3.		SAPONINS				
	a.	Foam test	-	-	-	-
4.		PROTEINS				
	a.	Xanthoprotein test	-	-	-	+
	b.	Biuret test	-	-	-	-
5.		FLAVANOIDS				
	a.	Flavanoid test	-	+	-	+
6.		TANNINS				
	a.	Ferric chloride test	+	+	-	+
	b.	Lead acetate test	+	-	+	-
7.		RESIN				
	a.	Resin test	-	-	-	+
8.		STEROL				
	a.	Salkowaski test	-	-	-	+
9.		LIPID				
			-	+	-	-

swabbing method. Sterile paper disc previously soaked in known concentration of extract was carefully placed at the labeled plate. The plates were incubated at 37°C for 24 hours. The presence of zone of inhibition was recorded as the presence of antimicrobial action, and it was expressed in the term of average diameter of zone of inhibition measured¹².

Results and Discussion

The present investigation includes the Phytochemical screening of *Buchanania lanzans* leaves and fruits in aqueous, ether, acetone and methanol extract to detect the presence of active metabolites¹³. The chemical tests performed on the aqueous, acetone, methanol and ether extracts of fruits and leaves. Alkaloid tannin, flavanoids, sterols showed positive result while saponin was absent

(Table 1-2). The antimicrobial activity of leaves of *B. lanzan* aqueous and methanol extract against gram negative bacteria *Vibrio cholerae* and *Klebsiella pneumoniae* shows that methanolic extract was more effective showing 7.3 mm and 7 mm zone of inhibition against *V. cholerae* and *K. pneumoniae*, respectively. The aqueous extract showed 6.3mm zone of inhibition against *V. cholerae* and 6.6 mm zone of inhibition against *K. pneumoniae*. Other solvents viz. methanol and aqueous extract also served as control showing no zone of inhibition (Table 3).

B. lanzan is phytochemically important due to the presence of various bioactive metabolites like flavanoids, tannin, resin, lipid and alkaloid. Due to the presence of phytochemicals the plant shows antibacterial

Table 2. Results of Phytochemical analysis of *Buchnanania lanzan* Fruits.

S.No		Test	Aqueous	Ether	Acetone	Methanol
1.		<i>ALKALOIDS</i>				
	a.	Mayer's test	-	-	-	-
	b.	Dragendoff's test	-	+	+	-
	c.	Wagner's test	-	+	-	+
2.		<i>CARBOHYDRATE</i>				
	a.	Benedict test	+	-	-	-
	b.	Fehling test	-	-	+	+
	c.	Tollens test	-	-	-	-
3.		<i>SAPONINS</i>				
	a.	Foam test	-	-	-	-
4.		<i>PROTEINS</i>				
	a.	Xanthoprotein test	+	-	-	-
	b.	Biuret test	-	-	+	-
5.		<i>FLAVANOIDS</i>				
	a.	Flavanoid test	-	-	+	+
6.		<i>TANNINS</i>				
	a.	Ferric chloride test	-	-	-	-
	b.	Lead acetate test	+	-	-	+
7.		<i>RESIN</i>				
	a.	Resin test	-	-	-	+
8.		<i>STEROL</i>				
	a.	Salkowaski test	-	-	-	+
9.		<i>LIPID</i>				
	a.	Glycerol test	-	+	-	-

Table 3. Antimicrobial activity of *Buchanania lanzan* (Leaves).

S.No.	Microbial agent	Sample	Zone of inhibition (Diameter in mm)			Average
1.	<i>Vibrio cholerae</i>	Aqueous	6	6	7	6.3
2.		Methanol	7	8	7	7.3
3.	<i>Klebsiella pneumoniae</i>	Aqueous	6	8	6	6.6
4.		Methanol	7	6	8	7

activity. Results suggested that methanolic extract is more effective than aqueous extract.

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