WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 6.805
Volume 5, Issue 8, 538-541. Research Article ISSN 2277– 7105

PHYTOCHEMICAL SCREENING AND ANTIMICROBIAL ACTIVITY OF '*TERMINALIA PANICULATA*' BARK

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Article Received on
26 May 2016,

Revised on 16 June 2016,
Accepted on 06 July 2016

DOI: 10.20959/wjpr20168-6501

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ABSTRACT

The article showed the phytochemical screening and antimicrobial activity of *Terminalia paniculata*, a potential herbal plant from Bareilly, Uttar Pradesh, India. The bark of plant was collected, dried and screened for phytochemical composition and antimicrobial evaluation. The phytochemical studies revealed that the presence of phenolic compounds especially alkaloids, coumarins, terpenoids. The antimicrobial activity revealed that the most susceptible microorganisms were found to be *Bacillus cereus, Klebsiella pneumonia, Candida ablicans Pseudomonas aeruginosa* and *Staphylococcus aureus.* Phytochemical analysis of test extract revealed that the alkaloids and coumarins are responsible for antimicrobial activity.

KEYWORDS: *Bacillus cereus, Klebsiella pneumonia, Candida ablicans Pseudomonas aeruginosa* and *Staphylococcus aureus.*

INTRODUCTION

According to WHO report above 80% of the world population is taking interest in indigenous medicinal plant remedies.[1] Therefore it is essential to investigate traditional medicine with a view to identity and exploit safe and effective remedies for ailments of both microbial and non microbial origin. The ethno botanical information obtained from the traditional herbal practitioners may serve as an initial lead for isolation and characterization of bioactive compounds. Phytocostituents are the natural bioactive compounds, exhibit potential therapeutic properties; work with nutrients and fibers to form an integrated part of defensive system in which alkaloids, flavonoids, terpenoids, phenolics, tannins etc considered as major constituents in crude drugs. These plant derived compounds are considered to be active

against human pathogenic microorganisms. In the present study *Terminalia paniculata*, a potential medicinal plant has activity against given above test pathogens.

MATERIAL AND METHODS

Plant material

The plant material was collected from Bareilly district and identified by Dr. Alok Khare, Reader, Bareilly College, Bareilly, UP, India and the voucher specimens was deposited.

Phytochemical Screening

The plant bark was shade dried powdered (500g) and extracted with ethanol using soxhlet apparatus for 6 hours.[2] The extract was filtered, concentrated under reduced pressure to dryness and subjected for phytochemical screening.[3, 4] The following chemical compound present in the ethanol bark extract shown in the Table 1.

Table: 1

S. No.	Phytoconstituents	Ethanol Extract of *Terminalia paniculata* Bark
1	Alkaloids	+
2	Glycosides	+
3	Saponin	+
4	Terpenoids	-
5	Flavonoids	+
6	Coumarines	+
7	Carbohydrates	-
8	Tannins	+
9	Amino Acid	-
10	Carotenoids	+
11	Volatile Oils	-

(+) means Present and (-) means Absent.

Table 2:

Antimicrobial activity of Ethanol extract of *Terminalia paniculata bark*					
S.N.	**Microorganism**	**Zone of Inhibition (in mm^{-1}) at below Concentration (mg/ml) of Ethanol Extract of *Terminalia paniculata* bark**			
		Minimum Inhibitory Concentration (MIC)	**25**	**50**	**100**
1	***Bacillus cereus***	-	-	-	-
2	***Klebsiella pneumoniae***	154	08	10	11
3	***Candida ablicans***	155	-	08	10
4	***P. aeruginosa***	309	10	13	15
5	***Staphylococcus aureus***	156	06	10	13

Antimicrobial Activity

The antimicrobial activity was performed by employing the pour plate as well as disc diffusion methods.[5, 6,7] The crude extracts of each sample dissolved in dimethyl sulfoxide (DMSO) and the concentrations of 10 to 100 mg/ ml were prepared. 25-30 ml of each sample was applied to sterile whatmann filter paper discs.

All the bacterial and fungal strains were grown in respective media for overnight at 37^0 C. The suspension of microorganisms adjusted to 105 to 107CFU/ml in broth media. In this method (Pour-plate method) 100ml of the suspension of bacterial/ Candida suspension microorganisms were prepared in the nutrient broth were inoculated in the nutrient agar in petridishes at room temperature in sterile condition and mixed thoroughly to ensure uniform growth. This was allowed to stand for 15 minutes so that the medium got solidified. The sterile filter paper discs of 5 mm diameter containing different concentrations of crude extracts were aseptically placed on the agar plates. All the seeded petri dishes were incubated at 27 ± 2^0 C for twenty-four hours in case of bacteria and 48-72 hours for fungal species. The assessment of antimicrobial activity was based on measurement of inhibition zones formed around the discs. The appearance of bacterial free zone around the disc is known as inhibitory zone, is considered as positive response. The diameter of the zones of inhibition around each disc measured and recorded at the end of the incubation period. The diameters of the inhibition zones were measured and expressed in millimeters. Each test was performed in three replicates and repeated twice. Model values were selected.

RESULTS AND DISCUSSION

The present study was designed to evaluate the phytochemical screening and antimicrobial activity of stem bark of *Terminalia paniculata*. Phytochemical studies (Table-1) revealed that the ethanol extracts of *Terminalia paniculata* exhibited positive reaction for maximum no of

secondary metabolites like alkaloids, glycosides, saponins, flavonoids, coumarins, tannins and carbohydrates were present.

In vitro antimicrobial studies of *Terminalia paniculata* (Table-2) revealed that the extract had significant antimicrobial activity against the test pathogens. The ethanol extract of stem bark was more effective on test pathogens when compare to leaf and fruit. The ethanol extract of stem bark exhibited maximum inhibition of zone (16mm) against *Pseudomonas aeruginosa* and minimum inhibition activity (6mm) against *Staphylococcus aureus*.

CONCLUSION

The present work revealed that *Terminalia paniculata* has rich and diversified phytochemical compounds like alkaloids, glycosides, coumarins, tannins and other compounds. These antimicrobial agents with its significant inhibition activity against various clinical isolates suggest conducting further studies for isolation and characterization of active principles. The molecular studies have been conducted in laboratory for elucidation of bioactive compounds.

AKNOWLEDGEMENTS

Authors are thankful to IFTM University, Moradabad and IVRI, Izaatnagar, Bareilly for support and for procurement of bacteria.

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