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ORIGINAL RESEARCH ARTICLE

Antimicrobial Activity of Methanolic Extracts of Bamboo Shoots (*Bambusa vulgaris*)

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ABSTRACT

Overuse of antibiotics has selected new strains of bacterial pathogens that are resistant to antibiotics used to combat them. Many plants have been used for centuries by traditional healers and may have antibacterial properties. Bamboo Shoot (Bambusa vulgaris) is one such plant, having been prescribed to treat stomach worms, lowering high blood pressure, toxemia (internal poisoning), weight loss, chronic constipation and many other remedies in Asian traditional medicine. Our research aim was to determine whether methanolic extracts obtained from the plant's shoot could inhibit growth of gram-positive bacteria and gram- negative bacteria. The methanolic extracts were obtained using the soxhelet apparatus.

Key Words: Antimicrobial activity, Bamboo Shoot (Bambusa vulgaris).

INTRODUCTION

Herbal medicine represents one of the most important fields of traditional medicine all over the world. To promote the proper use of herbal medicine and to determine their potential as sources for new drugs, it is essential to study medicinal plants, which have folklore reputation in a more intensified way [1]. Contrary to the synthetic drugs, antimicrobials of plant origin are not associated with side effects and have an enormous therapeutic potential to heal many infectious diseases. For example, vincristine (an antitumor drug), digitalis (a heart regulator) and ephedrine (a bronchodilator used to decrease respiratory congestion) were all originally discovered through research on plants. The potential for developing antimicrobials from higher plants appears rewarding as it will lead to the development of a phytomedicine to act against microbes. Plant-based antimicrobials have enormous therapeutic potential as they can serve the purpose with lesser side effects that are often associated with synthetic antimicrobials [2]. Thousands of secondary plant products have been identified and it is estimated that thousands of these compounds still exist. Since secondary metabolites from natural resources have been elaborated within living systems, they are often perceived as showing more "drug – likeness and biological friendliness than totally synthetic molecules" making them good candidates for further drug development [3-5].

Bamboo is a member of the grass family, which is generally used for medicinal purposes as to maintain optimum health weight or to treat liver disorders. Bamboo shoots help in lowering high blood pressure as they are rich in potassium. Bamboo shoots are packed with phenolic acids, with anti-oxidant and anti-inflammatory properties. One of the important fact about bamboo shoots nutrition is that the phyto-chemicals present in bamboo shoots are potent antioxidants which are considered as magical, due to their anti-cancer, anti-bacterial and anti-fungal properties. Bamboo shoots can be ideally consumed for healthy weight loss as they are low in calories.

MATERIALS AND METHODS

Collection of Plant Material

Plant materials were collected at the local area of M.P. and authenticated from K.N.K. College of horticulture, Mandsaur by Dr. Gyanendra Tiwari. The voucher specimen (MIP/C/ VSNTS-18) was submitted in Department of Pharmacognosy at Mandsaur Institute of Pharmacy, Mandsaur.

Preparation of extract

Fresh Shoots were collected and dried in shade. Dried shoots were powdered and subjected for extraction with methanol. The extract was collected, filtered and concentrated by heating with electronic water bath.

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Test Microorganisms

In this study *Streptococcus pneumoniae*, *Escherichia coli, Proteus vulgaris, S. epidermis* and *Staphylococcus aureus* were used.

SCREENING OF ANTIMICROBIAL ACTIVITY

Preparation of Media [6]

The definite volumes of peptone (1%), Beef extract (1%), Agar (3%) and Sodium chloride (0.5%) were dissolved in distilled water and pH was adjusted to 7.2. This solution was sterilized by autoclaving at 15 p.s.i. for 20 min.

Preparation of sub-culture

One day prior to this testing, inoculation of the above bacteria cultures were made in the nutrient agar and incubated at 37°C for 18-24 hr.

Preparation of test solutions

Test compound (5.0 mg) was dissolved in dimethylsulphoxide (5.0 ml) to give a 1,000 μg/ml this solution was used for testing.

Antimicrobial activity testing method

Whatman Filter paper discs of 7 mm diameter were prepared, sterilized and dipped in test and standard (Ofloxacin) drugs (each disc absorbs approximately 0.08 ml of solution). Using an ethanol dipped and flamed forceps, both reference standard and test drug discs were aseptically placed opposite each other over nutrient agar plates seeded with the respective test microorganisms.

Incubation

The plates were incubated in an upright position at 37ºC for 24-48 hours. The diameter of inhibition zones (in mm) & % inhibition of Zone were measured and the results were recorded [2].

RESULTS AND DISCUSSION

Different strain of gram negative bacteria and positive bacteria isolated from urine specimens, viz., *Escherichia coli (433), Streptococcus pneumoniae* were used in the present study. The results of *in vitro* antimicrobial activity of *Bambusa vulgaris* are presented in (**Table 1).** The diameter of inhibitory zones recorded includes the size of filter paper discs (6mm in diameter).

The in vitro anti microbial activity of Methanolic extracts of *Bambusa vulgaris* on gram-positive and gram-negative bacteria collected from local market, Mandsaur were studied. This result are shown in Table 1 the maximum activity was on *B. subtilis*(16-17 mm) and minimum activity was on *S. aureus*(11-12mm), among the gram positive bacteria. The inhibition zone, especially on Ofloxacin resistant was 26-27mm respectively.

On the other hand the maximum activity was observed on E. coli (14mm) among the gram negative bacteria. The anti bacterial activity of the plant on antibiotic resistant strains was especially notable.

The yield of methanolic extracts obtained from air dried plant material was 1 gm, these extract showed strong antimicrobial activity on *Staphylococcus epidermidis* and *Staphylococcus aureus*. It is important that the methanolic extracts of *Bambusa vulgaris* have antimicrobial activity on E-coli ,which are multiple antibiotic bacteria, because E-coli is a biogenic amine procedure in food[7].Also E- coli has become an important agent of nosocomial infection[8].

The methanolic extracts also inhibited the growth of multiple antibiotic resistant Staphylococcus stain, tested. The effect of methanolic extracts on *S. aureus* and *S.epidermidis* were high. *S. aureus* is a one of the most common causes of both hospital and community-acquired infection worldwide [9]. *S. aureus* is a major cause of cutaneous infections, furunculosis, impetigo and arthritis, and toxinoses, such as food poisoning, septic shock, scalded skin syndrome and toxic shock syndrome [10].The presence of antibiotic resistant staphylococci is of concern due to the possible spread of resistance determinants among the staphylococcus species. This could lead to the survival, growth and spread of enterotoxigenic staphylococci and staphylococci of clinical significance [11].

The inhibition zone of the methanolic extracts of these materials collected from different location, on bacteria, were similar (Table 1). The study demonstrates that *Bambusa vulgaris* had antimicrobial activity on Gram-positive and Gram-negative bacteria.

Table 1: Antimicrobial Activity of *Bambusa vulgaris*

S.No	Test Organism	Standard (Ofloxacin) Zone of inhibition (mm)	Test Zone Of inhibition (mm)	Activity index	% activity
1	*Streptococcus pneumoniae*	21	12	0.46	46%
2	*Staphylococcus aureus*	23	11	0.42	42%
3	*Staphylococcus epidermis*	20	16	0.61	61%
4	*Escherichia coli*	22	14	0.53	53%
5	*Proteus vulgaris*	18	-	-	-

Fig 1: Photographic representation of Antimicrobial activity of different Microorganisms

E. coli *S. A* *S. Epi* *S. P*

REFERENCES

1. Parekh, J. and S.Chanda, *In vitro* antibacterial activity of the crude methanol extract of *Woodfordia fruticosa* kurz. flower (lythraceae).Brazilian J. Microbiol.,2007; 38: 204-207,
2. Iwu, M.W., A.R. Duncan and C.O. Okunji, New antimicrobials of plant origin In: Janick, J. (Ed.), Perspectives on New crops and New Uses. ASHS Press, Alexandr, VA,1999; pp: 457-462.
3. Koehn, F.E. and G.T. Carter, The evolving role of natural products in drug discovery. Nat. Rev. Drug Discov; 2005; 4: 206-220.
4. Balunas, M.J. and A.D. Kinghorn. Drug discoveryfrom medicinal plants. Life Sci, 2005; 78: 431-441.
5. Drahl, C., B.F. Cravatt and E.J. Sorensen. Protein-reactive natural products. Angew Chem. Int. Ed. Engl, 2005; 44: 5788-5809.
6. R.Kokare Chandrakant, "Pharmaceutical Microbiology Experiments and Techniques," First edition 2005, Career Publication, Nashik, 63-65.
7. Ben-Gigirey B,Vieites-Baptista de Sousa JM, Villa TG,Baros-Velazquez J. Characterization of biogenic amine producing Stenotrophomonas maltophilia strains isolated from white muscle of fresh and frozen albacore tuna. Int J food microbial, 2000; 57:19-31.
8. Denton M, Kerr KG. microbiological and clinical aspects of infection associated with Stenotrophomonas maltophilia, clin microbial rev ,1998;11:57-80
9. CDC. Staphylococcus Aureus with reduced susceptibility to vancomycin-United states 1997. MMVR morb Mortal Wkly Rep, 1997; 46; 765-6.
10. Projan SJ, Novick RP. The molecular Basis of Pathogenicity. In:Archer G, Crossley K, editors. The Staphylococci in Human Disease. New York: Churchill Livingstone, 1997; p. 55-81.
11. Heir E, undhein G, Holck AL. identification and characterization of quaternary ammonium compound. Int J food microbial, 1999; 48: 211-212.