



ANALYSIS OF ANTIMICROBIAL POTENTIAL OF TRIVANGA BHASMA ON UTI CAUSING *PROTEUS MIRABILIS*

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ABSTRACT:

Trivanga bhasma is an Ayurvedic medicine with antimicrobial properties. It may help fight urinary tract infection caused by *Proteus mirabilis*. Research suggests it inhibits bacterial growth and disrupts cell membranes. While more studies are needed Trivanga Bhasma shows promise as a natural remedy. Urinary tract infection caused by *Proteus mirabilis* are a common health concern necessitating the development of effective treatments options. Trivanga bhasma an Ayurvedic medicine, has long been recognized for its antimicrobial properties. This study aimed to investigate the potential of Trivanga Bhasma against clinical isolates of *Proteus mirabilis* associated with UTIs. Through various in vitro assays, the antimicrobial activity Trivanga bhasma was evaluated, revealing promising result. It exhibited significant inhibitory effects on the growth of *Proteus mirabilis*, suggesting its potential as a natural remedy for UTIs caused by this pathogen. Further research is warranted to elucidate the underlying mechanisms and explore its clinical application in treating UTIs.

Keywords:- Trivanga Bhasma, Urinary tract infection, Antimicrobial activity.

INTRODUCTION :

Urinary tract infection are among the most common bacterial infection worldwide, affecting millions of individuals each year. *Proteus mirabilis* is a leading cause of UTIs particularly in patients with catheter associated infections or structural abnormalities of the urinary tract. The emergence of antibiotic resistances in this pathogen has raised concerns regarding the efficacy of conventional treatments options. As a result, there is growing interest in exploring alternative approaches, such as traditional medicines, to UTIs caused by *Proteus mirabilis*. (D.H.Tambekar *et al*, 2010)

Ayurveda, the ancient Indian system of medicine, offers a wealth of knowledge on the therapeutic properties of various natural substances. Trivanga Bhasma, a herb-mineral formulation used in Ayurvedic medicine, has been traditionally employed for its antimicrobial properties. It is composed of three metals -gold, silver and copper processed through a series of

purification and incineration steps. Trivanga Bhasma is believed to possess potent antimicrobial activity making it a potential for the treatment of UTIs caused by *Proteus mirabilis*. (Sharma K *et al*, 2019)

Despite the long standing use of Trivanga bhasma in Ayurvedic practice, there is a scarcity of scientific studies investigating its effectiveness against specific pathogens, including *Proteus mirabilis*. Therefore, this study aims to evaluate the antimicrobial potential of Trivanga Bhasma against clinical isolates of *Proteus mirabilis* associated with UTIs. By conducting in vitro assays, we seek to determine the inhibitory effects of Trivanga Bhasma on the growth of *Proteus mirabilis* and elucidate the underlying mechanism of action. (Sharma K *et al*, 2010)

The finding of this study may contribute to the development of alternative treatments options for UTI caused by *Proteus mirabilis*, particularly in cases where conventional antibiotics may be ineffective. Additionally,

exploring the antimicrobial properties of Trivanga Bhasma can provide valuable insights into the traditional knowledge of Ayurveda and its potential applications in modern medicine. (S.B. Dahikar et al, 2010)

MATERIAL AND METHODS:

Metal Based Herbal medicines such as Trivanga Bhasma were procured from local market. These commercially available formulations are used for treating various diseases in traditional clinical practice. In India are usually prepared from purified metal, Triturated with decoction of extract. They are generally prescribed in the dose of 100-200mg day⁻¹ and recommended to be taken with a suitable adjuvant.

Bacterial culture:

Bacterial culture from clinical laboratory in Nagpur, India. These cultures were then grown and stored in specific broth and selective and differential media. They made sure to standardize the size of the bacterial culture based on guideline from the NCCLS. To prepare the cultures for testing, they incubated them in nutrient broth until they reached a specific levels of turbidity. The final concentration of the inoculum was adjusted to a specific number of colony forming units per milliliter using SPC. This Standardizes process help ensure consistent and reliable results in the study.

Preparation of extract :

The aqueous extract were prepared by following the method 2gm bhasma powder was taken with 50ml of distilled water. The mixture was heated on a plate at 30-40min with continuous stirring for 20minutes. The mixture was filtrate obtained was evaporated in a water bath 40°C to dry to obtain the solid mass of the extract, finally extract were transfers to glass bottles, seals by sung caps and stored at 4°C units.

Antibacterial activity of disc diffusion method

The antibacterial activity of both aqueous and organic solution of Ayurvedic preparation, they used the modified paper disc diffusion methods.

They matched the turbidity of the bacterial culture with a McFarland turbidity standard. Then, they spread the inoculum over a Muller Hinton agar plate using sterile cotton swab to ensure even microbial growth. Next, they placed the prepared antibacterial disc on the plate. The plate were then incubated at 37°C for 18hours. They evaluated the antibacterial activity using 5mg /disc and measured the diameter of the inhibition zones. The experiment was repeated three times and the average diameter of the zone of inhibition was recorded. This method helps assess the effectiveness of Ayurvedic preparation against bacteria.

Agar Well diffusion method :

Agar well diffusion method is widely used to evaluate the antimicrobial activity of bhasma microbial extract. Similarly to the procedure used in disc diffusion method. The agar plate surface is inoculated by spreading a volume of the microbial inoculum over the entire agar surface. Then a hole with a diameter of 6 to 8 mm is punched aseptically with a sterile cork bore of a trip and a volume (20-100µl) of the antimicrobial agent or extract solution at desired concentration is introduced into the well. Then, agar plate are incubated under suitable conditions depending upon the test microorganism. The antimicrobial agent diffuse in the agar medium and inhibit the growth of the microbial stain tested.

OBJECTIVE AND ANALYSIS :

The antibiotic sensitivity test was examined using antibiotic to check the sensitivity against clinical isolates. The result showed that the organism exhibited varying levels of sensitivity to the tested antibiotics. It was highly sensitive to antibiotics Co-trimoxazole and Tobramycin as indicated by large zone of inhibition around the antibiotic disc. From (table 1) it can be observed that bacterial stain isolates were found sensitive and resistances.

Agar well diffusion method again gram negative bacteria or gram positive bacteria. It was found

that an aqueous extract decoction method showed a maximum zone of inhibition against given *Proteus mirabilis*(35mm) followed by aqueous extract decoction method soaked in deep freezer showed a maximum zone of inhibition against *Proteus mirabilis*.

RESULT AND DISCUSSION :

Metallic herbal preparation have several advantages over bhasma based medicines. They are more stable, require lower doses, and can be easily stored for a longer period of time. These preparation also contain minerals and metals as essential components, which contributed to their therapeutic efficacy. The combination of metal and minerals with herbs is believed to transform them into a bio-compatible form, making them more effective in treating specific illness. It's interesting to note that different combinations of metal and herbs can have varying effects on different organs in the human body. According to the antibacterial activity of bhasma was observed in Trivanga Bhasma was found strong antibacterial against *Proteus mirabilis*.

Trivanga Bahama, when used for UTI works by its antimicrobial properties. It helps in reducing the infection causing bacteria in the urinary tract. Additionally Trivanga Bhasma has diuretic properties which means it promotes urine production and help infusing out toxins from the body. This can aid relieving symptoms of UTI and supporting the healing process.

CONCLUSION :

Based on the study mentioned earlier it was observed that bhasma such as Trivanga Bhasma exhibited significant antibacterial activity. This suggests that these Ayurvedic preparation can be effectively used to control or prevent enteric bacterial infection. However, it is important to note that the complex nature of these preparation requires the use of modern techniques for standardization and the production of highly quality herbal products.

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Table 1. Antibiotic sensitivity test

Sr. No	Antibiotic used	Zone inhibition diameter	of Interpretation
1	Ampicillin(10mcg)	9mm	Resistance
2	Amoxicillin clavulanic acid(30mcg)	10mm	Resistance
3	Cefotaxmine(30mcg)	20mm	Sensitive
4	Co-trimoxazole(25mcg)	35mm	Sensitive
5	Gentamicin(10mcg)	14mm	Sensitive
6	Tobramycin(10mcg)	25mm	Sensitive

Table 2. Zone of inhibition agar well diffusion method

Sr. No	Bacterial strain	Zone of Inhibition (mm)	
		300µ/well	500µ/well
1	Clinical isolates	30mm	35mm



Fig 2. Zone of inhibition agar well diffusion method



Fig 1. Zone of inhibition diameter antibiotic sensitivity test