

ANTIBACTERIAL ACTIVITY OF METHANOLIC EXTRACT OF PLANT TRIDAX PROCUMBENS

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ABSTRACT

Natural treatments for the illness with a greater safety and efficacy profile include herbs. Because of the wide range of climatic conditions and seasons that are ideal for the cultivation of several plant species, India is endowed with an abundance of medicinal herbs. Only a small percentage of the many herbal medications used in India have received thorough research to yet. One of the most important components of the majority of compound medicines mentioned in Ayurvedic literature is the extremely valuable medication Tridax procumbens (L). Numerous pharmacological activities, including hepatoprotective activity, anti-inflammatory, wound healing, antidibetic activity, hypotensive effect, immunomodulating property, bronchial catarrh, dysentery, diarrhea, and to prevent hair loss, promote hair growth, and have antimicrobial activity against both, are well known.

KEYWORD: Tridax procumbens, Antimicrobial activity, Staphylococcus aureus.

INTRODUCTION

With 'Herbal Renaissance' happening all over the globe, medicinal herbs are staging a phenomenal comeback. Ethno botanical information estimates that more than 6000 higher plant species forming about 40% of the higher plant diversity, are used in its codified and folk healthcare traditions.^[1] As sources of biologically active molecules and blue prints for the development of modified derivatives with enhanced activity and or reduced toxicity, plant- derived drugs form an important segment of the modern pharmacopoeia. Ethno- pharmacologists, micro- biologists and botanists are combing the earth for such natural treasures and developing novel chemotherapeutic agents which are less toxic and more economic.^[2]

A major stumbling block to the successful management of infectious diseases has been the propensity with which microorganisms are able to develop resistance to routinely used antibiotics. The development and

spread of multidrug resistant superbugs especially in the hospital environment, continues to be a burning global issue due to the indiscriminate and irrational use of antibiotics.^[3]

The use of the medicinal herbs for curing disease has been documented in history of all civilization. It was concluded that plants contain active principles, which are responsible for the curative action of the herbs. The isolated active constituent of medicinal herbs and after testing some found to be therapeutically active.^[4] One such plant known to be associated with various pharmacological properties including antimicrobial ones is *Tridax procumbens*, belonging to the daisy family, are found perennially in various tropical and subtropical regions as well as mildly temperate regions worldwide.^[5] Listed as a weed and a pest plant, it has been known by several names including *Tridax* daisy in English, Jayanti veda in Sanskrit, Ghamra in Hindi, Thata poodu in Tamil.

Reports state that the leaf juice can be used to cure fresh wounds, and also as a hair tonic.^[5] A few reports have focused on the immense potential of this plant which has antimicrobial, wound healing, anti-inflammatory and immunomodulatory properties.^{[6][7]} However, there is a paucity of reports on its effect on nosocomial and multidrug resistant pathogens. Hence this study was carried out to compare the antibacterial activity of aqueous and ethanolic extracts of the leaves of *T. procumbens* and to study the efficacy of the extracts against community acquired and nosocomial human pathogens. To the best of our knowledge, the effect of *T. procumbens* against multidrug resistant nosocomial pathogens has not been studied so far. Hence it is worthy to do it.

MATERIALS AND METHODS

Plant

The fresh flowers *Tridax procumbens* Linn. (Compositae) were collected in the months of march from the garden located in campus of Pataldhamal Wadhwani College Of Pharmacy, Yavatmal, Maharashtra state, India, and authenticated by the authority of botany department, Amravati University, Amravati.

Bacteria

Pathogenic strains of *Staphylococcus aureus* s, and *Escherichia coli* (ATCC) were obtained from pathology department from Sheri Vasantnao Naik Government Medical College Yavatmal, and were maintained on agar slant medium(HiMedia) at 4 °C for further experiments.

Culture Media

Types of media was required for carrying out this study, Nutrient agar (biolife) and Mueller-Hinton agar (HiMedia). Also methanol was used for extraction process. These media issue from pathology department from Shri Vasantnao Naik Government Medical College Yavatmal, and the solvent were issue from store room in pataldhamal wadhwani college of pharmacy yavatmal.

Preparation of Plant Extract

Flowers of *Tridax procumbens* plant were collected and kept for shed drying for optimal period. After complete drying they were subjected for grinding into coarse powder by the mechanical means. The powdered flowers were kept for maceration in methanolic medium for 96 Hrs at room temperature and

filtered.^[10]

Assessment of Activity

By using well diffusion method

The antibacterial activity was performed by agar well diffusion method.^[8] In this method Mueller – Hinton (MH) agar petridishes is used (by using autoclave at 121⁰C for 15 min). The PH level of the agar was maintained between 7.2 and 7.4 by adding NaOH and HCl. MH agar at 37⁰C was inoculated with a MH broth culture of each bacterial species and poured over the agar plates to form a homogenous layer. Three to four well (holes) were made in the plates (of about 6mm diameter) using a sterile corn borer and plant extract was tested in triplicate with gentamycin (10 μ g/ml) well as a reference or positive control.^[8] The plates were evaluated after incubation at 37⁰C for 24 hours after which the zone of inhibition around each was measured by using a scale in millimeters (mm).The ratio between the diameter of inhibition zone (mm) produced by plant extracts and the inhibition zone around the well with gentamycin (mm) was used to express antibacterial activity.

RESULTS

Table 1: Phytochemical screening of Methanoilc extract of flowersof *Tridax procumbens* Linn.

Tests	Methanolic Extract
Carbohydrate	
Molish's	+ve
Fehling's	+ve
Benedicts	+ve
Cardiac glycoside	
Legal test	+ve
Saponin	
Foam test	-ve
Flavonoids	
Shinoda test	+ve
Lead acetate test	+ve

Table 2: Inhibition zone (mm) by Methanolic extract of flowers of *Tridax procumbens* against *E. coli* at different concentration.

Species	Concentration	Zone of inhibition (mm) mean.
E. Coli	67.3 mg/ml	12.5 \pm 1.378
	150 mg/ml	16.16 \pm 0.7528
	Std 10 μ g/ml	18.83 \pm 0.7528



Figure 2.1: MIC concentration of extract 67.3 mg/ml against *E.coli*.



Figure 2.2: MIC concentration of extract 150 mg/ml against *E.coli*.



Figure 2.3: MIC of standard gentamycine 10µg/ml Against *E.coli*.

Table 3: Inhibition zone (mm) of methanolic extract of flowers of *tridax procumbens* against *S. Aureus* at different concentration.

Species	Concentration	Zone of inhibition in(mm) mean
<i>S. Aureus</i>	48.20 mg/ml	17.5 ± 0.7528
	100mg/ml	21.83 ± 0.7528
	Std 10 µg/ml	28.16 ± 1.169



Figure 3.1: MIC concentration of extract 48.20 mg/ml against *S. Aureus*.



Figure 3.2: MIC concentration of extract 100 mg/ml against *S. Aureus*.



Figure 3.3: MIC standard of gentamicin 10µg/ml Against *S. Aureus*.

Table 1 the preliminary phytochemical screening of methanolic extract of flowers of *tridax procumbens* Linn revealed the presence of carbohydrate, glycoside, and Flavonoids.

Table 2 & figure 2.1, 2.2, 2.3 Shows the zone of inhibition by methanolic extract of flowers of *tridax procumbens* Linn. Methanolic extract is active at 67.3 mg/ml and 150mg/ml as compared to standard dose of gentamycine against *E.Coli*

Table 3 & figure 3.1, 3.2, 3.3 shows the zone of inhibition by methanolic extracts of flowers of *tridax procumbens* Linn. Methanolic extract is active at 48.20 mg/ml and 100mg/ml, as compared to standard dose of gentamycine against *S. Aureus*.

DISCUSSION

Resistance in micro-organisms to many antimicrobial has resulted in morbidity and mortality from treatment failure and increased health care costs and increasing capability of microbes to develop multidrug resistance has encouraged search for new, safe and effective bioactive agents of herbal origin.

It has been reported that *Tridax procumbens* medicinal plants have been used in the treatment against different diseases.^[9] Effect of methanolic extract on different micro-organisms i.e *S. aureus* and *E. coli*. The methanolic extract shows zone of inhibition in well diffusion method after incubation of plates for 24 hours at 37 °C. As per the results, *S. aureus* showed maximum zone of inhibition by methanolic extract compared with *E. coli*. On the basis of the antibacterial assay of this study *S. aureus* was found more (susceptible to the employed flowers extracts) than *E. coli*. The methanolic extract of flowers of *tridax procumbens* was evaluated for their MIC against *E. coli* and *S. aureus* at 67.3 mg/ml and 48.20 mg/ml respectively. The methanolic extract of *Tridax procumbens* showed significant antimicrobial activity against positive *Staphylococcus aureus* and on *E. coli* gram negative bacterial strains. Gram positive (*S. aureus*) bacteria and gram negative bacteria (*Escherichia coli*), showed a reduction in their growth on treatment with the different concentration of extracts of *Tridax procumbens*. The degree of inhibition was measured by the well diffusion method, reported that the more zone of inhibition in gram positive when compare with gram negative bacteria.

CONCLUSION

The methanolic extract of flowers of *Tridax procumbens* (L) has significant antibacterial activity against *S. Aureus* and *E. coli*. But *staphylococcus aureus* i.e. gram positive bacteria are more susceptible than *Escherichia coli* i.e. gram negative bacterial.

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