

# Various Dosage Forms of *Tridax Procumbens* and their Antimicrobial Activity Against Specific Pathogens

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## Abstract

**Background:** *Tridax Procumbens* Linn, (*Tridax*) is a herb traditionally used in Indian traditional medicine for different ailments like cough, cold, amoebiasis and most importantly for seizing the bleeding and wound management. Practically it is observed that the wound treated with *Tridax* was found to be very rarely infected and healed properly. Researched suggests that the different dosage form of the *Tridax* have different potential in wound healing. On these two backgrounds, the hypothesis was made that the *Tridax* has got antimicrobial property and the antimicrobial potential varies as per the dosage form.

**Method:** To examine the hypothesis, in the present experiment, seven Ayurvedic dosage forms of *Tridax* viz. fresh leaves juice, fresh flower juice, fresh root juice, aqueous decoction, medicated oil, medicated Ghee, ash, alkaline aqueous water-soluble fraction of the Ash and six organic solvent extracts of *Tridax* viz. ethanol, methanol, chloroform, ethyl acetate, benzene and petroleum ether were tested for their antimicrobial activity against eleven different disease-causing microbes viz. *Bacillus subtilis*, *Proteus vulgaris*, *Shigella flexneri*, *Staphylococcus aureus*, *Enterobacter aerogenes*, *Chryseobacterium gleum*, *Klebsiella pneumoniae*, *Aspergillus fumigatus*, *Candida albicans*, *Aspergillus niger* and *Aspergillus flavus*. Antimicrobial experiment was carried out with appropriate nutrient media and disc diffusion method.

**Results:** Leaf juice showed microbial inhibition zone of 28mm against *B. subtilis*. Flower juice showed 17mm against *C. albicans*, aqueous decoction showed 14mm against *C. gleum*, Ethanol extract, Methanol extract, Chloroform ext. and Ethyl act. Extract showed microbial inhibition zone of 17mm, 14mm and 14mm against respectively.

**Conclusion:** The different dosage form of *Tridax* have a different and significant antimicrobial potential against different microbes. It supports the importance of different processing suggested in classical Ayurvedic text for obtaining different results from a particular herb.

**Keywords:** *Tridax procumbens*, Antimicrobial, Dosage forms.

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## Introduction

*Tridax procumbens* Linn. (*Tridax*) is a herb found everywhere in India, especially in rocks and mountains. This plant is called *Avanti*<sup>1</sup> in Ayurveda and *Peet Bhrigraj*, *Kambarmodi*, *Dagadphul*, *Gabbu Chemanti*<sup>2,3,4</sup> as different vernacular names. *Tridax* is traditionally used for wound healing, seizing bleedings, cough, cold,

amoebiasis etc. It is observed that the wound treated with Tridax heals properly without developing any infection or sepsis. Research regarding the wound healing activity of different preparations of Tridax shows that the different preparation has different wound healing activity and analgesic activity<sup>5</sup>. These two studies suggest that the Tridax may have antimicrobial potential and the potential may be different in different dosage forms.

**Hypothesis:** The different dosage forms of Tridax like Juice, Paste, Decoction, Oil, a water-soluble fraction of ash and organic solvent extracts like alcohol soluble extract, chloroform extract, petroleum ether extract etc. have different antimicrobial activity on specific pathogenic microorganisms

**Objective:** To identify the antimicrobial potential of different dosage forms of Tridax against different eleven microbes.

## Materials and Method

**Preparation of dosage forms:** Different dosage forms of Tridax were prepared as per general guidelines laid for herbal preparations from classical Ayurvedic treaty Sharangdhara Samhita<sup>6</sup>

**Table 1: Dosage Form**

Sr.No.	Dosage form
1	Fresh juice- leaf
2	Fresh juice- flower
3	Fresh juice- root
4	Reduced aqueous decoction
5	Alkali- water-soluble fraction from ash
6	Oil- medicated sesame oil with Tridax
7	Clarified butter (Ghrita) medicated with Tridax

Organic solvent extracts were also prepared and included in the study for comparison. As follows

1. Ethanolic extract 10% w/w
2. Methanolic extract 10% w/w

3. Chloroform extract 10% w/w
4. Benzene extract 10% w/w
5. Ethyl acetate extract 10% w/w
6. Petroleum ether extract 10% w/w

**Microbial Strains:** The strains of pathogenic microbes<sup>7</sup> involved in the study were obtained from the Institute of Microbial Technology and Sawai Man Singh Medical College and Hospital, Jaipur #.

**Table: 02: Microbial strains**

No.	Species and MTCC No.
1	Bacillus subtilis (441)
2	Proteus vulgaris (744)
3	Shigella flexneri (1457)
4	Staphylococcus aureus (7443)
5	Enterobacter aerogenes (111)
6	Chryseobacterium gleum (1916)
7	Klebsiella pneumoniae (109)
8	Aspergillus fumigatus#
9	Candida albicans (3017)
10	Aspergillus niger (1344)
11	Aspergillus flavus#

## Microbiological techniques adopted

Culture media was prepared and set in Petri dishes to form media plates. Sterile 5mm disks for disk diffusion method were prepared from standard Whatman paper No. 1. These disks were soaked in individual trial drug 10 ml and dried for the antimicrobial study. 24-hour microbial subculture was prepared and 100 ml of it was spread over the media plate with a spreader. Trial disks were placed and marked on media plate and incubated in an incubator for 24 hours at 37°C. Solvent used for extraction was used as a control. Media plates were observed for inhibitions zones of microbial growth after 24 hours.

## Observations and Results

**Table: 3: Observations and Results**

	Drug and their inhibition zone in mm	B. subtilis	P. vulgaris	S. flexneri	S. aureus	E. aerogenes	C. gleum	K. pneumoniae	A. fumigatus	C. albicans	A. niger	A. flavus
1.	Leaf juice	28	6	6	0	7	11	0	8	9	8	9
2.	Flower juice	7	7	0	6	0	10	0	10	17	0	9
3.	Root juice	8	8	6	8	7	13	6	9	11	0	8
4.	Kwatha Ghana	8	7	6	13	0	14	9	8	0	0	0
5.	Kshara	13	9	0	11	11	12	8	10	12	7	13
6.	Taila	8	0	8	0	8	9	0	0	11	7	0
7.	Ghrita	6	9	0	9	7	6	0	0	7	0	0
8.	Ethanol ext.	7	6	11	9	8	13	0	0	17	0	8
9.	Methanol ext.	7	6	13	7	6	8	6	12	14	10	7
10.	Chloroform ext.	7	6	12	7	0	13	8	14	13	12	8
11.	Benzene ext.	7	9	9	9	7	9	7	9	8	7	8
12.	Ethyl act. Ext	8	0	19	7	6	6	0	8	8	7	7
13.	Pet. Ether ext.	10	10	11	12	10	10	7	7	11	7	9

**Note:** Nil/0 = No Inhibition, Insignificant = 6 mm-9 mm, Significant= 10mm-13mm, Highly significant = 14mm and above.)

Image I

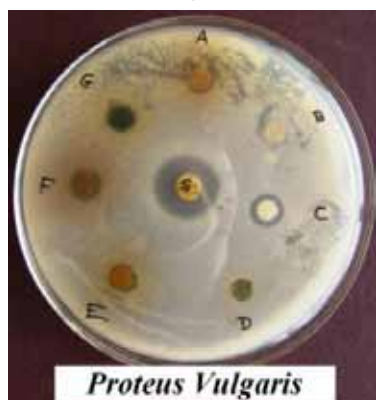


Image II



Image III



### Results

- Fresh juice (Leaf):** Demonstrated highly significant activity of microbial growth inhibition against *B. subtilis*. Significant inhibition of growth against *C. gleum* and insignificant activity against other microbes.
- Freshjuice (Flower):** Demonstrated highly significant inhibition of microbial growth against *C. albicans*. Significant inhibition against *C. gleum* and *A. fumigates*. and insignificant activity against other microbes.
- Fresh Juice (Root):** Demonstrated significant inhibition against *C. gleum* and *C. albicans*. and insignificant activity against other microbes.
- Reduced aqueous decoction:** Shows highly significant inhibition against *C. gleum*. Significant inhibition against *S. aureus*. and insignificant activity against other microbes.
- Alkali (water-soluble fraction from Ash):** It did not show any significant activity against any pathogenic microbe.
- Medicated oil:** It has significant inhibition against *C. albicans*. and insignificant activity against other microbes.
- Clarified butter medicated with Tridax (Ghrita):** Shows significant inhibition against *S. aureus*. and insignificant activity against other microbes.

8. **Ethanollic extract:** Shows significant inhibition against *S. flexneri*, *C. gleum* and *C. albicans*. and insignificant activity against other microbes.
9. **Methanolic extract:** Shows highly significant inhibition against *C. albicans*. Significant inhibition against *S. flexneri*, *A. fumigates* and *A. niger*. and insignificant activity against other microbes.
10. **Chloroform extract:** Shows highly significant inhibition against *A. fumigates*. Significant inhibition against *S. flexneri*, *C. gleum*, *C. albicans* and *A. niger*. and insignificant activity against other microbes.
11. **Benzene extract:** Failed to show any significant activity against any pathogenic microorganisms.
12. **Ethyl acetate extract:** Demonstrates highly significant inhibition against *S. flexneri*. Failed to show significant activity against any other pathogenic microorganisms.
13. **Petroleum ether extract:** Demonstrates significant inhibition against *P. vulgaris*, *B. subtilis*, *S. flexneri*, *S. aureus*, *E. aerogenes*, *C. gleum* and *C. flavus*. Failed to show significant activity against any other pathogenic microorganisms.

### Discussion

Nowadays solvent extraction industry has developed to a great extent. Solvent extracts are preferred since they provide maximum yield. In Ayurveda, different preparations of the same herbs are employed for a specific condition. Not only the fraction of herbs diffused into the solvent but also the solvent itself like oil and Ghee etc. plays a role in the pharmacological action, prevention etc. of the drug. The organic solvent does not hold a good reputation due to its carcinogenic and other adverse effects. Ayurveda believes that the medium used for the processing of any medicines leaves its impression and adds its attributes to the drug being processed. In that sense, if we are processing herbs with organic solvents, definitely, the drug is going to carry the trace and attributes of the toxic solvents in their constitution whereas the use of natural holistic solvents not only adds to the bioavailability but also eliminates the possibility of unforeseen adverse effect<sup>6</sup>. The only disadvantage is that all the phytochemicals may not be extracted in the process thus affecting the yield of industrial processed. In the current study, we need to learn that when a adopt a formula from traditional medicine, not only the herbs involved but also the processing and methodology

adopted should be taken into consideration in favour of utilization of the traditional knowledge in a safe as well as effective way.

### Conclusion

Tridax is a traditionally used herb in India for various ailments. Antimicrobial study of this herb shows that its various classical preparations and dosage forms demonstrated selective and distinct antimicrobial activity against different pathogenic microbes. fresh juice of leaves, aqueous decoction and flower juice show highly significant inhibition of *Bacillus subtilis*, *C. gleum* and *Candida albicans* respectively. Alkali derived from water-soluble ash and other organic extracts have inhibited about 50% of the tested microbes. Tridax may act as a potent antimicrobial agent for specific strains and may have potent utility in the pharmaceutical industry. Further study is necessary to explore the potential to more depth.

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**Conflict of Interest:** Nil.

### References

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