



## Formulation and antimicrobial activity of 95% ethanolic-benzene-chloroform extract of *Curcuma aromatica* Salisb

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### Abstract

In view of increasing resistance to existing antimicrobial agents, herbal drugs are being looked as very importance source for discovery of new agents for treating various ailments related to bacterial infections. The present study describes the anti microbial activity of *Curcuma aromatica* Salisb rhizomes extract against microrgnism. *Bacillus substils*, *Staphylococcus aureus*, *Staphylococcus epidermis*, *Escherichia coli*, *Staphylococcus flexineria* and *Pseudomonas aeruginosa*. For this purpose aqueous extract of rhizomes were prepared and tested by "Disc Diffusion Method". As a result of this study it was found that the extract of fruit generally revealed anti microbial activity against both gram positive bacteria (*B. substils*, *S. aureous* and *S. epidermis*) and gram negative bacteria (*E. coli*, *S. flexineria* and *P.auriginosa*).

**Keywords:** Anti-microbial activity, *Curcuma aromatica* Salisb, 95% Absolute Ethanolic-Benzene-Chloroform Extract, Disc diffusion method.

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### Introduction

*Curcuma aromatica* Salisb which belongs to the Zingiberaceae family is a perennial herb. Traditionally it is used as a anti-inflammatory agent. Many reports have suggested useful pharmacological properties of *Curcuma* drugs such as anti-inflammatory [1] anti-tumor [2] and immunological effects [3]. Traditionally, since the pharmacological effects of curcuminoids, especially curcumin, have been investigated, such as radical scavenging [4], the inhibition of nitric oxide (NO) [5, 6] anti-inflammation [7], anti-tumor [8], anti-allergy [9] and anti-dementia [10]. Pharmacological studies of other *Curcuma* species were very few, because botanical origins of *Curcuma* drugs could not be easily identified due to similarity of morphology, and variety of naming derived from used parts and producing areas. The present investigation deals with anti-bacterial of *Curcuma aromatica* Salisb rhizomes.

## Materials and Methods

The leaves of *Curcuma aromatica* Salisb were collected from the local areas of Bhind Madhya Pradesh, India during October 2009.

### Preparation of Extracts

The powdered plant material (850 g) was subjected successive hot soxhlet extraction using (60-80°C), 95% Absolute Ethanolic-Benzene-Chloroform Extract, in their increasing order of polarity. The extracts so obtained were concentrated to dryness by evaporating the solvent under reduced pressure using rotary evaporator. Yield of extracts was 95% Absolute Ethanolic (4.0%), chloroform (8.2%) and Benzene (2.5%). All the extracts were dissolved in sterile Acetone for antibacterial as well as antifungal activity.

### Formulation of extract

For anti-microbial activity study on the day of experimentation, the different amount of powder was suspended in distilled water to get different concentration of suspension.

### Microorganism

The micro organisms used in this study were *B.subtilus*, *S.aureus*, *S.epidermis*, *E.coli*, *S.flexinaria*, and *P.auriginosa*.

### Antimicrobial activity

The anti microbial activity of the aqueous extract was carried by disc diffusion method [11]. a suspension of tested microorganisms was spread on Muller-Histon Agar (MHA) (Oxoid) medium. The filter paper discs (9 mm in diameter) were individually impregnated with different concentration of extract and then placed into the agar plates which had previously been inoculated with the tested microorganisms. The plates were subsequently incubated at 37°C for 48 Hrs. After incubation the growth inhibition rings were quantified by measuring the diameter of the zone of inhibition in mm. All the tests were performed in triplicate. Ciprofloxacin, cephalixin, amoxicillin and ampicillin served as positive control.

## Results and Discussion

*In vitro* preliminary screening of the antimicrobial activity of the plant extracts from *Curcuma aromatica salisb* was studied against some micro-organisms using the filter paper disc diffusion method. The antimicrobial affect of plant extract against the different strains are illustrated in Table 1. The extract of *Curcuma aromatica salisb* at the concentration of 100% has antimicrobial activity on the tested micro-organism form high to low respectively. *P.auriginosa* (12mm), *E.coli* (18mm), *S. epidermis* (16 mm), *S. aureus* (17mm), *S. flexinaria* (16mm), and *B.subtilus* (19mm) showed in (Table-1). The data indicated that gram negative *P. auriginosa* was the most sensitive strain of those tested with the extract of *Curcuma aromatica salisb* with strongest inhibition zone of 21 mm. The extract concentration of 100% also exhibit high antimicrobial activity against *S.epidermis*, with modest activity against, *S. aureaus*, *B.sustilus*, *S. flexinaria*, *E.coli*. The 75% concentration of the extract of *Curcuma aromatica salisb* also show strongest inhibition zone against different strains of microorganisms. The data indicates that anti-microbial activity of extract (at 85 % concentration) with strongest inhibition zone of 16 mm for the strain of *B.subtilus*, *S. aureaus* *E.coli*, However, the inhibition zone for the species of *P.auroginosa*, and *S.epidermis* and *S.flexinaria* was found 16mm, 13mm and 17mm respectively. The Table - 1 shows that different concentration (50%, 75% and 100%) of plant extract were having good antimicrobial activity against *B.subtileaus*, *S.aureaus*, *S.epedermis*,

*E.coli*, *S.flexineria* and *P.auriginosa*. The minimum inhibitory concentration (MIC) of the *Curcuma aromatica salisb* rhizomes extract was measured which is depicted in the Table-1. It was observed that *S. aureaus* and *P. auriginosa* have shown MIC value at 15 % concentration of plant extract. Other bacteria have shown very small zone at 5 % concentration of the extract. On comparing the inhibition zone of the extract to that of standard antibiotics (cephalexin, ciprofloxacin, ampicillin and amoxicillin) extract showed better activity than cephalexin. However, extract is not potent than ciprofloxacin, ampicillin and amoxicillin in these condition. In the end of study we have found the extract *Curcuma aromatica salisb* revealed antimicrobial activities against microorganisms.

**Table -1 Antimicrobial activity of *Curcuma aromatica* Salisb aqueous extract of different microorganisms**

Sample Conc. in %	Zone of Inhibition in (mm)					
	<i>S. Aureus</i>	<i>B. Subtillis</i>	<i>E. Coli</i>	<i>P.auriginosa</i>	<i>S.epidermis</i>	<i>S. flexineria</i>
100	17	19	18	12	17	16
75	15	14	15	10	16	15
60	13	15	16	09	14	12
50	15	14	17	08	16	14
40	14	12	16	10	15	13
25	11	13	13	11	11	15
20	09	11	15	07	13	11
10	12	13	12	08	12	10
5	13	08	11	11	09	06

**Table 2: Antimicrobial activity of antibiotics on different microorganisms**

Micro-Organisms	Microorganisms (inhibition zone in mm)					
	Gram-positive			Gram-negative		
	<i>S. aureus</i>	<i>B.subtilus</i>	<i>S. epiderms</i>	<i>E.coli</i>	<i>S.flexineria</i>	<i>P.auriginosa</i>
Ampicillin	19	18	16	17	17	13
Cephalexin	20	19	-	-	18	14
ciprofloxcin	19	18	17	17	-	13
Amoxicillin	11	8	10	13	9	11

**Table 3. Phytochemical group test for the Petroleum ether, Chloroform, Extract of leaves of *Curcuma aromatica* Salisb**

S. No.	Phytoconstituents	Extract of leaves of <i>Curcuma aromatica</i> Salisb
1	Alkaloid	-
2	Amino acid	+
3	Flavonoids	-
4	Glycosides	+
5	Tannins	+
6	Saponins	+
7	Gums	-
8	Triterpenoids	+
9	Steroids	-

### Conclusion

Aqueous extracts of rhizomes of *Curcuma aromatica* Salisb exhibited better antibacterial activity as compared to their petroleum ether, methanolic and ethanolic extracts. Among the organisms tested *E.Coli* was more susceptible to the aqueous extracts of all the three herbs. Further pharmacological and clinical studies are required to understand the mechanism and the actual efficacy of these herbal extracts in treating various infections and skin diseases like psoriasis.

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