

**STUDY OF ANTIBACTERIAL ACTIVITY OF *Justicia procumbens* VAR. EXTRACTS****BHAWANA PANDEY<sup>1</sup>**

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**ABSTRACT**

*Justicia procumbens* (Acanthaceae) is an important medicinal herb found as a weed throughout India. It has been used in almost all the traditional system of medicine, ayurveda, unani, and sidha from the ancient time. The present study discuss about the antibacterial activity of *Justicia procumbens* against *E.coli*, *S.aureus* and *Pseudomonas fluorescens* and minimum inhibitory concentration (MIC) was also determined. It was found that the extracts shown excellent inhibitory activity against *B.subtilis*. MIC obtained from bacterial strains for methanol and aqueous extract, leaf extract of *Azadirachta indica* was mixed in different concentration and again the MIC of *Justicia procumbens* was noted and found that with 50µL/mL. dilution of *A.indica* in 200µL/mL. of *Justicia procumbens* inhibitory activity takes place which increases with increase in concentration. The present study is the first study on all parts of *Justicia procumbens* which combines these different parameters in it including the mixing of plant extracts with *A.indica* leaf extract.

**KEYWORDS:** Minimum Inhibitory Concentration, Inhibitory Activity, Antibacterial Activity

Plants have been used in traditional medicine for several thousand years. The use of traditional medicine in most developing countries is a normative basis for the maintenance of good health. The secondary metabolites of the plants are the major sources of pharmaceutical. Medicinal plants have been used as an exemplary source for centuries as an alternative remedy for treating human diseases because they contain numerous active constituents of immense therapeutic value. In the present era of drug development and discovery of newer drug molecules many plant products are evaluated on the basis of their traditional uses. One of the many plants which are being evaluated for their therapeutic efficacies is *Justicia procumbens* which is commonly known as Shrimp Plant (Charde *et al.*, 2011). Although it has many medicinal properties, it is particularly used in pains and inflammation, (Anonymous, 2005), Laxative, Diuretic (Zafar, 2009) and Eczema, (Paul, 2010).

The plant shows many pharmacological activities (Vivek *et al.*, 2012) like, anti-allergic (Tyler *et al.*, 1994), hepatoprotective (Bafna and Mishra 2004), Rheumatism, (Han *et al.*,2003), antiparasitic (Banerji *et al.*, 1970). Many traditional uses are also reported like antiperiodic, purgative and laxative, in

various types of gastric disorders and in body pain (Girach *et al.*,1992) which are being studied till today. Also possess antioxidant activity (Tahiliani and Kar 2000).

*Justicia procumbens* var. belongs to the family- Acanthaceae and used by traditional healers for the treatment of Pains and Inflammation, Common ailments. Leaves are used in decoction for backache, plethora, and flatulence. (Dhar *et al.*,1968).

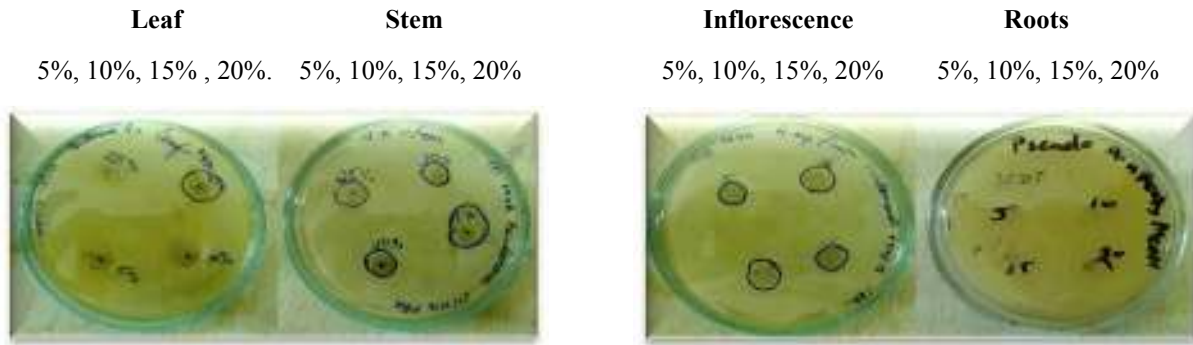
**MATERIALS AND METHODS****Antimicrobial Screening against Bacterial Strains**

The methanolic and aqueous extract of leaf, stem, inflorescence and roots of *Justicia procumbens* was prepared and its antibacterial activity were checked by Well Diffusion Method against *Escherichia coli*, *Pseudomonas fluorescens*, *Staphylococcus aureus* and *Bacillus subtilis*.MIC was also observed.

**OBSERVATIONS AND RESULTS****Antimicrobial Screening against Bacterial Strains:**

The zone of inhibition was observed in all plates for antimicrobial activity and the minimum inhibitory concentration was determined.

**Antimicrobial Activity of *Justicia procumbens* against Bacterial strains:**

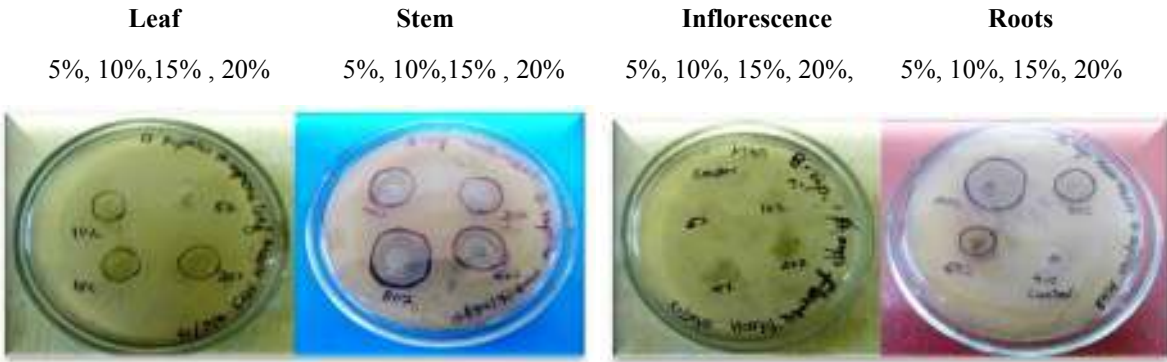


**Figure 1: Antibacterial activity of *Justicia procumbens* extracts against *P. fluorescence*.**

For *P. fluorescence* the methanolic leaf, stem, inflorescence extract of *Justicia procumbens* showed the antimicrobial activity where as no zones

were observed for roots extract, i.e.; negative for roots.

**Methanolic Extract**

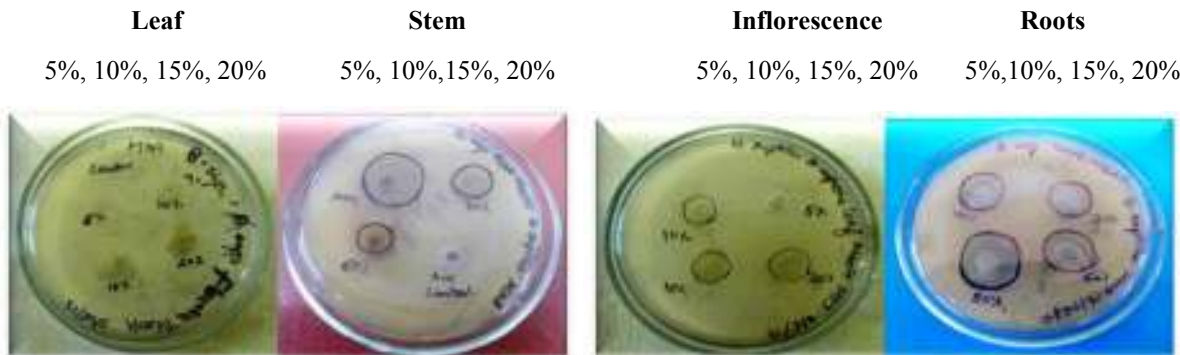


**Figure 2: Antibacterial activity methanol extracts of *J. procumbens* against *Bacillus subtilis*.**

Methanolic extract of leaf, stem, inflorescence, roots of *Justicia procumbens* showed

inhibitory activity against *Bacillus subtilis* as zones of inhibition were observed in media plates.

**Aqueous Extract**



**Figure 3: Antibacterial activity of aqueous extracts of *J. procumbens* against *Bacillus subtilis*.**

Zone of inhibition was observed in aqueous extracts of *Justicia procumbens* against *Bacillus*

*subtilis* showing its susceptibility towards the extracts. The diameter of these zones was measured and MIC was determined.

***Escherichia coli***

<b>Leaf and Stem</b>	<b>Inflorescence</b>	<b>Roots</b>
5%, 10%, 15%, 20%	5%, 10%, 15%, 20%	5%, 10%, 15%, 20%



**Figure 4: Antibacterial activity methanol extracts of *Justicia procumbens* against *E.coli*.**

The methanolic extract of *Justicia procumbens* showed less susceptibility towards the *E.coli* bacteria as the positive results were obtained only in leaf and stem extracts while inflorescence and roots sowed no zone of inhibition. Also it was negative for the aqueous extracts of *Justicia procumbens*.

**Kanamycin Antibiotic:** Kanamycin is an antibiotic that acts against the plant pathogenic bacteria. The plates were set up against different bacteria to observe its antibacterial susceptibility.

<b><i>B.subtilis</i></b>	<b><i>Pseudomonas</i></b>	<b><i>E.coli</i></b>
5%, 10%, 15%, 20%, 100%	5%, 10%, 15%, 20%, 100%	5%, 10%, 15%, 20%



**Figure 5: Antimicrobial activity of bacterial strains against Kanamycin antibiotic.**

Zone of inhibition at different concentration of Kanamycin (stock 1µg/mL.) observed against

*B.subtilis* and *Pseudomonas* where as no zone was observed against *E.coli*.

**Zone of inhibition (diameter in mm) against Bacterial strains.**

**Table 1: Zone of inhibition (diameter in mm) against Bacterial strains**

Microbe	Conc. in %	Zone of inhibition (in mm)								Standard Kanamycin
		Methanolic Extract				Aqueous Extract				
		Leaf	Stem	Inf	Roots	Leaf	Stem	Inf	Roots	
<i>B.subtilis</i>	5	-	-	-	-	-	-	-	-	13
	10	10	-	-	-	-	-	-	-	15

	15	10	-	10	-	10	-	-	-	18
	20	11	10	11	-	11	-	-	-	19
	30		13		-		-	-	-	
	35		13		-		-	-	-	
	40		14		-		-	-	-	
<i>E.coli</i>	5	10	-	-		-	-	-	-	-
	10	12	-	-		-	10	-	-	10
	15	15	10	10		-	10	-	-	11
	20	15	10	12		-	12	11	-	14
<i>P.florescenc e</i>	5		-							15
	10	-	-							21
	15	-	-	-	-					21
	20	-	-	10	-					
	25	10	-	10	-					23
	30	10	-	11	-					
	35	11	-	10	-					

Inf = inflorescences, Conc. = concentration

Antimicrobial activity against the bacterial strains showed maximum inhibition against *Bacillus subtilis*, *E.coli* and least against *S.aureus* for both

methanolic and aqueous extract of *Justicia procumbens*.

**Table 2: Minimum Inhibitory Concentration (MIC) in  $\mu\text{L}/\text{mL}$ . of *Justicia procumbens* extracts against Bacterial strains**

Solvent	Extract	<i>E.coli</i>	<i>P.florescence</i>	<i>B.subtilis</i>
Methanol	Leaf	150	200	100
	Stem	150	350	200
	Inf	150	200	100
	Roots			600
Aqueous	Leaf	-	-	150
	Stem	200	-	-
	Inf	150	-	-
	Roots	600	-	-

## RESULTS AND DISCUSSION

The present work deals with the study of different parts of *Justicia procumbens*, Its antimicrobial screening was done for which the results supports the traditional usage of the studied plants and suggests that the plant extracts possess compounds with antimicrobial properties that can be used as antimicrobial agents in new drugs for the therapy of infectious diseases caused by pathogens. The results suggested that minimum concentration of *Justicia procumbens* extracts inhibit the growth of various pathogenic bacteria. This activity may be due

to different chemical compounds present in extracts including flavonoids, triterpenoids, essential oils and natural phenolic compounds or free hydroxyl groups which are classified as active antimicrobial compounds. It was reported that *Justicia procumbens* possesses high antibacterial activity like antibacterial Kanamycin antibiotic.

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