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ORIGINAL ARTICLE **OPEN ACCESS**

Antimicrobial Activity and Phytochemical Analysis Of Leaf, Stem And Flower Extracts Of *Lantana camara*.

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ABSTRACT
Phytochemicals are compounds produced by plants to help them thrive or thwart competitors, predators or pathogens. The present work is done to evaluate the phytochemical analysis of extracts of leaves, stem and flower of Lantana camara. The antimicrobial activity of varying concentrations of solvent extracts of the plants against the pathogens Shigella sonei, Escherichia coli, Staphylococcus aureus, Proteus vulgaris and Salmonella typhi was investigated by the zone of inhibition in disc diffusion method. Phytochemical screening of the plant extract was done for steroid, tannin, saponin, anthocyanin coumarin, alkaloids, proteins amino acids, phytosterol, leucoanthocyanin, cardiac glycosides and flavonoids. The investigation showed that the plant showed good antimicrobial activity against the selected pathogens and showed presence of certain useful phytochemicals.
Key words: *Lantana camara, phytochemicals, disc diffusion method, antimicrobial activity.*

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INTRODUCTION

An antimicrobial activity is the inhibition of microbial growth by production of antibiotics. Phytochemicals are chemical compounds produced by plants to thwart competitors, predators or pathogens [1]. Phytochemicals are under research for their possible health effects. These are extracted and isolated to define their structure and tested in the laboratory model systems to identify the specific role in given biological activity and its physiological action on the human body.*Lantana camara,* a small perennial shrub, is known to produce various phytochemicals possessing antimicrobial, fungicidal and insecticidal properties [2]. So the present study was carried out to explore the plant *Lantana camara* for its antimicrobial activity on various pathogens and its phytochemical analysis.

MATERIAL AND METHODS

The stem, leaves and flower and *Lantana camara* were collected from Karad region. These were washed, dried in shade and powdered. The solvents acetone, methanol, ethanol, hot water and cold water were used to extract the active agents from *Lantana camara*. The extracts were made by mixing 5g of dried powder in the solvents, leaving it overnight at 28^0Cand filtering it. This was used as the stock solution to make different solutions of varying concentrations [3]. The suspensions of 18 hrs old cultures of *E. coli, Staphylococcus aureus, Shigella sonei, Salmonella typhi* and *Proteus mirabilis* were used to determine the antimicrobial activity of the extracts by disc diffusion method on Muller Hinton agar plate. The plates after spreading 0.1ml of bacterial suspension and the disc of extracts were kept for diffusion for 5 min. After keeping the discs on the plates, the plates are incubated at 28^0C for 24 hrs and observed for zone of inhibition. The phytochemical analysis of the extracts for the presence of steroids, tannin, saponin, anthocyanin, coumarin, alkaloids (Wagner test), proteins (Xanthoproteic test), amino acids (Ninhydrin test), phytosterol (Salkowskis test and Phenol ferric Chloride test), leucoanthocyanin, cardiac glycosides (Keller-Killani test) and flavonoids (Alkaline reagent test) was done [4].

RESULTS AND DISCUSSION

Table 1 shows that the maximum inhibition was seen in 200mg/ml stem extracts in methanol and acetone with zone of 11mm and 12mm against *Salmonella typhi*. *Shigellasonei* was inhibited by 200 mg/ml ethanol extract showing inhibitory zone of 10mm.Table 2 shows the inhibition by 200mg/ml ethanol extract of leaves on *Escherichia coli* with a zone of 11mm and acetone extract of leaves with zone of 13mm against *Salmonella typhi*. Table 3 shows that the maximum inhibition was in 200mg/ml acetone extract of flowers with zone of 13mm against *Salmonella typhi*. *Escherichia coli* was inhibited by 200 mg/ml ethanol extract showing inhibitory zone of 12 mm. *Staphylococuus aureus* was affected by 200 mg/ml of acetone extract with an inhibitory zone of 11mm. Table 4 shows that steroids, alkaloids, proteins, cardial glycosides and flavonoid are present in all the extracts.

Table 1: Inhibitory zone diameter of stem extracts of *Lantana camara.*

Name of test organisms	Diameter of zone inhibition (mm) width													
	Ethanol extract (mg/ml)				Methanol extract (mg/ml)				Acetone extract(mg/ml)				Hot water	Cold water
	Control	50	100	200	Control	50	100	200	Control	50	100	200	-	-
Staphylococuus aureus	4	5	6	9	5	7	8	8	4	6	7	8	-	-
Escherichia coli	4	6	7	7	5	7	8	8	4	6	7	8	-	-
Shigella sonei	4	7	8	10	4	5	7	8	4	5	8	9	-	-
Proteus vulgaris	4	6	6	7	4	7	8	9	5	7	8	9	-	-
Salmonella typhi	4	6	7	8	4	7	9	11	5	9	12	12	-	-

Table 2: Inhibitory zone diameter of leaves extracts of *Lantana camara.*

Name of test organisms	Diameter of zone inhibition (mm) width													
	Ethanol extract (mg/ml)				Methanol extract (mg/ml)				Acetone extract (mg/ml)				Hot water	Cold water
	Control	50	100	200	Control	50	100	200	Control	50	100	200	-	-
Staphylococuus aureus	4	1	2	5	2	6	6	7	5	5	6	8	-	-
Escherichia coli	4	7	9	11	2	4	4	5	5	3	4	4	-	-
Shigella sonei	4	7	7	6	2	5	4	5	2	3	5	6	-	-
Proteus vulgaris	4	5	7	3	2	3	3	4	4	3	3	6	-	-
Salmonella typhi	3	4	7	8	3	5	6	7	5	8	11	13	-	-

Table 3: Inhibitory zone diameter of flower extracts of *Lantana camara.*

Name of test organisms	Diameter of zone inhibition (mm) width													
	Ethanol extract (mg/ml)				Methanol extract (mg/ml)				Acetone extract(mg/ml)				Hot water	Cold water
	Control	50	100	200	Control	50	100	200	Control	50	100	200	-	-
Staphylococuus aureus	2	10	11	7	3	7	9	10	5	4	10	-	-	-
Escherichia coli	2	6	7	12	2	6	8	9	5	8	9	10	-	-
Shigella sonei	2	6	7	8	2	3	6	7	5	7	9	10	-	-
Proteus vulgaris	3	10	11	7	2	3	4	7	4	5	8	10	-	-
Salmonella typhi	3	9	11	12	3	5	7	9	5	10	11	13	-	-

Table 4: Results of phytochemical analysis of stem, leaves and flowers extracts in ethanol, methanol and acetone, hot and cold water of *Lantana camara.*

Phytoconstituents	***Lantana camara* extracts**								
	Ethanol			Methanol			Acetone		
	Leaves	Stem	Flower	Leaves	Stem	Flower	Leaves	Stem	Flower
Steroids	+	+	+	+	+	+	+	+	+
Tannin	-	-	-	+	+	-	-	-	-
Saponin	+	-	-	+	+	-	+	-	-
Anthocyanin	-	-	-	-	-	-	-	-	-
Coumarin	+	+	+	-	+	+	+	+	+
Alkaloids	+	+	+	+	+	+	+	+	+

Proteins	+	+	+	+	+	+	+	+	+
Amino acids	-	-	+	-	-	+	-	-	+
Phytosteroid	+	+	+	+	-	+	+	+	+
Phenol	+	+	+	+	-	+	+	+	+
Leucoanthocyanin	-	-	-	-	-	-	-	+	-
Glycosides	+	+	+	+	+	+	+	+	+
Flavonoid	+	+	+	+	+	+	+	+	+

(+) sign indicates positive results (-) sign indicates negative results

SUMMARY AND CONCLUSION

The stem, leaves and flower extracts of *Lantana camara* showed maximum antimicrobial activity against the pathogens *E. coli, Staphylococcus aureus, Shigella sonei, Salmonella typhi* and *Proteus mirabilis.* The stem, leaves and flower extracts in hot and cold water showed no antimicrobial activity and maximum inhibition was seen in 200mg/ml stem extracts in methanol and acetone with zone of 11mm and 12mm against *Salmonella typhi*. *Shigella sonei* was inhibited by 200 mg/ml ethanol extract of stem. The leaves extracts showed maximum inhibition was in 200mg/ml acetone extract with zone of 13mm against *Salmonella typhi*. The flower extracts showed maximum inhibition in 200mg/ml in acetone extract with zone of 13mm against *Salmonella typhi*. *Escherichia coli* was inhibited by 200 mg/ml ethanol extract of flowers showing inhibitory zone of 12 mm. *Staphylococuus aureus* was not affected by 200 mg/ml of ethanol and acetone extract of flowers. Phytochemical investigation of *Lantana camara* in various extracts revealed the presence of many active phytoconstituents like saponin, coumarin, alkaloids, cardiac glycosides, tannin, steroid, flavonoid, protein, anthocyanin, amino acids, leucoanthocyanin and phytosterols.

CONFLICT OF INTEREST

There is no conflict of interest.

AUTHOR'S CONTRIBUTION

The author along with Jadhav A. A. had done the laboratory work. Manuscript was written by the author. Dr. G. R. Pathade had proofread the manuscript.

ETHICS STATEMENT:

No work on human and animals was done during the study to harm them.

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