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ANTIBACTERIAL ACTIVITY OF WITHANIA SOMNIFERA LEAF EXTRACTS

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ABSTRACT

Withania somnifera is an important medicinal plant used in ayurvedic system of medicine since ancient times. The plant have potential to treat arthritis and rheumatism diseases so attention has been drawn to study antibacterial activity of the plant to challenge on antibacterial resistant pathogens. Four solvent extracts from leaves of *withania somnifera* tested against four test human pathogens viz., *Staphylococcus aureus, Bacillus subtilis, Escherichia coli*.

Keywords- *Withania somnifera, antibacterial activity,human pathogens.*

I. INTRODUCTION

Withania somnifera (solanaceae) commonly known as ashwagandha, Indian ginseng & winter cherry [1], an important herb in ayurvedic and used as Indian medicinal plant for over 3000 years. Leaves of this plant have been used as remedy against number of health disorders such as rashes, syphilis, ulcers, stomach-ache, painful swellings [2], protection against allergies, anti-inflammatory [3 & 4]. In the present study, we evaluated antibacterial activity of *withania somnifera*, leaf extracts using different solvents.The plant is used widely against several diseases so this is the reason to evaluate antibacterial activity of this leaf extracts, which provide another advantage to users.

II. MATERIAL AND METHODS

Collection of plant materials

Withania somnifera leafs were obtained from government agriculture college Indore (M.P) India. The leaves were washed thoroughly with running tap water; shade dried and powder using mechanical grinder. The powdered material was stored in air tight bottles for further analysis.

Preparation of extract from leaves

The different solvents like methanol, , ethanol, acetone were used for extractions. Approximately 10 grams of powdered leaf material was dissolved in different solvents in a conical flask and kept at room temperature in a rotatory shaker for 48 hours. Then it was allowed to filtered using whatmann no.1 filter paper, allowed to evaporate and stored in air tight bottles for further use.

Microrganism collection and maitainance

The bacterial pathogens *Staphylococcus aureus*(ATCC6538), *Bacillus subtilis*(ATCC2063), *Escherichia coli*(ATCC2065), were procured from Himedia Mumbai.

Disc diffusion assay

Antibacterial tests were carried out by the disc diffusion method[5]. The discs (6mm in diameter) impregnated with leaf extractions of *withania somnifera* were placed on the pathogens inoculated agar plates. The plates were incubated at room temperature for 24 hours. Antimicrobial activity was evaluated by measuring the zone of inhibition (mm) against the test organisms.

III. RESULTS AND DISCUSSION

Screening of natural product is the need of hour in search of new antibacterial agents that would be active against the microoraganism[6]. In the present investigation, the antibacterial activity of acetone, ethyl acetate, methanol leaf

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extracts of withania somnifera was evaluated against gram-positive and gram-negative bacteria. Tabulated results of the experiment are shown in the table 1, 2, 3 and antibiotic levofloxacin is taken as positive control as an antibacterial antibiotic. Table 1 acetone extract of *withania somnifera* leaf extract show maximum antibacterial activity against the test bacteria S. aureus at 25% and 50% concentration and minimum for E.coli at same concentration whereas ethyl acetate extract of withania somifera leaf extract show maximum zone of inhibition against the test organism E.coli at 75% and 25% concentration and minimum for P.aeruginosa. The positive control antibiotic levofloxacin show maximum zone of inhibition for P.aeruginosa and E.coli and minimum zone of inhibition for S.aureus.

Table no. 1: Antibacterial activity of withania somnifera (Acetone extract)

S.no	Bacteria name	25%	50%	75%	100%
1	E.coli	10mm	11mm	11mm	12mm
2	P.aeruginosa	10mm	14mm	11mm	14mm
3	S.aureus	15mm	15mm	10mm	12mm

Table no.2: Antibacterial activity of withania somnifera (ethyl acetate extract)

S.no	Bacteria name	25%	50%	75%	100%
1	E.coli	20mm	13mm	14mm	13mm
2	P.aeruginosa	10mm	10mm	10mm	10mm
3	S.aureus	10mm	10mm	12mm	11mm

Table no.3:- Antibacterial activity of withania somnifera (methanol extract)

S.no	Bacteria name	25%	50%	75%	100%
1	E.coli	12mm	13mm	16mm	15mm
2	P.aeruginosa	11mm	10mm	10mm	10mm
3	S.aureus	10mm	10mm	14mm	11mm

Table no.4:- Antibiotic Levofloxacin as positive control.

S.no	Bacteria name	Zone of inhibition
1	E.coli	18mm
2	P.aeruginosa	22mm
3	S.aureus	17mm

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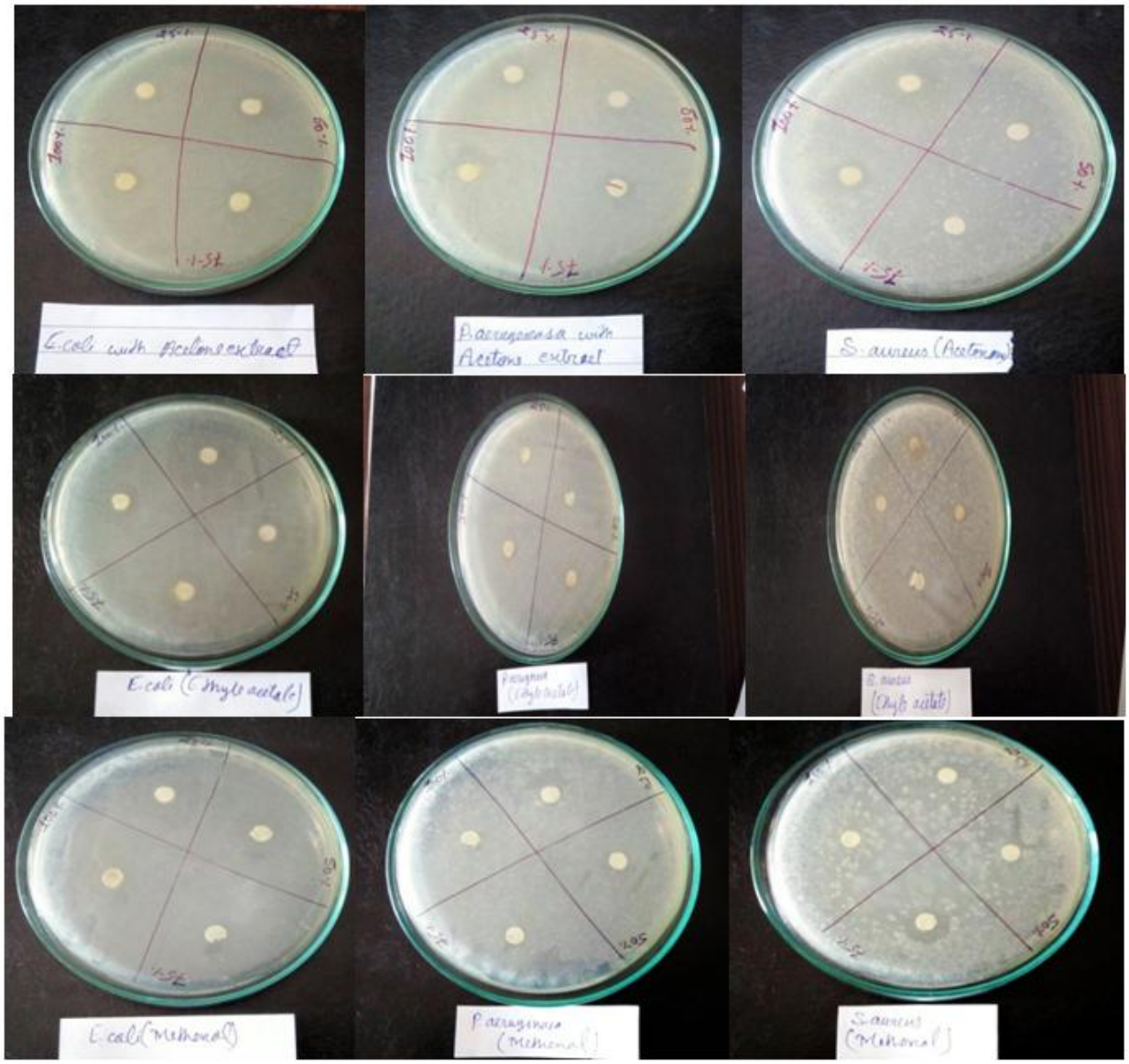

Fig1: Plates Showing zone of inhibition in different solvent against bacteria.

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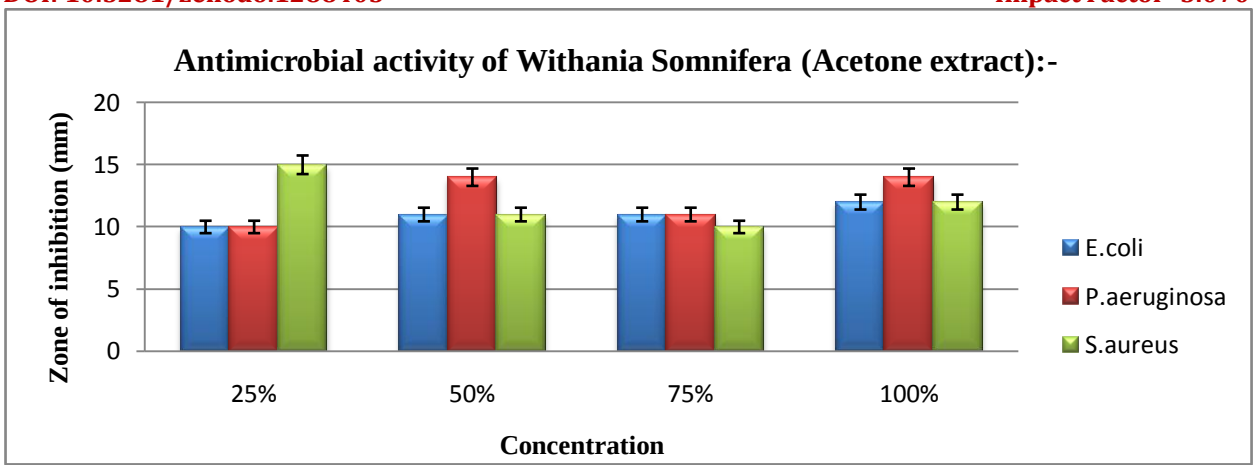

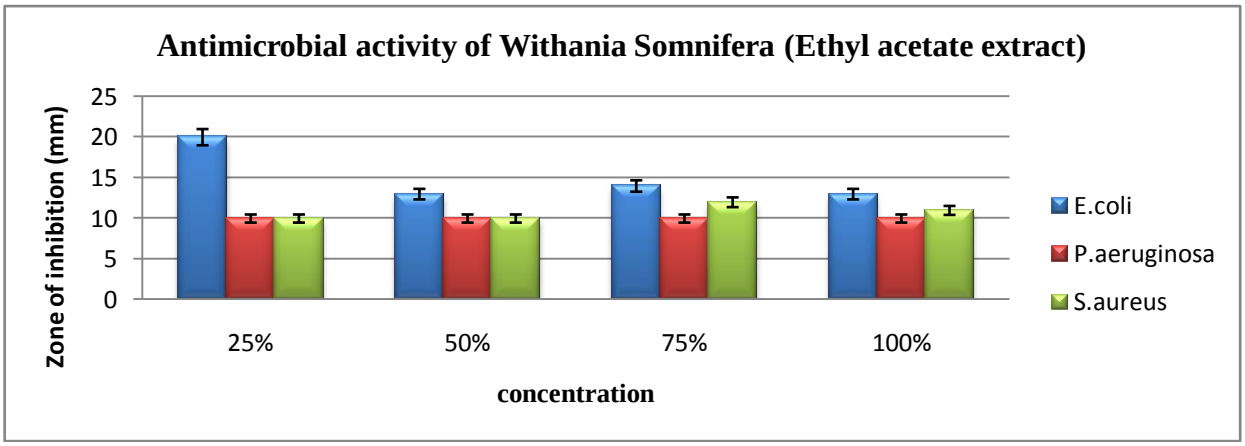

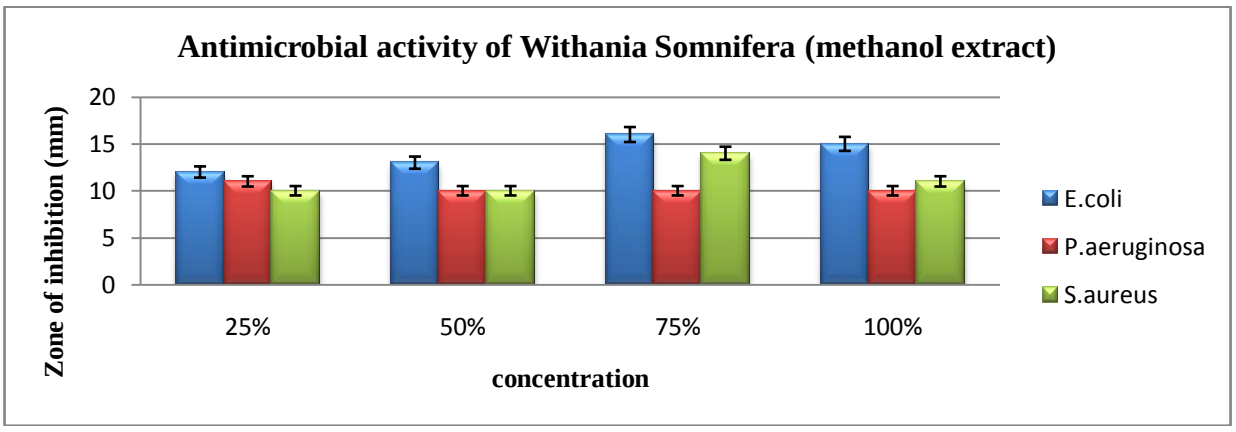

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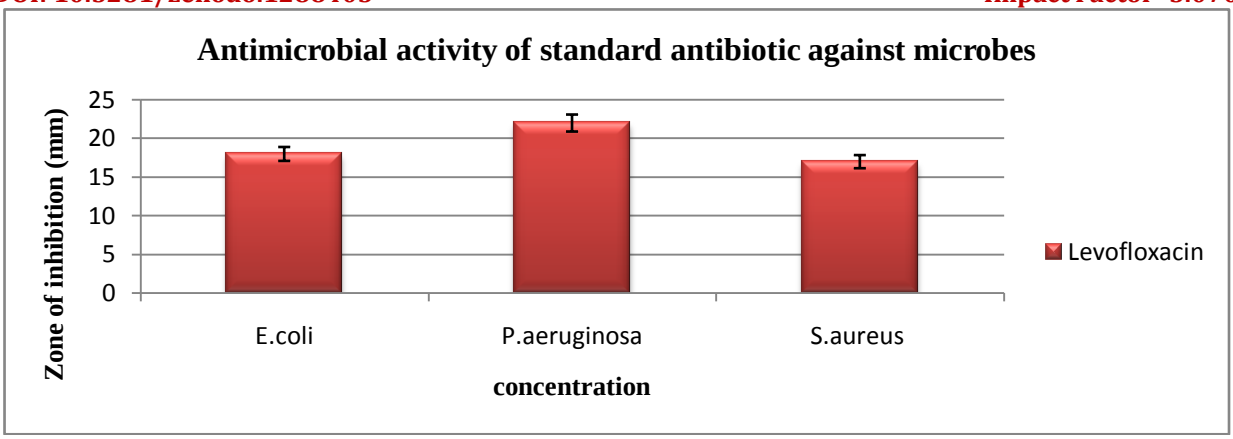

IV. CONCLUSION

A detailed antibacterial activity was carried out on *withania somnifera* leaf extracts in different solvents. Although the antibacterial study of leaf extract is found less. But in present study acetone and methanol extract show highest antibacterial activity and ethyl acetate show lowest activity. The leaves extracts of *withania somnifera* have antibacterial activity which can be useful to study biocontrol activity.

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