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Antibacterial Activity of Various Extract of *Mucuna Pruriens Linn. Seeds*

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A B S T R A C T

Antibacterial activity of different extract of seeds of *Mucuna pruriens was examined.* The antibacterial activity of different extract of *each of* 50 mg/ml concentrations was determined by disc diffusion method with various gram positive and gram negative bacteria. The antibacterial activity was found significantly higher in ethyl acetate extract against all the selected pathogenic bacteria. The petroleum ether and aqueous extract was found inactive. The finding of results suggested that the strongest antibacterial effect was observed in the ethyl acetate extract against *S. Typhi and S. Aureus (36 mm*), *Pseudomonas (*29 *mm), B. Subtilis (28 mm*) followed by *E. coli* (26 mm inhibition zone), as compare to positive control range from 15 mm to 26 mm against all bacterial species therefore this study indicates that ethyl acetate extract possesses potential antibacterial activity.

Keywords: *Mucuna pruriens,* Antimicrobial activity, disc diffusion method, pathogenic bacteria.

A R T I C L E I N F O

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1. Introduction

The *Mucuna pruriens Linn. Belongs to* Fabaceae family, the most popular drug in Ayurvedic system of medicine is commonly known as Kewanch or Kaunch and Velvet bean[1-2]. This climbing annual legume plant, is widely

present in tropical and sub-tropical regions of the world. Whole *Mucuna* plant contain valuable medicinal properties [3]. The seed of *Mucuna pruriens* possess varieties of pharmacologiacal activities such as antimicrobial, anti-inflammatory, antidiabnetic, aphrodisiac, antioxidant, neuroprotective, antiprotozoal, analgesic, antivenom, Anthelmintic , anti-parkinsonism activity etc. [4-6] . Presently lives saving drugs are mostly prepared from medicinal plants. About 80% of the world's population even today relies on traditional medicines for their primary health care needs according to world health organization. Medicinal Plants were used for treating various diseases from ages in the world especially developing countries were dependence on traditional medicine for various diseases [7]. Medicinal plants offer new sources of biologically active chemical compounds as antimicrobial agents [8]. Infectious diseases are an important health hazard all over the world, both in developing and developed countries. Medicinal plants and microorganisms are rich sources (remedies for nearly all ailments) of secondary metabolites, which were the potential sources of useful drug and other useful bioactive products [9]. Thus there has been growing interest in the investigation of traditional medicine as an alternative form of healthcare and the development of microbial resistance to available antibiotics. The alternative route for the substitution of synthetic chemicals, side effects always creates problems has led to investigate the antimicrobial activity of medicinal plants. L-Dihydroxy phenyl alanine (L-DOPA) is a major constituent of the *Mucuna pruriens's* seeds. Various alkaloid constituents mucanadine, mucunine, prurienidine, purienine, epoxy fatty acids such as cis-12,13-epoxyoctadec-trans-9-cis-acid,cis-12,13-epoxyoctadectrans-9-enoic acid[10]. Recently three lipid derivatives were reported from n-hexane extract of seeds of *Mucuna pruriens* - (z)-Triactont-5,7,9-triene; (z)-Docos-2,4,6-trien-1,8-diol and (z)-Docos-5-en-1-oi acid[11]. This work has been done to evaluate the antibacterial activity of various extracts of seeds of *Mucuna pruriens* against five selected pathogenic bacteria of different strains by disc diffusion test. The ethyl acetate extract of seeds of *Mucuna Pruriens* found highly statically significant for all microorganism.

2. Materials and Methods

Collection of Seeds:

Mature seeds of Mucuna pruriens were collected from the tribal region of Mandla district, Madhya Pradesh. The Plant material was thoroughly cleaned, shade dried and powdered with the help of blender. 100g of the dried plant material was used for extraction.

Solvent extraction:

100g of powdered material was filled in thimble and sequentially extracted in soxhlet Apparatus with solvents of increasing polarity starting from petroleum ether, ethyl acetate, ethanol, and finally with water. Extracts were filtered by Whatman filter paper. Filtrate was then concentrated under reduced pressure and preserved at 5^oC in air tight bottle.

Antibacterial activity:

Antibacterial activity was carried out on four crude extract using standard method of agar disk diffusion. Pathogenic bacteria including gram positive and gram negative bacteria, *Escherichia coli, Salmonella typhi, Pseudomonas, Staphylococcus aureus, Bacillus subtilis* was used for testing. All the bacterial strains were obtained from Department of microbiology, Govt. Model Science College, Jabalpur. 50 mg/ml of plant extracts were used for the study. Standard antibiotic 50 mg/ml Chloramphenicol concentration was served as positive control. Sterilized filter paper discs (Whatman No. 1) 6 mm was saturated with filter sterilized plant extract. The impregnated discs were then placed on to the inoculated nutrient agar medium plate [8, 12]. Plates were incubated at 37^oC for 24 hours. Antibacterial bacterial activity was determined by measuring the inhibition zone diameter around the disc. Zone of inhibition is indicated by the clear area around the disc, which shows no bacterial growth.

Statistical Analysis:

The experiments were replicated thrice. Observed data were subjected to analysis of variance (ANOVA) test using CRD design.

3. Results and discussions

are indicated in Table-1, the values of zone of inhibition for ethyl acetate extract were found at 26 mm, 36 mm, 29 mm, 36 mm, and 28 mm against Escherichia coli, Salmonella typhi, Pseudomonas, Staphylococcus aureus, and *Bacillus subtilis* respectively, which were found statically highly significant. The zone of inhibition for positive control and ethanol was found to be 15 mm and 14 mm against E. coli which was found to be non-significant. The value of zone of inhibition against salmonella for positive control and ethanol were obtained 23 mm and 22 mm respectively which was also found to be non-significant. Positive control and ethanol showed zone of inhibition of 26 mm and 20 mm against Pseudomonas. The value for positive control was significant however, non-significant for ethanol. The zone of inhibition 23 mm and 16 mm was obtained for positive control and ethanol extract against S. aureus. However both values was found non-significant. Positive control and ethanol extract show zone of inhibition of 16 mm and 18 mm against Bacillus and both these values was found to be non-significant. No zone of inhibition was obtained by petroleum ether and aqueous extract against all bacterial species. Figure I & II clearly shows good result for ethyl acetate extract against *E. coli, S. typhi, Pseudomonas, S. aureus,* and *B. Subtilis*.

Table 1: Antibacterial Activity Of Different Extract Of *Mucuna Pruriens* Against Different Bacterial Species

Plant Extract (50mg/ml)	**Test organism**				
	Zone of Inhibition (in mm)				
	E. coli	***S. typhi***	***Pseudomonas***	***S. aureus***	***B. Subtilis.***
Petroleum ether	0 (0.707)	0 (0.707)	0 (0.707)	0 (0.707)	0 (0.707)

Ethyl acetate	26 (5.148)	36 ((6.042)	29 (5.431)	36 (6.042)	28 (5.339)
Ethanol	14 (3.808)	22 (4.743)	20 (4.528)	16 (4.062)	18 (4.301)
Aqueous extract	0 (0.707)	0 (0.707)	0 (0.707)	0 (0.707)	0 (0.707)
Positive control	15 (3.937)	23 (4.848)	26 (5.148)	23 (4.848)	16 (4.062)
Fcal	97.105	415.333	102.413	597.5	65.647
Df	10	10	10	10	10
SED	0.918	0.632	1.135	0.516	1.22
SEM±	0.649	0.447	0.802	0.365	0.869
CD at 5%	1.876	1.291	2.318	1.054	2.510

*Values inside the parentheses are the square root transformations of original values.
Values outside the parentheses are back transformed means of original values.

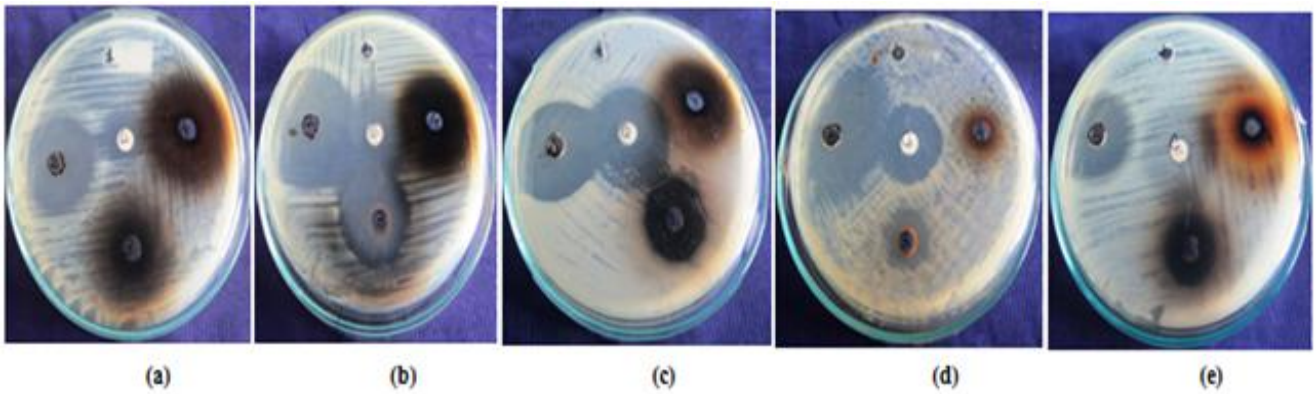

Figure 1: Zone of Inhibition produced by (a) *Escherichia coli*, (b) *Salmonella typhi*, (c) *Pseudomonas*, (d) *Staphylococcus aureus*, (e) *Bacillus subtilis* with 1. Petroleum ether extract, 2. Ethyl acetate extract, 3. Ethanol, 4. Aqueous extract and 5. Positive control

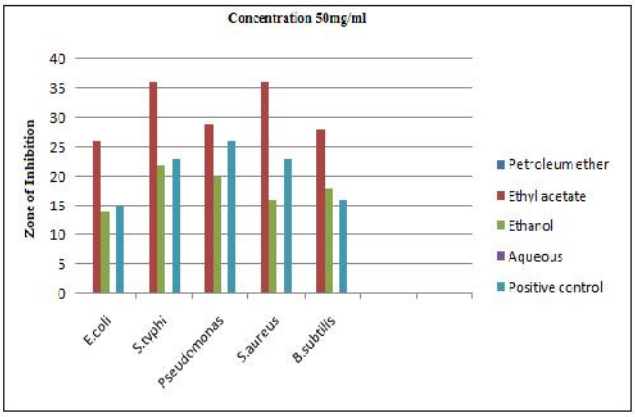

Figure 2: Graphical representation of antibacterial activity of various extract of Mucuna Pruriens's seeds

Discussion: Findings obtained from present study revealed that ethyl acetate extract of *Mucuna pruriens's* seeds possess potential antibacterial activity against *Escherichia coli, Salmonella typhi, Pseudomonas, Staphylococcus aureus,* and *Bacillus subtilis*. Table 1, indicates maximum activity against *Salmonella typhi, S. aureus and* least activity against *E. coli*. Murugan M and Mohan VR found similar finding for petroleum ether and aqueous extract [13]. V Bala et. al. also found significant results for E. coli and S. aureus in 50% aqueous ethanol extract[14].

4. Conclusion

From the results we conclude that ethyl acetate extract of seeds of Mucuna Pruriens showed maximum zone of inhibition as compared to positive control against all bacterial species therefore it possesses potential antibacterial activity against E. coli, S. typhi, Pseudomonas, S. aureus, and B. Subtilis. Whereas ethanol extract showed satisfactory zone of inhibition only against B. Subtilis as compared to positive control.

5. Acknowledgements

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