STUDIES ON EFFECTS OF SEED AND LEAF EXTRACTS OF *Mucuna pruriens* ON SOME COMMON BACTERIAL PATHOGENS

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ABSTRACT

The present study was carried out to evaluate the antibacterial activities of seed and leaf extracts of *Mucuna pruriens* against some common bacterial pathogens. Three extracts such as acetone, methanol and ethanol were prepared for the present study. Agar Well Diffusion method was used for evaluating antibacterial activities. Results suggested that the methanol extract of leaves of *Mucuna pruriens* showed more antibacterial activities against test bacteria with the zone of inhibition ranging between 12mm to 54mm compared to ethanol and acetone extracts used in concentration of 0.05 g/ml. Methanol extract of seeds at concentration of 1g/ml showed maximum inhibitory activities. The results obtained in the study showed that *Mucuna pruriens* extract can be a potential source of natural antibacterial agent.

Key Words: *Mucuna pruriens*, Antibacterial activities, Agar diffusion, Ethanol, Acetone, Bacterial pathogens

INTRODUCTION

Medicinal plants exhibit antibacterial activities.\(^1\) Medicinal plants are the local heritage with global importance. They have curative properties due to presence of various complex chemical substances of different compositions. About 2000 plant species are considered to have medicinal value. Study of modern herbalism is rapidly evolving throughout the world. Today herbal remedies are coming back into prominence because the efficacy of the conventional medicines such as antibiotics which one had near universal effectiveness against serious infections is on the wane. Herbal medicines offer conventional treatments providing safe well tolerated remedies for chronic illnesses. *Mucuna pruriens* is an herbaceous twinning annual which belong to family fabaceae. some of the common names include cow itch, common cow itch, cowhage, kaunch, kanchkuri, alkushi etc. The roots are bitter, sweet, thermogenic, emollient, stimulant, aphrodisiac, diuretic purgative, emmenogouge, antihelminthic, febrifuge and tonic. The leaves are aphrodisiac and tonic useful in ulcers, inflammation and general debility. The seeds are astringent anthelmintic alexipharmic and useful in gonorrhea, sterility and consumption. *Mucuna pruriens* is cultivated in certain regions for high levodopa content of its seeds confirmed their efficacy in the treatment of Parkinson’s disease. In the Indian Ayurvedic medicine (Indian traditional medicine) Parkinson’s disease was treated with the natural products obtained from *Mucuna pruriens* seeds now known to contain L-dihydroxyphenylalanine (L-DOPA).\(^2\) In addition to L-DOPA seeds also contains proteins, oils and traces of manganese and also contains several alkaloids. Treatment with *Mucuna pruriens* has been found to regulate steroidogenesis and improves semen quality in infertile men and also found to increase the level of testosterone.\(^3\) *Mucuna pruriens* itch producing property is attributed to the trichomes (hairs) present on the pods. It has been observed that this unique property is accounted by the presence of 5-hydroxy tryptamine (5-HT) in the hair.\(^4\) *Mucuna pruriens* has been reported to be anti-diabetic. It has been reported that *Mucuna pruriens* ethanolic seed extract possess anti-diabetic activities comparable with the standard drug glibenclamide.\(^5\)

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Mucuna pruriens has been extensively used as cover crop for enhancement of water infiltration, softening the soil, improvement of soil fertility and to control the weeds. It has been reported that the seed extract of Mucuna pruriens showed antivenom activities. There reports describes the seed powder of Mucuna pruriens helps in some way against stress, it increases secretion of semen and it acts as a restorative and an invigoring tonic or aphrodisiac in disease characterized by weakness or loss of sexual power. Mucuna pruriens has also been shown to be neuroprotective.

**AIMS AND OBJECTIVES**

The present work was carried out to study the antibacterial activities of seed and leaf extracts of Mucuna pruriens prepared in three different solvents methanol, ethanol and acetone.

**MATERIAL AND METHODS**

**Collection and processing of plant material**

**Collection of leaves**

Fresh green leaves were collected from the plant of Mucuna pruriens. The leaves were washed thoroughly 2-3 times with running water and once with sterile distilled water and then air dried in shade and powdered in mechanical grinder.

**Collection of seeds**

After drying, the pods were thrashed to remove mature seeds. The dried seeds were powdered in a mechanical grinder and extracted in solvents- methanol, ethanol and acetone.

**Preparation of leaf extract**

**Methanol extraction**

For this, extracted powdered leaf material 5g was weighted and dissolved in 100 ml of analytical grade solvent methanol. The methanol extract was filtered through Whatmann no.1 filter paper. The filtrate was evaporated and the residue was re-dissolved in small volumes of the same solvent methanol.

**Ethanol and acetone extraction**

5% ethanol extract and acetone extracts were also prepared by similar method as described for methanol extraction.

**Preparation of seed extracts**

**Methanol extraction**

For the preparation of methanol extract, 10g of seed powder was dissolved in 100 ml of analytical grade solvent methanol. The methanol extract was filtered through Whatmann no.1 filter paper. The filtrate was evaporated and the residue was re-dissolved in small volumes of the same solvent methanol.

**Test micro-organisms**

The bacterial cultures used for screening were Staphylococcus aureus, Salmonella typhi, Shigella dysenteriae, Bacillus subtilis, Escherichia coli, Pseudomonas aeruginosa.

**Study of antibacterial activities**

The antibacterial activity study was carried out by Agar Diffusion method. Bacterial suspensions in the quantity of 0.1 ml were aseptically introduced and spread on sterile nutrient agar plates. Three wells of about 6 mm diameter were prepared aseptically on each agar plate. One ml of each methanol, ethanol and acetone extracts of Mucuna pruriens were introduced into the wells in the plates. The negative control was also kept with 1 ml of the respective solvents viz. methanol, ethanol and acetone. Plates were kept in refrigerator for half an hour for diffusion of extract and then incubated at 37 °C for 24 hrs. Observations were recorded in the form of zone of inhibition measured in millimeter. Negative control showed no zone of inhibition against any test pathogen.

**RESULTS AND DISCUSSION**

The methanol seed extract of Mucuna pruriens showed strong antibacterial activities against two of the test pathogens i.e. Shigella dysenteriae and Bacillus subtilis compared to ethanol and acetone seed extracts. Methanol seed extract showed no inhibitory activities against Salmonella typhi and Pseudomonas aeruginosa while showed least antibacterial activities against Escherichia coli as indicated in Fig.1.
Fig. 1: Effect of seed extracts of *Mucuna pruriens*

The inhibitory effect of methanol, ethanol and acetone seed extracts of *Mucuna pruriens* on a test pathogen *Shigella dysenteriae* is as indicated in Fig. 2. The antibacterial effect of seed extracts of *Mucuna pruriens* on a test bacterial pathogen *Staphylococcus aureus* is as indicated in Fig. 3.

Fig. 2: Effect of methanol (M), ethanol (E) and acetone (A) extracts of seeds of *Mucuna pruriens* on *Shigella dysenteriae*

Fig. 3: Effect of methanol (M), ethanol (E) and acetone (A) extracts of seeds of *Mucuna pruriens* on *Bacillus subtilis*
Thus the methanol seed extract of *Mucuna pruriens* was more effective in regard to range of organisms inhibited than ethanol and acetone seed extracts. None of the extract inhibited the growth of *Salmonella typhi* and *Pseudomonas aeruginosa*.

![Graph showing zone of inhibition for different pathogens against methanol, ethanol, and acetone extracts]

**Fig. 4**: Effect of leaves extract of *Mucuna pruriens*

The effect of leaves extract of *Mucuna pruriens* is indicated in **Fig. 4** which showed that the methanol extract showed antibacterial activities against all the test pathogens. The ethanol extract inhibited all but not *Salmonella typhi* and *Bacillus subtilis* while the acetone extract showed least inhibitory effect inhibiting only *Staphylococcus aureus* and *Shigella dysenteriae*.

**CONCLUSION**

The present study strongly demonstrated that the methanol extracts of seeds and leaves of *Mucuna pruriens* were found to be more effective in inhibiting the test pathogens compared to ethanol and acetone extracts. On the basis of the results obtained in the present study, it can be concluded that methanol extract of *Mucuna pruriens* had significant antibacterial activities and may provide a support to use of the plant in traditional medicine.

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**REFERENCES**


We generate our own environment. We get exactly what we deserve. How can we resent a life we’ve created ourselves? Who’s to blame, who’s to credit but us? Who can change it, anytime we wish, but us?

Richard Bach