



**DERMATOLOGICAL PHARMACOLOGY OF AQUEOUS AND ETHANOL LEAF
EXTRACTS OF *MUCUNA PRURIENS***

*Ohadoma S. C. and Lawal B. A. S.

Department of Pharmacology, College of Medical Sciences, University of Calabar, Nigeria.

*Corresponding Author: Dr. Ohadoma S. C.

Department of Pharmacology, College of Medical Sciences, University of Calabar, Nigeria.

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ABSTRACT

Objective: To assess the dermatological activity of *Mucuna pruriens* leaf extracts with particular emphasis on the antifungal and wound-healing effects. **Methods:** The crude aqueous as well as ethanol extracts of the dried leaves of *M. pruriens* were obtained by 72 h maceration in water and ethanol respectively. The extracts were investigated employing modified agar-well diffusion method, while the wound-healing activity was determined using standard method, in which three groups comprising five mice each were used. Groups II and III received 10% and 20% extract/petroleum jelly (Vaseline) mixture respectively. Group I received Vaseline only and served as negative control. **Results:** The aqueous leaf extract showed lesser pronounced antifungal activity against *Aspergillus spp* and *Candida albicans* than the ethanol extract. Observed on wounds treated with 10% and 20% extract/Vaseline mixture was considerable signs of dermal healing compared to control (Vaseline) only. **Conclusion:** *Mucuna pruriens* leaf extracts accelerated wound-healing process and exerted antifungal effect in *albino mice*.

KEYWORDS: *Mucuna pruriens*, antifungal, wound-healing, dermatological activity, test microorganisms.

INTRODUCTION

Mucuna pruriens is a plant notorious for the extreme pruritus (itchiness) it causes upon body contact. This is particularly with the young foliage and seed pods. It is an annual, climbing shrub with long vines that can reach over 15 m in length. *M. pruriens* is found in Africa, India and the Caribbean; also known as cowitch or velvent bean.^[1] On aging it is almost free of hairs but when the plant is young, it is almost covered with fuzzy hairs. The leaves of *M. pruriens* are tripinnate, orate, reverse ovate, rhombus-shaped or grooved with a pointy tips.^[1] *M. pruriens* possess antidepressant tendency in cases of depressive neurosis and management of Parkinson's disease.^[2,3] It is reputed in ethnomedicinal setting against mycotic infections^[4] and as a toxin antagonist for various snake bites as well as prophylactic intervention of snake bites against *Naja spp* (Cobra), *Echis* (saw scaled viper), *Calloselasma* (Malayan pit viper), *Bangaganis* (Krait).^[1]

M. pruriens as a leguminous plant fixes nitrogen and fertilizes the soil hence used as an important forage, fallow and green manure crop.^[1] Raw, unrefined moist tobacco or cowdung is traditionally applied to treat and ameliorate the itching caused by the spicules of *M. pruriens*.^[3] This study was to assess the folkloric antifungal and wound-healing effects of the leaf extracts of *M. pruriens*.

MATERIAL AND METHODS

Plant material

The official identification of leaves of *Mucuna pruriens* collected from Owerri, Imo State, Nigeria was done by Dr. F.N. Osuala, Department of Pharmacognosy, Madonna University, Nigeria where a voucher specimen has been deposited in the Herbarium. The leaves of *M. pruriens* were air-dried at room temperature for 28 days and pulverized into fine powder. The powdered leaves of *M. pruriens* (1 kg) was extracted via maceration with water and ethanol (Sigma Aldrich, Germany) respectively, for 72 h. The resultant extracts were filtered, evaporated using a rotary evaporator (RV 05 Basic 1B, 1KA Staufen, Germany) and the concentrated extracts preserved in a refrigerator. Phytochemical analysis of the extracts were screened.^[5]

Animals

A total of 9 mice (18-32 g) of both sexes were employed in this study. The animals were maintained under standard laboratory situations and had free access to pellets (Vital Feeds Plc, Nigeria) and clean water. Prior to experimental uses, the mice were transferred to work area and allowed for two weeks acclimatization.

Test Organizations

Pure clinical isolates of *Penicillium spp*, *Aspergillum spp*, and *Candida albicans* were obtained from medical

laboratory unit of Madonna University Teaching Hospital, Elele, Nigeria.

Antifungal Sensitivity testing

By measuring the diameter zones of inhibition in millimeters produced after incubation, antifungal activity of *M. pruriens* was determined.^[6] Fluconazole (0.05%) was used as control.

Wound-healing activity

The aqueous extract of *M. pruriens* powdered was mixed with petroleum jelly in different concentrations of 100 mg extract / g petroleum jelly, w / w (10%) and 200 mg extract / g petroleum jelly, w / w (20%). Petroleum jelly only was used as control. An area of uniform wound (1.5 cm/m diameter) was excised from the nape of the neck of all the animals with the aid of round shape sterile object.

Group I mice were treated with pure petroleum jelly only twice daily and served as control.

Groups II and III received 10% and 20% mixture respectively, twice daily. The healing time was recorded in each group. This is in accordance with modified method of Mahmood *et al.*^[7]

Statistical analysis

Results were expressed as mean \pm standard error of mean (SEM). Comparisons between the groups in term of the mean of wound-healing was calculated using students t-test.^[7]

Table 11: Wound healing time of *Mucuna pruriens* leaf extracts in rodents.

Group	No. of Mice	Treatment	Healing time (days) (mean \pm SEM)
I (control)	3	Vaseline only	28.00 \pm 0.16
II	3	10%/g Vaseline	22.33 \pm 0.21
III	3	20%/g Vaseline	18.67 \pm 0.13

Table 111: Antifungal activity of *Mucuna pruriens* leaf extracts.

Test	Mean diameter zone of inhibition (mm) SEM.		
	Fungal Organisms		
Extract (400 mg / ml)	<i>C. albicans</i>	<i>Penicillium spp.</i>	<i>Aspergillum spp.</i>
Aqueous	5.70 \pm 0.13	-	-
Ethanol	7.20 \pm 0.14	6.20 \pm 0.17	5.70 \pm 0.13
Fluconazole	8.10 \pm 0.17	8.70 \pm 0.13	9.10 \pm 0.11

DISCUSSIONS

The extract of *M. pruriens* according to the results obtained from this study possess both antifungal and wound-healing effects. This may not be unconnected with the presence of plethora of phytochemicals including saponins, steroids, glycosides, phenolics, tannins, flavonoids and alkaloids found in *M. pruriens* which corroborate previous documented evidences that plants containing most of these, usually possess antifungal^[8,9,10] and wound-healing^[7] activities. Effective antifungal activity of *M. pruriens* against *Candida albicans*, *Penicillium spp.* and *Aspergillum spp.* known to be pathological to human, makes this plant handy towards controlling diseases caused by them. Any agent

RESULTS

The phytochemical analysis revealed the presence of saponins, steroids, glycosides, phenolics, tannins, flavonoids and alkaloids (Table I). The antifungal studies indicated that *M. pruriens* leaf extracts exhibited varying degree of activities against *Penicillium spp.*, *Aspergillum spp.*, and *Candida albicans*. Ethanol extract of the leaf manifested pronounced antifungal effect compared to the aqueous extract. The order of inhibition was mostly significant ($P < 0.05$) against *Candida albicans* than *Penicillium spp.* and least against *Aspergillum spp.* (Table III). The aqueous leaf extract of *M. pruriens* in the wound-healing studies showed accelerated progression of wound-healing activity (Table II). Compared to the control (petroleum jelly only), wound treated with 10 and 20 percent preparations showed significant ($P < 0.05$) dermal healing.

Table 1: Phytochemical analysis of *Mucuna pruriens* leaf extracts.

Phytochemicals	Results
Saponins	++
Steroids	++
Glycosides	+
Phenolics	++
Tannins	++
Flavanoids	++
Alkaloids	+++

Key: +++ = High; ++ = Moderate; + = Low;

that can inhibit the growth of organisms can also check diseases caused by those organisms. This statement agrees to the works of many researchers.^[11,12,13] The ethanol extract showed pronounced activity against fungi in comparison with the aqueous extract. This outcome was because organic solvents (ethanol) extracted more phytochemicals recognizing that the active constituents are both polar and non polar which are extracted mainly via organic solvent medium. This is in consonance with organic solvent extractions being suitable in authenticating antifungal properties of medicinal plants.^[14,15]

Another segment of this work showed that aqueous extract of *M. pruriens* leaf accelerated progression of wound-healing activity. By this, suggestion may be proffered that it contains proteolytic enzymes reputed for effectiveness in dislodging necrotic tissue as well as preventing infection. The leaf extract of *M. pruriens* was found to contain flavonoids among other phytochemicals. Flavonoids are noted for their antioxidant activity as well as effective scavengers of superoxide anions, therefore, *M. pruriens* may possess hepatoprotective activity.^[16,17]

CONCLUSION

This work demonstrated that *M. pruriens* leaf extract exerted wound-healing as well as antifungal effects and hence justified its ethnomedicinal application.

Conflict of Interest: We declare that we have no conflict of interest.

Source of support: Nil.

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