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Pharmacological Assessment of *Mucuna Pruriens* Leaf Extrects for Antifungal and Wound Healing Effects

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Abstract:

Objectives: *To asses the antifungal and wound healing effects of the leaf extracts of Mucuna pruriens.* ***Material and Methods:*** *The crude ethanol and aqueous extracts of the dried leaves obtained by 72h maceration in ethanol and water respectively were evaluated using modified agar-well diffusion method; and the wound healing activity by standard method, in which three groups comprising three mice each were used. Group 2 and 3 received 10% an 20% extract/petroleum jelly mixture respectively, while Gruop1 served as negative control and received only petroleum jelly.* ***Results:*** *The ethanol leaf extract showed more pronounced antifungal activity than the aqueous extract. Wounds treated with 10% and 20% extract petroleum jelly, showed compared to petroleum jelly only (control).* ***Conclusion:*** *The leaf extracts of M. pruriens exert antifungal effect and acceleration of wound healing process in albino mice.*

Keywords: *Mucuna pruriens, antifungal effect, wound healing effect, test organisms.*

1. INTRODUCTION

Mucuna pruiens is also known as Cowitch or velvent bean [{1}].It is an annual, climbing shrub with long vines that can reach over 15 m in length, found in Africa, India and the Caribbean. The plant is notorious for the extreme pruritus or itchiness it causes on body contact, particularly with the seed pods and young foliage. When the plant is young it is almost covered with fuzzy hair, but on aging, it is almost free of hairs. And the leaves are tripinnate, orate, reverse orate, pointy[{1}]. *Mucuna pruriens* is reputed as a toxin antagonist for various snake bites agains *Naja spp* (cobra), *Echis* (saw scaled viper), *Calloselasma* (Malayan pit viper), *Banganis* (krait) as well as prophylactic treatment of snake bites [{1}]. It has been found to possess antidepressant properties in case of depressive neurosis, management and treatment of Parkinson's diseases [{2,3}] *Mucuna pruriens* is used as an important forage, fallow and green manure crop [{1}].It fixes nitrogen and fertilizes the soil since the plant is a legume. Traditionally, raw, unrefined moist tobacco or cowdung is applied to treat the itching caused by the spicules of this plant [{3}]. This study was undertaken to assess the antifungal and wound healing effects of the leaf extracts of *Mucuna pruriens.*

2. MATERIALS AND METHODS

2.1. Collection and Identification of Plant

Leaves of *Mucuna prupriens* were collected from Owerri, Imo State, Nigeria and official identification was done by Pharm. F.N. Osuala, Department of Pharmacognosy, Madonna University, where a voucher specimen has been deposited in the herbarium. The leaves were air-dried at room temperature for 28 days and pulverized into fine powder. The powdered leaves (1 kg) was extracted by maceration with ethanol (Sigma Aldrich, Germany) and water respectively for 72 h. The extracts were filtered, evaporated using a rotary evaporator (RV 05 Basic, 1B, 1KA Staufen, Germany) and the concentrated extracts stored in a refrigerator. Phytochemical screening of the extracts were carried out [{4}].

2.2. Animals

Nine (9) mice (18-32 g) of both sexes bred in the Laboratory Animals facility of the Department of Pharmacology and Toxicology, Madonna University, Elele, were used in this study. The animals were maintained under standard laboratory situations and had free access to standard pellets (Vital feeds

Plc, Nigeria) and clean water. Prior to experimental uses, the animals were transferred to work area and allowed for two weeks acclimatization.

2.3. Test Organisms

Pure clinical isolates of *Candida Albicans*, *Penicillum species* and *Aspergillum species* were obtained from Medical Laboratory Unit of Madonna University Teaching Hospital, Elele, Nigeria.

2.4. Antifungal Sensitivity Testing

Antifungal activity was determined by measuring the diameter zones of inhibition in millimeters, produced after incubation [5]. Fluconazole (0.05%) was used as control.

2.5. Wound Healing Activity

The powered extract was mixed with petroleum jelly in different concentrations of 10% (100 mg extract/ g petroleum jelly, w/w) and 20% (200 mg extract / g petroleum jelly, w/w). 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 mice with the aid of round sharp sterile object. Group 1 (control) mice were treated with only pure petroleum jelly (100% pure petroleum jelly) twice daily. Group11 and 111 were treated with 10% and 20% respectively, twice daily. The healing time was recorded in each group. This is in accordance with modified method of Mahmood *et al.*,[6].

2.6. Statistical Analysis

Results were expressed as mean± standard error of mean (SEM). Statistical comparisons between the groups in terms of the mean of wound healing was calculated using student's "t"-test[6].

3. RESULTS

The phytochemical studies showed the presence of alkaloids, flavonoids, tannins, phenolics, glycosides, steroids and saponins (Table 1). The antifungal studies showed that the leaves extracts of *Mucuna pruriens* exhibited varying degrees of activities against *Candida albicans*, *penicillum spp.* and *Aspergillum spp.*Ethanol extracts of the leaf showed pronounced antifungal effect compared to the aqueous extract. The inhibition was mostly significant (p<0.05) against *Candida spp, then Penicillum spp.* and least against *Aspergillum spp*. (Table 11).

The wound healing studies showed that aqueous leaf extract of *Mucuna pruriens* accelerated the progression of wound healing activity (Table 111). Wounds treated with 10% and 20% preparations showed significant (p<0.05) dermal healing compared to control (petroleum jelly only).

Table1. *Phytochemical analysis of Mucuna pruriens leaf extracts.*

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

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

Table11. *Antifungal activity of Mucuna pruriens leaf extracts.*

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

Table111. *Wound healing time of Mucuna pruriens leaf extracts in albino mice.*

Animal group	No. of Mice	Types of treatment	Healing time (days) (mean±SEM)
A (control)	3	Petroleum Jelly only	28.00±0.16
B	3	10%/g petroleum jelly	22.33±0.21
C	3	20%/g petroleum jelly	18.67±0.13

4. DISCUSSION

The results obtained from this study showed that extracts of *Mucuna pruriens* possess both antifungal and wound healing effects. The presence of plethora of phytochemicals-alkaloids, phenolics, flavonoids, tannins, glycosides, saponins and steroids corroborate previous studies in which plant extracts containing most of these, do possess antifungal [7,8,9] and wound healing [6] activities. *Candida albicans, penicillum spp.* and *Aspergillum spp.* known to be pathological to humans. Hence , effective antifungal activity against these organisms will be handy towards controlling diseases they cause in humans. This work showed that microbial growth was hindered by the extracts, and it was obvious that any agent that can hinder the growth of micro-organism will also check diseases caused by those organisms, which agrees to the works of many researchers [10,11,12]. This research highlighted that the ethanol extract exhibited pronounced antifungal activity in comparison with aqueous extract. This was because ethanol as an organic solvent extracted more of the phytochemicals recognizing that the active ingredients are both polar and non-polar, and they are extracted mainly via organic solvent medium. This is in harmony with organic solvent extraction being suitable in verifying antifungal properties of medicinal plants [13,14]. This study showed that aqueous leaf extract of *M. pruriens* accelerated the progression of wound healing activity. This suggests that it may contain proteolytic enzymes which appeared to be effective for dislodging necrotic tissue and preventing infection. The extract was found to contain flavonoids. Flavonoids are reported to exhibit antioxidant activity and effective scavengers of superoxide anions; hence *Mucuna pruriens* may have hepatoprotective activity [15, 16].

5. CONCLUSION

This investigation demonstrated that the leaf extracts of *Mucuna pruriens* possess antifungal and wound healing effects and hence justified its inclusion in phytotherapy. And further investigation is encouraged to isolate and identify the active component(s).

5.1. Conflict of Interest Statement

We declare that we have no conflict of interest.

Source of support: Nil

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