

Evaluation of *Bambusa arundinacea* Leaves for Wound Healing in Albino Rats

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Abstract: The extracts of *Bambusa arundinacea* have been used in Indian folk medicine. Normally, the anti-inflammatory agents delay wound healing. Literature claim *Bambusa arundinacea* promotes wound healing and has anti-inflammatory activity. This study was undertaken to test the particular claim in male albino rats and found methanol and petroleum ether extract to be significant when compared to the untreated control. But the different extracts showed a significantly less tensile strength when compared with that of standard drug.

Key words: Wound healing • Leaf extract • *Bambusa arundinacea*

INTRODUCTION

The leaves of *Bambusa arundinacea* are emmenagogue, useful in ptosis [1,2] inflammatory conditions [3], bronchitis, asthma, as immune suppressant [4], antihypertensive [5] and they are also used in Ayurvedic medicine for wound healing [1]. Though the plant and its extracts have been used in the folk medicine extensively but no scientific evidence for such activities is available in established scientific journals of repute.

Hence, in the present study, it is planned to investigate the wound healing property of this plant's extract.

MATERIAL AND METHODS

Collection of Plant: The leaves of *Bambusa arundinacea* were collected near Porur, Chennai and identified by D.Narayanappa, Chief Botanist, TAMPCOL (Tamilnadu Medicinal Plant Farms and Herbal Medicine Corporation Ltd), Government of Tamilnadu, India. It belongs to family Gramineae.

Tamil: *Mullumoongil*

English: *Spiny or thorny bamboo*

Hindi: *Kanwas*

Preparation of the Plant Extract: The leaves of the plant were dried in shade, powdered and passed through a 40

mesh sieve. Dried powder (200g) was taken and subjected to successive extraction with Petroleum ether, Chloroform and Methanol in Soxhlet apparatus. The extracts were concentrated to dry residue by distillation (Temp. 60 °C without vacuum) and dried completely in desiccator and weighed. (Only the methanol extract was found to be active and significant. Hence only Methanol extract was taken for this study). The yield of Methanol extract is 20.5g. On preliminary phytochemical study, the methanol extract showed the presence of flavanoids, glycosides, traces of alkaloids and phyosterols. The extract showed the absence of proteins, amino acids, tannins, fixed oils, volatile oils and steroids. For dosing, the methanol extract was uniformly suspended in 1% carboxy methyl cellulose (CMC) dissolved in water and administered intra-peritoneally (i.p.).

Animal Used: Adult male Albino rats of Wistar Strain weighing 230 ± 20 g were used. They were housed in standard rat cages and maintained on standard diet and water ad libitum. The animal study was performed after getting clearance from the Institutional Animal ethics Committee (IAEC) of Sree Balaji Medical College and Hospital.

Toxicity Studies: Toxicity studies of the methanol extract were carried out in Swiss Albino mice of either sex weighing between 20 and 25g. The LD₅₀ of the methanol extract was found to be 1812.5 mg/Kg (i.p.).

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Preparation of Extract Containing Ointment: 00 G of ointment containing 0.5% W/W and 1% W/W of the extracts were prepared by triturating the extract in hydrophilic ointment. 100 G of water removable hydrophilic ointment was prepared by emulsification of stearyl alcohol 25 G, white petroleum 25G, sodium lauryl sulphate 1G, propylene glycol 12 G, methyl paraben 0.025G, propyl paraben 0.015 G and purified water 37ml.

Wound Healing Effect of Leaf Extract: Forty-eight healthy adult Wistar strain rats of either sex, weighing 200-210 G were used for this experiment. They were maintained by standard diet. Before the start of the experiment they were starved overnight and were given water ad libitum. They were divided into 8 groups of six animals each as follows

Group I: Control CMC treated with ointment base only.

Group II: Standard treated with Framycetin ointment 0.5% W/W.

Group II: Treated with methanol (Meth. Ext.) Extract ointment 0.5% W/W.

Group IV: Treated with methanol extract ointment 1% W/W.

Group V: Treated with petroleum ether (P.E.) extract ointment 0.5% W/W.

Group VI: Treated with petroleum ether extract ointment 1% W/W.

Group VII: Treated with chloroform ether (Chlo. Ext.) Extract ointment 0.5% W/W.

Group VIII: Treated with chloroform ether extract ointment 1% W/W

Animals were anaesthetized with pentobarbitone 40 mg/kg/IP supplemented with ether. The hairs of the anaesthetized animals were clipped from the dorsal plane of the thoracolumbar region. The incision wound of 2 cm length was produced surgically debilitated back of each animal extending to the muscle to a depth of about 0.2 cm. the wounds were sutured under aseptic conditions. During the experiment period, no systemic antibacterial agents were given. Sutures were removed on 7th postoperative wounding day. On 8th postoperative day

animals were sacrificed and wound-breaking strength was measured by continuous water flow technique [6]. If any infected animals were present, they were excluded from the experiment.

Statistical Analysis: The student t-test was used to compare between the groups. A *p*-value of 0.05 or less was regarded as significant. A *p*-value < 0.01 was regarded as highly significant. All statistical tests were performed using the Statistical Package for Social Sciences version 12.0.

RESULTS

Effect of Extracts of Leaves of *Bambusa arundinacea* on Wound Healing (Table 1): When compared, the animals treated with methanol extract (Group III and IV) showed significantly more (*p*<0.0001) tensile strength (Table 1.) at a concentration of 0.5 to 1% W/W. Petroleum ether extract also showed significantly more (*p*<0.01) tensile strength of the wound, when compared to untreated control. However, their activity was not as much as that of methanolic extract. No animals were excluded from the study. The different extracts showed a significantly less tensile strength when compared with that of framycetin treated animals.

DISCUSSION

The complex process of healing involves various phenomena like wound contraction, granuloma formation etc [7]. The contribution for healing by these events depends upon the type of the wound. Wound contraction plays a significant role in healing of excision wound [8], while granuloma formation contributes in healing of dead space and re-sutured incision wounds [9]. Re-sutured incision model is more relevant clinically

Table 1: Effect of *Bambusa arundinacea* extract on tensile strength

Treatment	Tensile strength in G
Group I control CMC	290.17 ± 13.63
Group III standard (Framycetin)	479.5 ± 15.54
Group III Meth. Ext. 0.5%	338.17 ± 10.52*
Group IV Meth. Ext. 1%	421.83 ± 10.63*
Group V P.E. Ext. 0.5%	301.67 ± 17.51**
Group VI P.E. Ext. 0.5%	313.33 ± 8.76**
Group VII chlo. Ext. 0.5%	310.83 ± 8.61**
Group VIII chlo. Ext. 0.5%	323.17 ± 5.74**

Student 't' test, *HS *P* <0.0001, ** S *P* <0.01

since most of the surgical wounds resemble it. Based on the present findings the pro-healing activity cannot be proposed. No animals were excluded from the study, which shows possible antibacterial activity of *B. arundinacea* to which the pro-healing activity can be attributed.

CONCLUSION

The antibacterial activity and the substance responsible for wound healing property need to be studied and isolated. The extract of *Bambusa arundinacea* can be combined with other clinically available wound healing drugs, which may reduce the dose of the drug needed and prevent emergence of resistance.

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