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HEALING EFFICACY OF *TRICHOSANTHES DIOICA* ROXB ON DEAD SPACE WOUNDS

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ABSTRACT

Methanolic extract of *Trichosanthes dioica* was studied for its effect on wound healing, using a dead space wound model in rats. Significant increases in granuloma tissue weight, tensile strength, and hydroxyproline content were observed. In histopathological studies, formation of new blood vessels, fibroblast cells and collagen fibers were found in extract treated group as compared to control. Thus, it was concluded that methanolic extract of *Trichosanthes dioica* is effective against dead space wounds.

KEY WORDS: Dead space wounds, Tensile strength, Fibroblast cells.

INTRODUCTION

Wound infection is one of the most common diseases in developing countries because of poor hygienic conditions [1]. Appropriate method for healing of wounds is essential for the restoration of disrupted anatomical continuity and disturbed functional status of the skin [2]. Dead space wound model is used to study the effect of the extracts on granulation and the healing process. Such wound models have been used for quantitative and qualitative studies of wound healing studies [3].

Several drugs obtained from plant sources are known to increase the healing of different types of wounds. Though some of these drugs have been assessed logically for evaluation of their wound healing activity in different pharmacological models. *Trichosanthes dioica* (Cucurbitaceae), commonly known as palval in Hindi, potala in Gujarati, parawal in Urdu and pointed gourd in English. It is distributed throughout the plains of North India, extending to Assam and East Bengal. The leaves are 7.5 by 5 cm, ovate-oblong, cordate, acute, rigid and rough on both surfaces. Flowers are dioecious. Fruits are 5-9 cm, oblong or nearly spherical acute and smooth. The stems are slender extensively climbing and woolly. Seed are compressed and corrugated on the margin [4]. In folk medicine, *Trichosanthes dioica* has been used as febrifuge, cathartic, hydrogogue and tonic [5]. The fresh juice of the unripe fruit is often used as a cooling and laxative to some

alternative medicine. Extracts of this plant has shown antihyperglycemic and hypolipidemic potential [6-7]. Thus, the present study aims to investigate the medicinal use of *Trichosanthes dioica* as a wound healing promoter against dead space wound model in rats.

MATERIALS AND METHODS

Plant material

Fresh fruits of *Trichosanthes dioica* were collected from local market of Bhopal (M.P.) and authenticated at Department of Pharmacognosy, RKDF College of Pharmacy, Bhopal, where a sample (voucher number- PCG-23) has been deposited. The fruits of *Trichosanthes dioica* were dried under shade and made into a coarse powder. The powder was passed through sieve no.40 and stored in an air tight container for further use.

Extract Preparation

Moderately coarse powder of *Trichosanthes dioica* (MTD) was subjected to methanol extraction by soxhlation. The extract was dried under reduced pressure using rotary flash evaporator and the yield was found to be 14.5% w/w respectively with reference to the air dried plant material.

Preparation of plant drug formulation

A 5% (w/w) simple ointment containing the methanol extract of *Trichosanthes dioica* was prepared by

trituration method using white soft paraffin base [8].

Animals

Wister rats of either sex, weighing 150-200 g, housed in standard condition of temperature, humidity and light were used. They were fed with standard rodent diet and water *ad libitum*.

The protocol was approved by Institution Animal Ethical Committee.

Grouping of animals and Dosing

Two groups of animals containing six in each were used. The animals of groups I, and II were considered as the control and extract treated respectively. Control group was dressed with ointment base only while extract treated group was dressed with the 5% ointment formulated with methanol extract of *Trichosanthes dioica*.

Evaluation of wound healing activity

Animals were anaesthetized by light ether and wound was made by implantation of two polypropylene tubes (2.0×0.5), one on either side, in the lumber region on the dorsal surface in each animal. On the eighth post-wounding day, granuloma tissue formed on an implanted tube was excised carefully. Granuloma tissue from one tube was dried (60°C) and stored in 10% formalin for the biochemical parameters and histopathological study, while the other part of granuloma tissue was used for determination of tensile strength [9-10]. Tensile strength was measured with the help of tensiometer, which is based on method of Kuwano [11].

Statistical Analysis

Results, expressed as Mean ± SEM, were evaluated by Student's *t*-test. Values of *P* < 0.05 were considered statistically significant.

RESULTS

Figures shows the effect of the methanol extract of *Trichosanthes dioica* on the various parameters concerned with the process of healing in rats.

Granuloma weight

A significant increase was observed in the dry granuloma tissue weight of extract treated group when compared with control as shown in fig 1.

Tensile strength

Tensile strength is the resistance to breaking under tension. It indicates how much the repaired tissue resists to breaking under tension and may indicate in part the quality of repaired tissue. Tensile strength for the extract treated group was found to be increased when compared with control group as shown in Fig 2. Increased tensile strength indicates better maturation of collagen by increased cross-linking.

Hydroxyproline estimation

Hydroxyproline content was found increase when compared with control as shown in fig 3.

Histopathological study

Formation of new blood vessels, fibroblast cells and collagen fibers were found in extract treated group as compared to control as depicted in fig 4 and 5.

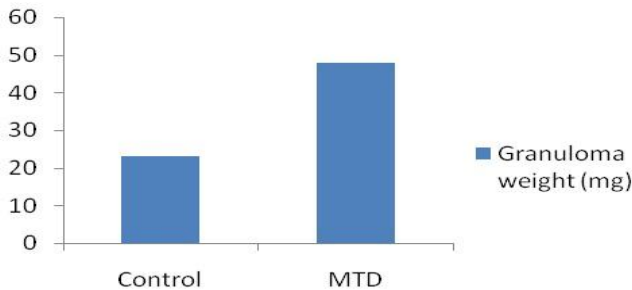


Fig 1 Granuloma weight

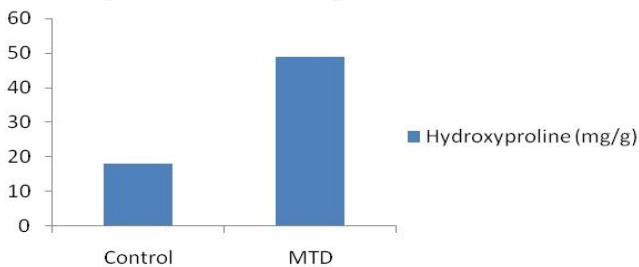


Fig 3 Hydroxyproline content

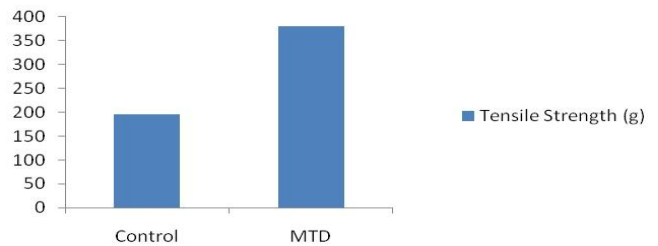
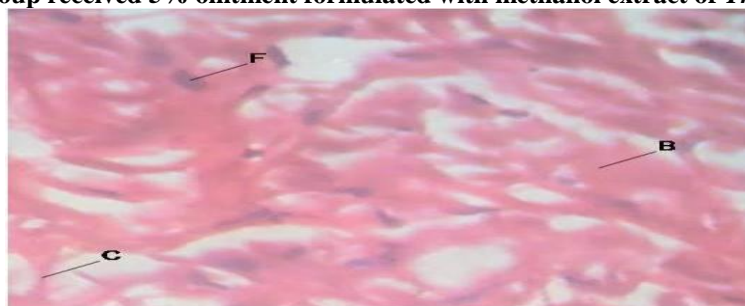


Fig 2 Tensile Strength

Fig 4. Control group which received ointment base only



Fig 5. Treated group received 5% ointment formulated with methanol extract of *Trichosanthes dioica*

F= Fibroblast cells, B = Blood vessels, C = Collagen fibers

DISCUSSION

Granulation, collagen maturation and scar formation are some phases which involves in normal healing process. These phases are parallel but independent of each other. Our earlier studies reported that methanol extract of *Trichosanthes dioica* has significant wound healing activity against excision, incision and burn wound models in rats. The findings of present study demonstrate a definite healing action against dead space wounds. Preliminary phytochemical screening of methanol extract of *Trichosanthes dioica* showed the presence of alkaloids, flavonoids, terpenoids and tannins. Earlier studies of medicinal plant extracts have shown that phytochemical constituents like flavonoids [12], triterpenoids [13] and

tannins [14] are known to promote the wound-healing process. Thus, healing activity of methanol extract of *Trichosanthes dioica* may be due to phytoconstituents present in it which either due to their individual or combined effect.

CONCLUSION

It may be concluded that under present operational condition ointment containing methanol extract of *Trichosanthes dioica* has been determined as most active healing agent. Hence, obtained results fully validate the folkloric use of *Trichosanthes dioica* to treat skin diseases like dead space wounds.

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