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Research Article

WOUND HEALING ACTIVITY OF DODONEA VISCOSA LINN OINTMENT IN RATS

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ABSTRACT

Effect of topical administration of methanolic extract of Dodonea viscosa linn ointment., was studied on the wounds in rats. The ointment of the methanolic extract of Dodonea viscosa linn ointment produced significant response in the wound tested. In the excision model the extract treated wounds were found to epithelialise faster and the rate of wound contraction was higher, as compared to control wounds. The extract facilitates the healing process as evidenced by increase in the tensile strength in the incision model. The results were also comparable to those of standard drug Povidone iodine.

Keywords: Wound Healing, Dodonea viscosa linn.

INTRODUCTION

Dodonea viscosa linn is an erect perennial shrub found through the hotter parts of India and Nepal. It is used for various medicinal purpose such as antifertility, antifungal, antimicrobial., insecticidal, febritage, sudoritic in gout and swelling and burns. Various parts of this plants are being used in the traditional systems of medicine to treat different rheumatic arthritis, analgesic, anti-inflammatory.

However, there were no reports on both ethnobotanical and pharmacological profile of this plant. Hence, the present study was made to evaluate the wound healing potential.

MATERIALS AND METHODS

Plant extract and standard used

The dried plant materials were, pulverized by a mechanical grinder, sieved through 40 mesh. The powdered materials were extracted with methanol using Soxhlet extraction apparatus. This methanol extract was then concentrated and dried under reduced pressure. The methanol free semisolid mass thus obtained was used for the experiment. Two types of ointment formulation were prepared from the extract; 5%(w/w) and 10%(w/w), where 5 gm and 10 gm of the extract were incorporated in 100 gm of Simple ointment base B.P respectively. Povidone iodine ointment (0.2% w/w) was used as a standard drug for comparing the wound healing potential of the extract.

Animals used

Wistar Albino rats (150 – 180 gms) were selected for these studies. Six rats were taken for each group. The rats were used after an acclimatization period of 7 days to the laboratory environment. They were provided with food and water.

Excision wound model

Four groups with six animals in each group were anaesthetized with ether. The rats were depilated on the back. One- excision wound was inflicted by cutting away a 500 mm^2 full thickness of skin from the depilated area, the wound was left undressed to open environment. Then the drugs, i.e, the reference

standard,(0.2%w/w) Iodine ointment, simple ointment B.P., Dodonea viscosa linn extract ointment (5%w/w), and Extract ointment (10% w/w) were applied once daily till the wound was completely healed. This model was used to monitor wound contraction and calculated as percent reduction in wound areas. The progressive changes in wound area were monitored plan metrically by tracing the wound margin on graph paper every alternate day.

Measurement of healing

Tensile strength, the force required to open a healing skin wound was used to measure , the control group (i.ehealing. The instrument for this measurement is called tensiometer, was designed on the same principle as the thread tester used in textile industry. It consist of a 6x12 inch board with one post of 4 inch long fixed on each side of the longer ends. A pulley with bearing was mounted on the top of one of the posts. An alligator clamp with 1 cm width, was tied on the tip of the post without pulley by a piece of fishing line (20-lb test monofilament) so that the clampcould reach the middle of the board. Another alligator clamp was tied on a piece of fishing line with a 1- l polyethylene bottle tied on the other end. Before testing the animal was anaesthetized with ether in an open mask. The sutures of the wound were cut out with a pair of scissors. The animal was then placed on a stack of paper towels that could be adjusted so that the wound was on the same level of the tip of the posts. The clamps were then carefully clamped on the skin of the opposite sides of the wound at a distance of 0.5 cm away from the wound. The longer piece of fishing line was placed on the pulley and the position of the board was adjusted so that the polyethylene bottle was freely hanging in the air. Water was added in to the polyethylene bottle at a rapid but constant rate by siphon from a large reservoir (20-L bottle) until the wound began to open up. The amount of water in the polyethylene bottle was weighed and considered as the tensile strength of the wound.

Statistical analysis

Data are exposed as mean ± SEM and subjected to student's t- test by comparing with the control.

RESULTS AND DISCUSSION

The measurements of the progress of the wound healing induced by the Povidone iodine ointment (0.2% w/w), Dodonea viscose linn ointment (5% w/w), the respective control group (i.e. simple ointment treated group in the excision method are shown in the Table.1. It is observed that the wound contracting ability of the Dodonea viscose linn ointment (5% w/w) significantly greater than that of the control. In the case of Povidone iodine ointment and Dodonea viscose linn ointment (10% w/w) treated groups it was found to be 19±3 d.

The process of wound healing occurs in four phases (i) coagulation, which prevents blood loss, (ii) inflammation and debridement of wound, (iii) repair, including cellular proliferation and (iv) tissue remodeling and collagen deposition. Any agent, which accelerates the above process is a promoter of wound healing. Plant products have been shown to possess good therapeutic potential as anti- inflammatory agents and promoter of wound healing due to the presence of active terpenes, alkaloids and flavonoids.

The wound healing property of Dodonea viscose linn appears to be due to the presence of its active principles which accelerates the healing process and confers breaking strength to the healed wound.

Table 1: Effect of plant extract and povidone iodine ointment on wound healing by excision wound method

Post wounding days	Wound area (mm²) mean ± S.E. and percentage of wound contraction			
	Simple ointment	Povidone iodine ointment (0.2%w/w)	Dodonea viscose extract ointment (5% w/w)	Dodonea viscosa extract ointment (10% w/w)
0	528±18.3(0.0)	517±17.3(0.0)	511±17.3(0.0)	538±18.3(0.0)
2	465±17.4(11.7)	416±21.4(19.7)	401±14.4(21.7)	442±37.4(16.7)
4	402±20.5(23.4)	320±29.4*(38.4)	320±26.5* (37.4)	408±20.5*(23.7)
6	374±13.2(29.4)	230±23.2**(54.4)	254±20.2**(50.4)	324±19.2**(39.4)
8	310±13.2(40.1)	172±17.4**(64.1)	172±17.2**(64.1)	206±17.2**(61.1)
10	295±14.2(45.2)	128±11.2**(75.2)	104±8.2**(75.2)	155±16.7**(70.2)
12	278±11.2(47.3)	74±11.2**(85.3)	67±4.2**(87.3)	92±11.2**(83.3)
14	260±14.3(50.4)	34±2.3**(93.4)	30±2.3**(93.4)	54±3.3**(85.4)
16	230±16.5(55.6)	9±0.8**(98.2)	7±1.5**(95.6)	26±1.7**(95.6)
18	212± 15.3 (60.1)	0.0** (100.0)	0.0**(100.0)	11± 0.5 (96.1)
20	180±11.2(65.1)	0.0**(100.0)	0.0**(100.0)	0.0(100.0)

*P<0.01, **P<0.001 Vs Control by Students 't' – test (n = 6) Figures in parenthesis represent percentage of wound contraction.

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