www.sphinxsai.com

PharmTech

International Journal of PharmTech Research
CODEN(USA): IJPRIF ISSN : 0974-4304
Vol.1, No.3, pp 506-508 , July-Sept 2009

Wound Healing Potential of Leaf Extracts of *Ficus Religiosa* on Wistar albino strain rats

Kalyon Roy*[1], H. Shivakumar [1], Sibaji Sarkar [2]

[1]S.C.S College of pharmacy, Harpanahalli , Karrnataka , India

[2]N.R Vekaria Institute of Pharmacy and Research centre, C.L. College Campus

Junagadh- 362001, Gujarat ,India.

Email: roy_kalyan2005@rediffmail.com

Abstracts: *Ficus religiosa* (Family- Moraceae) which is commonly known as Pepal tree, is abundantly distribute through out in India. *Ficus religiosa* leaf are reported to have wound healing, inflammatory, analgesic, anti lipid- peroxidation activity .Hence the present study was aimed to investigate the wound healing activity by excision and incision wound models to evaluate the wound-healing activity of *Ficus religiosa* extracts, prepared as ointment form (5 and 10%) and applied on Wistar albino strain rats of either sex. Povidine iodine 5% was used as Standard drug. The healing of the wound was assessed by the rate of wound contraction, period of epithelialisation, skin breaking strength. Both the extracts as ointments (5% and 10%) of *Ficus religiosa* leaf extract promoted the wound-healing activity significantly in all the wound models studied. High rate of wound contraction, decrease in the period for epithelialisation, high skin breaking strength were observed in animals treated with 10% leaf extract ointment when compared to the control group of animals. So leaf extracts of *Ficus religiosa* in the form of 10% ointment promote wound-healing activity better than the former concentration, 5%.

Key words: Wound healing Activity, *Ficus religiosa* , 70% hydro alcoholic extracts .

1. Introduction

Many plants synthesize substances that are useful to the maintenance of health in humans and other animals. A number of traditions came to dominate the practice of herbal medicines for various effective human benefits at the end of the twentieth century. With a veiw to increasing the wide spectrum of medicinals usages, the present day reqiures a new biologically active ointment which exhibit wound healing activity as local applications. Oflate, *Ficus religiosa* (Family- Moraceae) which is commonly known as Pepal tree, is abundantly distribute through out in India. Even though the bark having wound healing activity [1], anti-inflammatory, analgesic, anti lipid- peroxidation activity [2] and have purgative properties (tender shoots) [3] but as per our knowledge there is no such literature till available for wound healing activity of leaves extract of title plant in the form of ointment. In spite of modern advanced technologies in the pharmaceutical industry, the availability of market products capable of stimulating the process of wound repair is still limited. Hence the present investigation was focused in the direction of establishment of wound healing activity of leaves extract (form of ointments) of *Ficus religiosa*.

2. Material and methods

2.1 Plant material collection:

Leaves of *Ficus religiosa* were collected during the month of April and May 2007 from Harpanahalli, Karnataka, India. Authentication has done by Prof. K. Prabhu, Dept of Pharmacognosy, S.C.S College of Pharmacy, Harpanahalli, India.

2.2 Preparation of extract:

Shade dried, powdered leaves of both plants were subjected to soxhlet extraction (Temp:45^{0}C, time 17 hours) with 70% hydroalcohol. Solvent elimination was done under reduced pressure afforded semi solid mass. The percentage of yield were calculated and was found

to be 32.5%. Phytochemical screening gave positive test for glycosides and tannins.

2.3 Animals:
Wistar albino rats of either sex (body wt. between 150-250 g) were used for the wound healing activity (Ref:157/1999/CPCSEA). They were housed in standard environmental conditions, fed with standard pellet diet and water ad libitum.

2.4 Excision wound model:
Under light ether anaesthesia an impression of 500 sq mm was made on the shaved back of the rat as described in Morton and Malone [4]. The skin of the impressed area was excised carefully. Animals are kept in separate cages. The day on which wound was made consider as day'0'(Zero).
Animals divided into four groups of each with 5 animals. Group A consider as control and treated with simple ointment (eg. Bees wax, Cetosteryl alcohol etc.), group B consider as standard and treated with 5% w/w Povidine iodine ointment, group C and group D are *Ficus religiosa* treated group and applied ointment 5% and 10% respectively (Table-1).
The percentage of wound closure was recorded on day 4,8,12 and 16. Wound area was traced and measured planimetrically with the help of sq mm graph paper. Number of days required for falling of the eschar without any residual raw wound gave the period of epithelization.

2.5 Incision wound model:
Animals divided in four groups each of five animals and were treated as described above. Para vertebral incision of 6cm long was made on either side of vertebral column of the rat and incision was made at least 1cm lateral to vertebral column with sufficient care [5]. The wounds were closed with interrupted sutures of 1 cm apart. Then the animals were caged individually for ten days. The sutures were removed 7th post wounding day and finally the tensile strength of the wound was measured on 10th post wounding day.

2.6 Statistical analysis:
The results were subjected to statistical analysis by using ANOVA followed by Turkey Krammer Multiple Comparison Test.

Table 1: Effect of hydro alcoholic leaf extracts ointment of *Ficus religiosa* on Excision wound parameters

Group	% Wound contraction on				Epithelization time (Days)
	4th day	8th day	12th day	16th day	
A Control	15.76 ± 3.00	30.94 ± 2.50	44.87 ± 3.20	61.67 ± 4.21	23.5±0.63
B Standard Povidine iodine5%(w/w)	33.51 ±2.64***	59.93 ± 3.38***	88.19 ± 4.10***	96.61 ± 3.73***	18 ±0.54***
C *Ficus religisa 5%* (w/w)	26.38 ± 2.14*	46.57 ±3.56**	59.46 ± 4.49***	77.76 ± 4.80***	20.2±0.58*
D *Ficus religiosa 10%* (w/w)	31.78 ±3.86***	57.44 ±2.90***	86.45 ±3.00***	93.22 ± 3.72***	18 ±0.60***

- The values are expressed as Mean ± SEM, n=5 in each group. If * P<0.05, **P<0.01 and ***P<0.001 vs control.

Table 2: Effect of hydro alcoholic leaf extracts ointment of *Ficus religiosa* on breaking strength (g) in Incision wounds

Group	Breaking Strength(g)
A Control	430.4 ± 6.46
B Standard Povidine iodine 5% w/w	571 ±8.84***
C *Ficus religiosa (5%)* extract	476.9 ± 7.25**
D *Ficus religiosa (10%)* extract	562.2 ± 6.93***

- The values are expressed as Mean ± SEM, n=5 in each group. If * P<0.05, **P<0.01 and ***P<0.001 vs control.

3. Results:

The results indicates the topical application of *Ficus religiosa* extract in different concentration (5% and 10%) have demonstrated significant reduction in the wound area. (Table 1).

The 10% ointment of *Ficus religiosa* treated animals showed faster epithelialisation of wound (18 ±0.60) than the animals treated with 5% extract ointment (20.2±0.58) . The period of epithelialisation was (18 ±0.54) in the case of standard drug 5% w/w standard Povidine Iodine Ointment treated animals.

In incision wound model, *Ficus religiosa* (10% and 5%) extract ointment treated animals showed increase in breaking strength (562.2±6.93), (476.9±7.25), respectively when compared to the control (430.4±6.46). The mean breaking strength was also significant in animals treated with standard drug (571±8.84) Results was tabulated in Table-2.

4. Discussion:

Wound healing, a complex sequence of events, is initiated by the stimulus of injury to the tissues. A positive stimulus may result from the release of some factors by wounding of tissues. Cutaneous wound repair is accompanied by an ordered and definable sequence of biological events starting with wound closure and progressing to the repair and remodeling of damaged tissue [6]. The results of present study indicates that 70% hydro alcoholic leaf extracts ointment of title plants at both strengths (5% and 10%) exhibited significant wound healing promoting activity. However, this effect was found to be concentration related fashion where 10% ointment promotes significant wound-healing activity by increasing cellular proliferation, formation of granulation tissue, synthesis of collagen and by increase in the rate of wound contraction as compared to the control animals. Similar types of wound-healing activity were reported on *Merremia tridentate* [7], *Diospyros cordifolia* [8] and *Bryophyllum pinnatum* [9]. This was evident by faster rate of wound closure and epithelization period in excision wound model and significant increase in skin breaking strength in incision wound model. Further phytochemical studies are needed where the extract will be subjected to further fractionation and purification to identify and to isolate the active compound(s) responsible for wound healing activity.

5. Acknowledgement:

The authors are grateful to Sri Sha Bra Sri Chandramouleeshwar Swamiji, president, TMAE society Harpanahalli for his encouragement in carrying out this project.

6. References:

1. Choudhary GP. Evaluation of ethanolic extract of *Ficus religiosa* bark on incision and excision wounds in rats, Planta Indica , 2006 , 2(3) ,17-9.
2. Sreelekshmi R, Latha PG, Arafat MM, Shyamal S, Shine VJ, Anuja GI, Suja SR and Rajasekharan S. Anti-inflamatory, analgesic and anti-lipid peroxidation studies on stem bark of *Ficus religiosa* Linn, Natural Product Radiance,2007, 6(5) , 377-81.
3. Warrier PK, Nambiar VPK, Ramankutty C. Indian Medicinal Plants. Vol-III, Madras: Orient Longman Ltd; 1995, 38p.
4. Morton JJP, Malone MH. Evaluation of vulnerary activity by an open wound procedure in rats, Arch Int Pharmacodyne , 1997, 196 , 117-26.
5. Ehrilch HP, Hunt TK. Effect of cortisone anabolic steroids on the tensile strength of healing wounds, Br J Surg 1969 , 170 , 203-06.
6. Phillips RA, Whitehe and Kinghton R. Initiation and pattern of angiogenesis in wound healing in the rat. American Journal of Anatomy, 1991, 192 , 257-62 .
7. Hatapakki BC, Hukkeri V, Patil DN, Chavan MJ. Wound healing activity of aerial parts of *Merremia tridentata* . Indian Drugs, 2004 , 41 , 532.
8. Mankani KL, Krishna V, Singh JSD, Manjunath BK, Vidya SM, Manohara YN. Evaluation of wound healing activity of the stem bark of *Diospyros cordifolia* . Indian Drugs 2004 , 41 , 628
9. Khan M, Patil PA, Shobha JC. Influence of *Bryophyllum pinnatum* leaf extract on wound healing in albino rats, J Natural Remedies, 2004 , 4 , 41.

*****