Research Article

Wound Healing Activity of Bark Extracts of *Ficus virens* on Wistar Albino Rats

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Accepted on: 11-05-2014; **Finalized on:** 31-07-2014.

ABSTRACT

Ficus virens aiton (Moraceae) which is commonly known as white fig is abundantly distribute throughout India. The present study was aimed to investigate the wound healing activity by excision wound model to evaluate the wound healing activity of *Ficus virens* methanolic extract, prepared as ointment form 10% and applied on Wistar albino rats of either sex. Povidone iodine 5% was used as standard drug. The healing of the wound was assessed by the rate of wound contraction and period of Epithelialization. *Ficus virens* bark extract promoted the wound healing significantly in excision wound model. High rate of wound contraction, decrease in the period for epithelialisation was observed in animals treated with 10% bark extract ointment when compared to the control group of animals.

Keywords: Wound healing activity, *Ficus virens*, Povidone iodine ointment 5%.

INTRODUCTION

Ficus virens (Syn; *Ficus infectoria*) is a plant belonging to the genus *Ficus* and family Moraceae is found in India, Malaysia and northern Australia.[1] Its common name is white fig and locally in hindi language known as pilkhan[2] investigation of *Ficus virens* revealed that phenolics compound form the major photochemical components of the leaves are responsible for the excellent antioxidant capacity of the extracts[3] and the stem bark of the tree is employed in the indigenous systems of medicine for the variety of purpose like astringent, antiseptic. It is also used as a inflammatory swellings, boils and wound healing but none of the earlier works has not yet been documented. In this study we have attempted to investigate the wound healing activities of *Ficus virens* bark methanolic extract.

MATERIALS AND METHODS

Plant material collection

The plant was obtained from the Tirumala forest; Triupathi and the bark were identified by Dr. Madhava Chetty. Authentication has done by Dr. P.Jayaraman, Director, Plant Anatomy Research Centre, Chennai.

Preparation of extract

The bark was dried under shade and powdered. The powder was defatted with petroleum ether and subjected to soxhlet extraction with methanol. The extract was evaporated to dryness. The dark brownish semisolid mass obtained was stored in a well closed airtight resistant container.

Phytochemical screening

The methanolic extract was taken to investigate for phytochemical screening[4]. The results revealed the presence of tannins, flavonoids, and terpenoids and phenolics compounds.

Animals

Wistar albino rats of either sex were used for the wound healing activity GNIP (TKR)/CPCSEA/IAEC/2013/23. They were housed in standard environmental conditions, fed with standard pellet diet and water *ad libitum*.

Excision wound model

For excision wound model, animals were divided into three groups in each model consisting of six animals as follows. Group I - consider as Control and treated with Simple ointment. Group II - *Ficus virens* 10% methanolic extract, Group III - consider as Standard and treated with 5% w/w Povidone iodine ointment.

Three groups of animals containing six rats in each group were anesthetized by open mask method with anesthetic ether. The rats were depilated on the back and a predetermined area of 500 mm^2 full thickness skins was excised in the dorsal interscapular region [5]. Rats were left undressed to the open environment. The extract and standard drug were applied daily until the complete healing. In this model, wound contraction and epithelialization period was monitored. Wound contraction was measured as percent contraction in each 2 days after wound formation. From the healed wound, a specimen sample of tissue was collected from each rat for histopathological examination.

Measurement of wound contraction

An excision wound margin was traced after wound creation by using transparent paper and area measured by graph paper.[6] Wound contraction was measured in each 2 days interval, until complete wound healing and expressed in percentage of healed wound area. The

evaluated surface area was then employed to calculate the percentage of wound contraction. Taking initial size of wound, 300mm^2, as 100%, by using the following formula as:

$$\% \text{ wound contraction} = \frac{\text{Initial wound size-specific day wound}}{\text{Initial wound size}} \times 100$$

Epithelialization period

It was evaluated by noting the number of days required for the Escher to fall off from the wound surface exclusive of leaving a raw wound behind.

Statistical analysis

The results were subjected to statistical analysis by using ANOVA followed Tukey's multiple comparison test

RESULTS

The results indicates the topical application of *Ficus virens* methanolic extract (10%) was used as test drug which indicates the significant reduction in the wound area at 10th, 12th & 14th days was found to be 1.05±0.05, 0.83±0.03, 0.41±0.03 respectively. Compound with the standard 5% povidone iodine ointment at 10th, 12th, 14th day was found to be 0.58±0.03, 0.45±0.03, 0.31±0.03 respectively.

On the 15th day a small portion of the animal skin was excised from the healed part and histopathological examination was done. The results shown that the epithelial cells collagen fibers were normal in the controlled treated group (Fig.1). Which was compared with the *Ficus virens* methanolic extract (10%) treated shown dermis subcutaneous region appeared normal, hair follicles sebaceous gland located in dermal subcutaneous region appeared normal (Fig.2) in standard 5% povidone iodine ointment skin, stratum corneal layers of epidermis showed thickening desquamation in the epidermal region of skin (Fig.3).

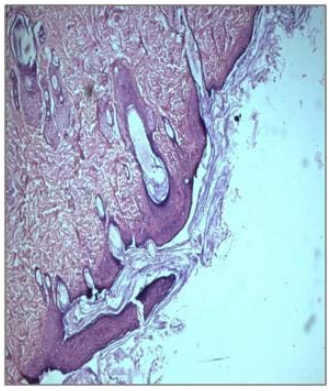

Figure 1: Control skin

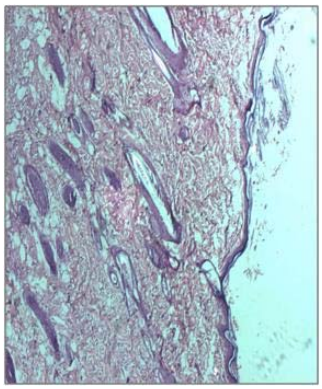

Figure 2: Drug skin

Figure 3: Standard skin

Table 1: Effect of *Ficus virens* bark extract of various parameters wound contraction of excision wound models in rats

% wound contraction on	Control	Test *Ficus virens* 10% W/W	Standard Povidone iodine 5% W/W
0	1.88±0.04	2.05±0.67	1.85±0.07
2	1.73±0.04	1.81±0.06	1.33±0.03
4	1.68±0.03	1.65±0.06	1.18±0.03
6	1.55±0.02	1.48±0.06	1.06±0.03
8	1.25±0.02	1.35±0.06	0.83±0.03**
10	1.05±0.02	1.05±0.05*	0.58±0.03**
12	0.75±0.02	0.83±0.03*	0.45±0.03**
14	0.38±0.03	0.41±0.03*	0.31±0.03**

N= 6, Value are expressed as mean ± SEM. P*<0.05, P**<0.01

DISCUSSION

Wound healing is the process of repair that follows injury to the skin and other soft tissues. Proper healing of wounds is essential for the restoration of disrupted anatomical continuity and disturbed functional states of the skin. It is the product of the integrated response of several types of injury[7]. 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[8]. Plants with wound healing activity have most reported and experimentally studies on various wound models. To reveal most active promising compounds. Results obtained in the present study revealed that treatment of albino rats with the fresh homogenized crude extract of *Ficus virens* bark has accelerated the wound healing process. Increase in tensile strength may be due to increase in collagen concentration and stabilization of fibers. The result suggest that treatment with homogenized extract of *Ficus virens* bark may have beneficial influence on the various spaces of wound healing suggest fibroplasia, collagen synthesis and wound contraction, resulting in faster healing. These findings partially justify the inclusion of these plants in the management wound healing in folk medicine. Further phyto chemical studies are needed where the extract will be subjected to further fractionation and purification to identify and to isolate the active compounds responsible for wound healing activity.

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Source of Support: Nil, **Conflict of Interest:** None.