



EVALUATION OF THE WOUND HEALING ACTIVITY OF *COMMELINA BENGALENSIS* LEAVES EXTRACT IN EXPERIMENTAL RATS

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ABSTRACT

Wound is still a worldwide health problem. Both conventional and synthetic drugs used in the treatment of wound are inadequate and sometimes they cause fatal side effects. In the absence of a reliable drug in modern medicine, there are a number of medicinal preparations in Ayurveda recommended for the treatment of wound. In view of severe undesirable side effects caused by synthetic agents, there is a growing need to follow systematic research methodology to evaluate the scientific basis for the traditional herbal medicines that are claimed to possess therapeutic effects. The benefits of herbal wound healing agents attract the researchers to evaluate their use in modern medicine and to minimize the undesirable or unpleasant effect of synthetic medicines. As we know, herbal medicines are natural in origin, safe to consume in the modern day many herbal plants like aloe, neem, turmeric, brahmi, senna, ashwagandha, asafetida, ginger, fennel, sankhpusphi, are extensively used in modern medicine and showed their potential benefits. *Commelina benghalensis* is a herbaceous plant growing throughout India. In our study we found that the methenolic extract of *Commelina benghalensis* shows significant increase in breaking strength of the skin and histopathological studies also shows increase in the number of macrophages. Various concentrations of methenolic extract of *Commelina benghalensis* are used i.e 5% methenolic extract of *Commelina benghalensis* and 10% methenolic extract of *Commelina benghalensis* and both the concentration are shown to increase the breaking strength although 10 % methenolic extract shows more collagen fibres in histological section. Hence the present study is designed to evaluate wound healing of potential of *Commelina benghalensis* leaves in rats.

KEY WORDS: *Wound Healing Activity, Macrophages, Concentration, Breaking Strength, Commelina Benghalensis L.*



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INTRODUCTION

Wound is defined simply as the disruption of the cellular and anatomic relationship and continuity of a tissue as a result of injury. It may be produced by chemical, physical, thermal, microbial or immunological attack to the tissue. Wounds are unavoidable and commonest events of life but should be treated without carelessness. In today's life wounds are the most susceptible cause of injury to a person. The wound is linked with the physical damage to the skin tissues internally or externally depending upon the cause of the agent responsible. The wound formation is due to the structural damage to the skin and sometimes due to the discontinuation of the skin protecting mechanism. The injury may be done deliberately such as a surgical incision or accidental following trauma. Immediately following wounding, the healing process begins¹

MATERIALS AND METHODS

Plant selection and Authentication

The *Commelina benghalensis* plant was selected on the basis of its traditional uses and extensive literature studies were carried to search similar work in the past. The resources used for the plant selection were books, journals and online sources. The Authentication of plant is done by Dr. Manish Kandwal scientist D Botanical survey of India, Botanical Garden of India Republic, Ministry of Environment, Forest and climate change, Government of India. (Authentication No BSI/BGIR-8(2)/2003/TECH)

Drying and Size Reduction of Leaves

The collected leaves of *Commelina benghalensis* were air dried for 12 days in the pharmacology lab. Afterward, shade dried leaves of *Commelina benghalensis* were crushed and made powdered with a mechanical grinder and passed through sieve

no. 40. The sieved powder was stored in airtight container and kept at room temperature.

Preparation of Extract of *Commelina benghalensis* Leaves

The dried powdered material was macerated for five days with methanol with frequent shaking. The powdered leaves (350 grams) were extracted using a Soxhlet extractor. This methanolic extract was concentrated to dryness under reduced pressure and controlled temperature (45-500C) to yield solid masses².

Phytochemical Screening of Leaves Extract

Methanolic extract of *Commelina benghalensis* were subjected to qualitative analysis for the various phyto constituents like alkaloids, carbohydrates, saponins, phenolics, tannins and flavonoids.

Experimental Design for Wound Healing Activity

The experimental protocol was approved by Institutional Animal Ethics Committee (Ref. No. HIMTCOP/IAEC/2018/03) of HIMT College of Pharmacy, Gr. Noida. The animals were maintained under standard conditions in an animal house approved by Committee for the Purpose of Control and Supervision on Experiments on Animals (CPCSEA). The animals had free access to conventional laboratory diet and tap water ad libitum.

Preparation Of 5% & 10% *Commelina benghalensis* Ointment (B.P.)

Hard paraffin and Cetostearyl alcohol were melted on water bath. To this wool fat and white Soft Paraffin were incorporated, stirred until all ingredients were melted. Contents were viewed for any foreign particle and decanted, added 5 gm methanolic extract of *Commelina benghalensis* for 5% and add 10gm methanolic extract of *Commelina benghalensis* for 10% if required stirred the mixture thoroughly until cold.³ (Table1)

Table 1

Composition for the preparation of 5% & 10% *Commelina benghalensis* ointment B.P. (Mehta, 2004)

Sl.No.	Ingredient	Quantity
1	Wool fat	5 g
2	Hard Paraffin	5 g
3	Cetostearyl alcohol	5 g
4	White Soft Paraffin	85 g
5	5% Methanolic extract of <i>Commelinabenghalensis</i> Or 10% Methanolic extract of <i>Commelina benghalensis</i>	5 g or 10 g

Incision Wound Model⁴

Wister male albino rat weighing between 200-220 gm body weigh were divided into four groups, each group consisting of 6 rats and each animal kept separately under laboratory condition. They had free access to commercial pallet diet and *ad libitum*.

- ❖ Group I: Served as normal control and no ointment were applied to all animals of this group.
- ❖ Group II: Served as standard group and animals of this group received 0.5% (w/w) framycetin ointment.
- ❖ Group III: Served as test group and animals of this group received *Commelina benghalensis* methanolic extract 5% (w/w) in ointment base.
- ❖ Group IV: Served as test group and animals of this group received *Commelina benghalensis* methanolic extract 10% (w/w) in ointment base.

Methods

Wister male albino rat weighing between 200-220 gm body weigh were divided into four groups. Para vertebral straight incisions of 6 cm length each were made through the entire thickness of the skin, on either side of the vertebral column with the help of a sharp scalpel. After complete haemostasis the wound were closed by means of interrupted sutures placed at equidistance points about 1 cm apart. Full aseptic measures were not taken and no local or systemic antimicrobial were used throughout the experiment.⁵ Animals were given medical care on daily basis with drugs, from zero day to ninth post-wounding day. The breaking strength of the wound were estimated on tenth day of wounding by uninterrupted and persistent water flow technique.⁶ Forceps (Allis) were firmly applied on both side of incision wound three millimeter away from the margin of wound on close to normal skin. The forceps on one side was hooked to a fixed rod of metal while the other forcep was joined to a thread suspended by weights running over a pulley.⁷ As early as gapping of the wound occurred, addition of

weights was ceased and simultaneously the weights were lifted so as to avoid entire wound opening. The weights required to produce gapping were noted. Methanolic extract ointment of *Commelina benghalensis* leaves at different concentration exhibited significant wound healing activity in incision wound models. The potential wound healing activity of methanolic extract ointment of *Commelina benghalensis* leaves may be due the presence of major phytoconstituents i.e. tannins, flavanoid, alkaloids, phenol. Preliminary phytoconstituents study of *Commelina benghalensis* revealed the presence of tannin and flavanoid. As, tannins, the main components of many plant extracts, act as free radical scavengers. Preliminary phytoconstituents study of *Commelina benghalensis* also revealed the presence of flavanoid which are known to reduce lipid peroxidation not only by preventing or slowing the onset of cell necrosis but also by improving vascularity.⁸⁻¹⁰ It is found that inhibition of lipid peroxidation property of any drug enhances the viability of collagen fibers by providing strength to collagen fibers.¹¹ In the present study the extract applied topically promoted the breaking strength. In the experimental study effect of methanolic leaves extract of the *Commelina benghalensis* on wound healing in excision wound in rats were compared with the normal control and both concentration of *Commelina benghalensis* significantly promoted breaking strength. The finding provides an insight into the usage of the *Commelina benghalensis* in traditional treatment of wounds. Leaves extract 5% (w/w). Overall a significant increase in breaking strength was observed after the application of *Commelina benghalensis* leaves extract (5%) w/w and *Commelina benghalensis* leaves extract (10 %) w/w topically.

RESULT AND DISSCUSSION

Incision Wound Model

Table 2
Effect of *Commelina benghalensis* on breaking strength (g) in Incision model

Treatment Group	Breaking strength (g)
Normal control	217.34±9.42
Standard (Framycetin)	419.71±7.20***
Test Group 1(Methanolic extract 5%)	289.46±13.34*
Test Group 2 (Methanolic extract 10%)	383.21±19.32**

Each value represents as the mean ± S.E.M of six observations.

*Where, *p<0.05, **p<0.01 and ***p<0.001 vs standard framycetin. (one way ANOVA)*

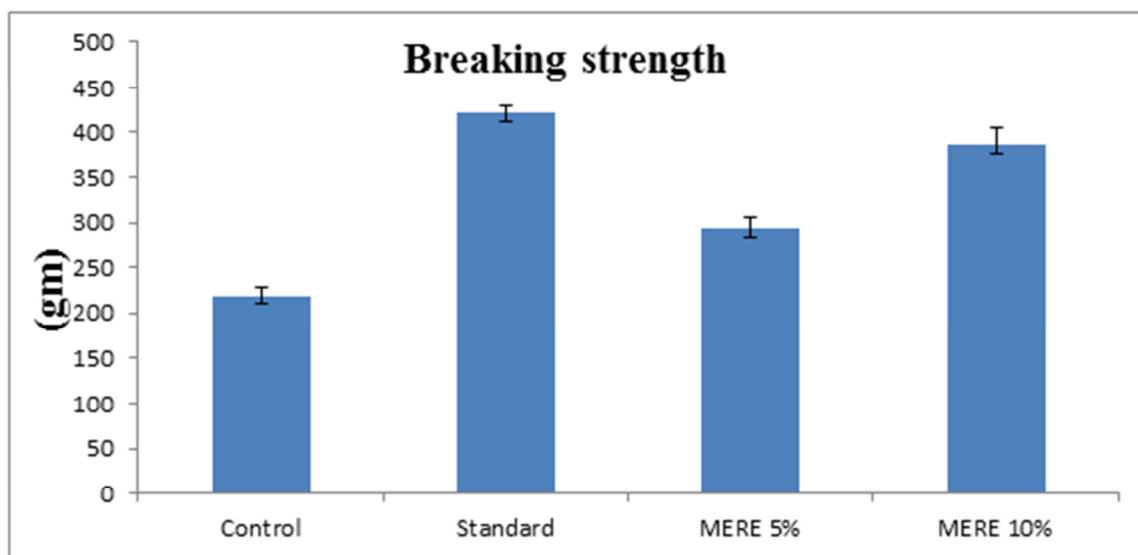


Figure 1
*Effect of methanolic extract of *Commelina benghalensis* leaves on breaking strength in incision wound model.*

In the incision wound model as shown in Table 2, a significant increase was observed in the skin breaking strength of the MERE group on the tenth post wounding day, at both concentrations (Table 2). The breaking strength of the MERE 10% (w/w) treated group ($383.21 \pm 19.32^{**}$) showed significant increase in the breaking strength as compared to the control group (217.34 ± 9.42) and MERE 5% (w/w) ($289.46 \pm 13.34^*$) but less than the Framycetin 0.5% (w/w) treated group ($419.71 \pm 7.20^{***}$). Thus MERE 10% (w/w) concentration of the extracts as well as the standard drug showed a significant increase in breaking strength in the 10 days old wound.

SUGGESTIONS FOR FUTURE RESEARCH

- The possible applications of the study include development of a promising wound healing agent having one or more plant extracts.¹²⁻¹⁴
- A detailed scientific study should be needed to mark the active constituents which shows wound healing property.¹²⁻¹⁴
- The use of extracts of herbs can be done in conjunction with other anti-microbial agents.
- Isolation of the active principle from the extract is the first step towards the evolution of a wound healing agents that may turn out to be a promising agent in not only open wound but also in ulcer, skin grafting and severe type of burn.¹⁵⁻¹⁶

CONCLUSION

In the experimental study effect of methanolic leaves extract of the *Commelina benghalensis* on wound healing in incision wound in rats were compared with the normal control and both concentration of *Commelina benghalensis* significantly promoted the breaking strength. The finding provides an insight into the usage of the *Commelina benghalensis* in traditional treatment of wounds.

AUTHORS STATEMENT

Mr. Om Prakash Joshi while doing the study made data of all results obtained, Mr. Balwan Singh analyzed these data and necessary inputs were given towards the designing of the manuscript. Dr. D.C.P Singh give necessary inputs to proper designing of research and designing of manuscript.

CONTRIBUTION

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CONFLICT OF INTEREST

Conflict of interest declared none.

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