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# Evaluation of Wound Healing Effect of Polyherbal Lotion in Experimental Animal

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**ABSTRACT: Objective:** The present study describes the wound healing activity and anti-microbial activity of *Aloe vera*, *Cinnamomum cassia* and *Curcuma longa* ethanolic extract.

**Methods:** For this purpose, ethanolic extract of powder of *Aloe vera*, *Cinnamomum cassia* and *Curcuma longa* were prepared by soaked in ethanol. The experimentally induced wound in wistar rats by “Excision wound model”.

**Results:** As a result of this study, it was found that the ethanolic extract of powder of *Aloe vera*, *Cinnamomum cassia* and *Curcuma longa* generally revealed wound healing activity and antimicrobial activity.

**Conclusion:** The result of the study suggests that the *Aloe vera*, *Cinnamomum cassia* and *Curcuma longa* of polyherbal lotion effective in accelerating wound healing process.

**KEYWORDS:** *Aloe vera*, *Cinnamomum cassia*, *Curcuma longa* Wound Healing activity, Excision wound model, Ethanolic extract, Polyherbal lotion.

## I. INTRODUCTION

In India, medicines based on herbal origin have been the basis of treatment and cure for various diseases. Moreover, Indian folk medicine comprises numerous prescriptions for therapeutic purposes such as healing of wounds, inflammation, skin infections, leprosy, diarrhoea, scabies, venereal disease, ulcers, snake bite [1]. More than 80% of the world’s population still depends upon traditional medicines for various skin diseases. Herbal medicines in wound management involve disinfection, debridement and providing a moist environment to encourage the establishment of the suitable environment for the natural healing process. A large number of plants are used by folklore traditions in India for treatment of cuts, wounds and burns. The drugs selected for this work were *Aloe vera*, *Cinnamomum cassia* & *Curcuma longa*. These three important herbs are reported to have significant antibacterial, immunomodulatory and anti-inflammatory activities which are complementary to wound healing process [2]. The growing popularity of natural and herbal medications, easy availability of raw materials, cost-effectiveness and the paucity of reported adverse reaction, prompted us to formulate a polyherbal topical preparation and assess its wound healing ability. The combination is used in order to enhance the wound healing activity [3].

## II. MATERIALS AND METHODS

### MATERIALS

The plants were selected on the basis of their antimicrobial activities and their medicinal uses reported in the literature. The herbs *Aloe vera*, *Cinnamomum cassia* & *Curcuma longa* were purchased from the local area of



Washim region in season of Jan 2022 and plant authenticated by Taxonomist in the department of Botany, Shri Shivaji Science and Arts College, Chikhli. All other chemicals were of analytical grade and used without further purification.

### PREPARATION OF EXTRACT

The powdered of *Acacia Aloe vera*, *Cinnamomum cassia* & *Curcuma longa* bark were used for extraction. The 50gm powder is soaked in 150 ml ethanol. The extraction procedure was carried out till a sufficient quantity of extract was obtained. The solvent was removed by evaporation method [4].

### FORMULATION OF POLYHERBAL LOTION

Poly herbal lotion formulation I (10%) and II (20%) was prepared by dissolving *Cinnamomum cassia*, *Aloe vera* and *Curcuma longa* ethanolic extracts as given in below table. To this Petroleum Jelly and White soft paraffin was added and the mixture was stirred. Petroleum jelly and white soft paraffin was used as a hydrocarbon (oleaginous) base. The concentration of extract of plant *Cinnamomum cassia*, *Aloe vera* and *Curcuma longa* were used on trial-and-error basis and studying its activity. Finally, these two formulations were selected and prepared. The evaluations of all two formulations were made and pharmacological wound healing activity of all formulations were studied. The formulae of prepared herbal gel formulations incorporating the herbal drugs extract is given below.

Table. No 4: Constituents of polyherbal lotion

Ingredients	Plant Part Used		Formulation I (10%)	Formulation II (20%)
<i>Aloe vera</i>	L eave		1gm	2gm
<i>Curcuma longa</i>	R hizome		1gm	2gm
<i>Cinnamomum cassia</i>	B ark		0.5g m	1gm
Petroleum Jelly	-		6.5g m	13g m
White soft paraffin	-		1gm	2gm

### WOUND HEALING ACTIVITY

In excision wound study, wound contraction rate was identical to the ointment and the herbal formulations (I and II). Complete healing was observed in 14th day in all treated groups while untreated group (control) and group IV (cream base) animals took more than 15 days for healing of wounds. There was a significant increase in percentage of contractibility from day five onwards in herbal lotion Treated rats when compared with control rats. The wound contracting ability of animals treated with lotion containing (20% w/w) herbal lotion was found to be significantly higher ( $P < 0.001$ ) on 15th day when compared to the control group. A better healing pattern and reduction in period of epithelisation was observed in herbal lotion 20% w/w treated group. Results obtained in the present study suggested that treatment of excision wounds with herbal lotion of *Cinnamomum cassia*, *A. vera* and *C. longa* has accelerated the wound healing process. The results showed that Mupirocin increased the collagen content of the skin and contributed to wound strength. The wound healing potential of the herbal lotion may be attributed to the presence of a mixture of phytoconstituents including Alkaloids and Glycoside.

Group I – Normal Excision wounded animals without treatment

Group II – Normal Excision wounded animals with Low dose (10%) treated for 15 days.

Group III – Normal Excision wounded animals with High dose (20%) treated for 15 days.

Group IV - Normal Excision wounded animals with Standard Drug Mupirocin treated for 15 days.



### EXCISION WOUND MODEL

The Wistar rats weighing (150 to 200 g) were selected and their hairs from dorsal thoracic central region were shaved after anaesthetized to a diameter of 50 mm with the aid of rizer blades [5]. The anticipated area of the wound was marked on the shaved skin. Skin wound were created with aid of toothed forceps, surgical blades and pointed scissors. The wound was cleaned with cotton swab soaked in alcohol. The two herbal formulations and Mupirocin ointment were applied on wound once daily for 14 days starting from the first day of wounding [6]. Wound contraction was measured at 14th days [7]. Contraction which mainly contributes for wound closure was studied by tracing the raw wound area on transparent paper every alternate day till wounds were completely covered with epithelium. These wound tracings were retraced on a millimetre scale Graph paper, to determine the wound area. Wound contraction (WC) was calculated as a percentage change in the initial wound size i.e.

$$\text{Percentage Wound Closure} = \frac{\text{Initial Wound Size} - \text{Specific Day Wound Size}}{\text{Initial Wound Size}} \times 100$$

Epithelization period was monitored by noting the number of days required for Escher to fall away, leaving no raw wound behind.

### STATISTICAL ANALYSIS

Experimental data are expressed as mean±(SEM) standard error of mean. Statistical analysis was performed by using one way Graph Pad Prism.

## III. RESULTS AND DISCUSSION

The prepared polyherbal lotion formulations incorporating herbal extracts i.e., *Cinnamomum cassia*, *A. vera* and *C. longa* ethanolic extract are subjected for the in vitro evaluation and stability studies by using various parameters.

### WOUND CONTRACTION

Wound contraction is another parameter used to assess wound healing. Significant wound contraction was shown in table.

**Rate of wound contraction in experimental animal**

Groups	Wound closure (mm <sup>2</sup> )	
	0 <sup>th</sup> day	14 <sup>th</sup> day
Group I	508.50 ± 5.23	286.83 ± 11.59
Group II	505.83 ± 4.79	100.5 ± 2.27
Group III	499.83 ± 3.92	65.17 ± 5.50
Group IV	504.83 ± 3.15	25.83 ± 2.37



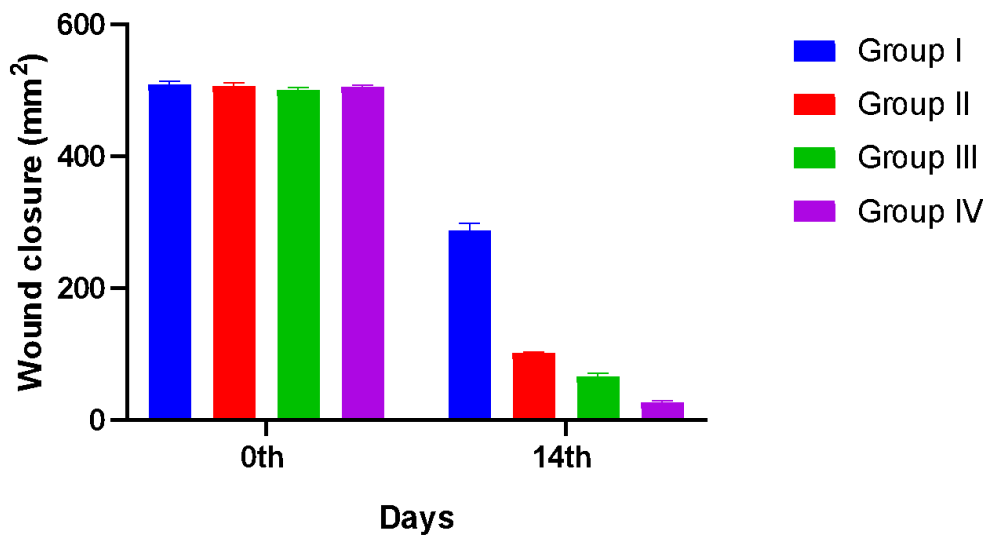


Fig.01 Rate of wound concentration in experimental animal

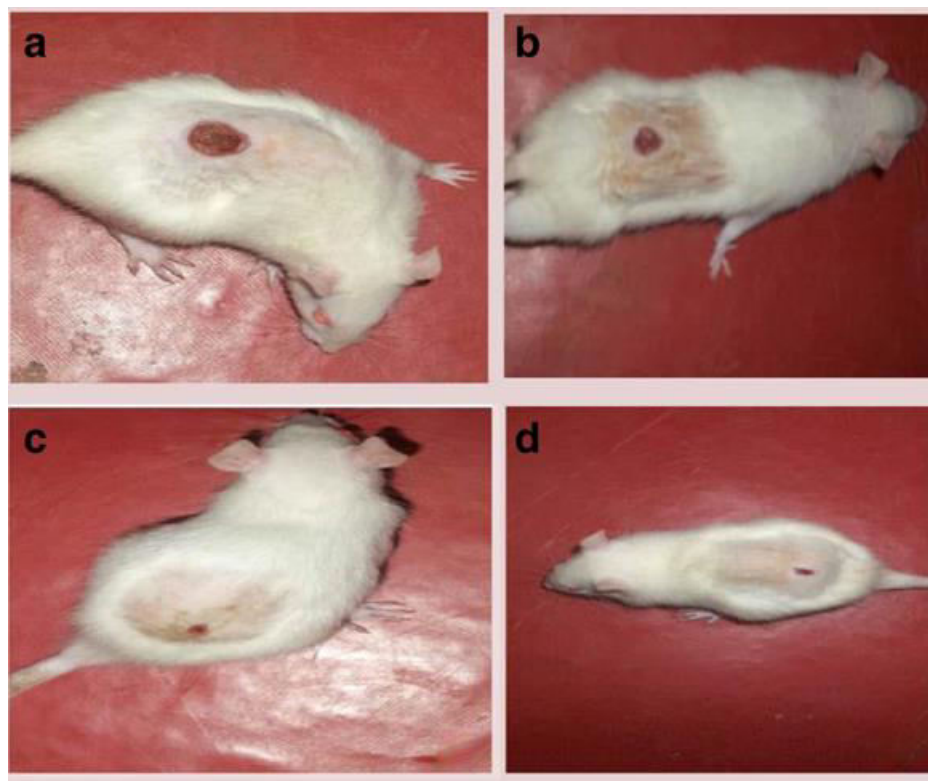



Fig.02 Wound healing activity

- a - Group 1 (Normal control) 
- b – Group 2 (Formulation 10 %)
- c – Group 3 (Formulation 20 %)
- d – Group 4 (Mupirocin)

## DISCUSSION

From the above remarks, it can be concluded that all the parameters of the selected herbs were within in the Pharmacopeial limit indicates the high-quality quality of raw materials. The extract studies showed the presence of selected active constituents in significant amount. The microbiological studies indicated that the formulations possess anti-microbial activity against tested organisms. The wound contraction studies revealed that the wound contraction increases on increasing the concentration of herbal extract. The study also reveals that the better activity of polyherbal formulation may be due to the synergistic action of the plant's constituents present in the formulation. Thus, the prepared topical gels possess a versatile approach in healing the wound.

## IV. CONCLUSION

In pharmacological evaluation *Aloe vera*, *Cinnamomum cassia* & *Curcuma longa* showed significant wound healing effects as compared control group. The polyherbal lotion that is the combination of these three drugs of prepared poly herbal lotion (20% formulation) showed synergistic wound healing activity as compared to poly herbal lotion (10% formulation). The prepared herbal lotion showed significant wound healing activity and the combination of *Aloe vera*, *Cinnamomum cassia* & *Curcuma longa* had synergistic wound healing activity. In present study it is concluded that wound healing potential of polyherbal lotion is better than control group. In polyherbal lotion there is the higher percentage of wound contraction. The present study is a platform and the work would go on a long a way in extracting the potential of *Aloe vera*, *Cinnamomum cassia* & *Curcuma longa* lotion for the various activity. The 20% Poly Herbal Lotion shows significant activity but as compared to standard drug the 20% poly herbal lotion shows less significant activity.

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## REFERENCES

1. Jones & Bartlett. American Academy of Pediatrics (2011). First Aid for Families. p. 39. ISBN 978-0763755522.
2. Orsted HL, Keast D, Forest-Lalande L, Medie MF. Basic principles of wound healing. Wound Care Canada, 9, 2004, 4–12.
3. Thomas AC, Wysocki AB (February 1990). "The healing wound: a comparison of three clinically useful methods of measurement". Decubitus. 3 (1): 18–20, 24–25. PMID 2322408.
4. Future. Journal of Pharmaceutical; 2002. p. 160-3.
5. Barua CC, Talukdar A, Barua AG, Sarma RK, Bora RS. Evaluation of the wound healing activity of methanolic extract of *Azadirachta Indica* (Neem) and *Tinospora cordifolia* (Guduchi) in rats. Pharmacology Res Online 2010; 1:70-7.
6. Jason KO, MD Joel, D Herbert. The effect of ZD6474, an inhibitor of VEGF signaling; On cutaneous wound healing in mice. J Surgical Res 2005; 129:251-2

7. James W.D, Berger T.G, and Elston D.M, 2006, Philadelphia: Elsevier Saunders. *Andrews' Diseases of the Skin: Clinical Dermatology* (10th ed., p. 4), Copyright 2006 by Elsevier Saunders.
8. Shah B. & Seth A.K, A Textbook of Pharmacognosy and Phytochemistry, by, Elsevier Publication India Private Limited, First Edition 2010, Page No. 339, 291 and 238.
9. Retrouvey H, Adibfar A, Shahrokhi S (January 2020). "Extremity Mobilization After Split-Thickness Skin Graft Application: A Survey of Current Burn Surgeon Practices". *Annals of Plastic Surgery*. 84 (1): 30–34. doi:10.1097/SAP.0000000000001993. PMID 31633538. S2CID 204815208.
10. Xu R, Luo, Xia H et al., "Novel bilayer wound dressing composed of silicone rubber with particular micropores enhanced wound e-epithelialization and contraction," *Biomaterials*, vol. 40, pp. 1–11, 2015.
11. Arya A. K, Tripathi K, and Das P, "Promising role of ANGPTL4 gene in diabetic wound healing," *Be International Journal of Lower Extremity Wounds*, vol. 13, no. 1, pp. 58–63, 2014.
12. Martin P, Leibovich SJ. 2005. Inflammatory cells during wound repair: the good, the bad and the ugly. *Trends Cell Biol*. 15, 599–607.
13. Ghosh PK, Gaba A (2013). "Phyto-extracts in wound healing". *Journal of Pharmacy & Pharmaceutical Sciences*. 16 (5): 760–820. doi:10.18433/j3831v. PMID 24393557.
14. McLain NE, Moore ZE, Avsar P, et al. (Cochrane Wounds Group) (March 2021). "Wound cleansing for treating venous leg ulcers". *The Cochrane Database of Systematic Reviews*. 2021 (3):
15. Madhava Chetty K, Sivaji K, Tulasirao K. Flowering plants of Chittor District, Andhra Pradesh. Tirupati, India: Students offset printers; 2008. p. 277.
16. Negahdari S, Galehdari H, Kesmati M, Rezaie A, and Shariati G, "Wound healing activity of extracts and formulations of Aloe vera, Henna, *Adiantum capillus-veneris*, and Myrrh on mouse dermal fibroblast cells," *International Journal of Preventive Medicine*, vol. 8, p. 18, 2017.
17. Jull AB, Cullum N, Dumville JC, Westby MJ, Deshpande S, Walker N (6 March 2015). "Honey as a topical treatment for wounds". *Cochrane Database of Systematic Reviews*. 3 (3): CD005083. doi:10.1002/14651858.CD005083.pub4. PMID 25742878.
18. Agarry OO, Olaley MT, Bello-Michael CO. Comparative antimicrobial activities of Aloe vera gel and leaf. *Afr J Biotechnol*. 2005; 4:1413–4.
19. Hou Q, He W.-J, Chen L, et al., "Effects of the four-herb compound ANBP on wound healing promotion in diabetic mice," *Be International Journal of Lower Extremity Wounds*, vol. 14, no. 4, pp. 335–342, 2015.
20. Adhirajan N, Ravi Kumar T, Shanmugasundaram N, and Babu M, "In vivo and in vitro evaluation of hair growth potential of *Hibiscus rosa-sinensis* Linn.," *Journal of Ethnopharmacology*, vol. 88, no. 2-3, pp. 235–239, 2003.
21. Hashemi SA., Madani SA., Abediankenari S. The review on properties of Aloe vera in healing of cutaneous wounds. *Biomed. Res. Int*, 2015, 714216.
22. Martin P, Leibovich SJ. 2005. Inflammatory cells during wound repair: the good, the bad and the ugly. *Trends Cell Biol*. 15, 599–607.
23. Killedar S.G, Harinath N. Antimicrobial and phytochemical screening of different leaf extracts of *memecylon umbellatum burm*. *Int Res J Pharmacy*.2012;3:188–92.
24. Agarry OO, Olaley MT, Bello-Michael CO. Comparative antimicrobial activities of Aloe vera gel and leaf. *Afr J Biotechnol*. 2005; 4:1413–4.
25. Ukil A, Maity S, Karmakar S, Datta N, Vedasiromoni JR, Das PK. Curcumin, the major component of food flavour turmeric, reduces mucosal injury in trinitrobenzene sulphonic acid-induced colitis. *Br J Pharmacol*. 2003; 139:209–18.
26. Roesch M, Perreten V, Dohr MG, Schaeren W, Schallibaum M, Blum JW. Comparison of antibiotic resistance of udder pathogens in dairy cows kept on organic and on conventional farms. *J Dairy Sci*. 2006; 89:989–97.



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