ISSN: 0974-6943

Research Article

Wound healing activity of herbal formulation

Mrs Archana A.Bele*, Dr Mrs Varsha M.Jadhav, Dr V.J.Kadam

*[1]**Bharati Vidhyapeeth College of Pharmacy, Navi Mumbai, M.S.**

For correspondence: Mrs.Archana A.Bele ,Department of Quality Assurance, Bharati Vidhyapeeth College of Pharmacy, Navi Mumbai, M.S

E-mail:drvmjadhav_bvcop@rediffmail.com, archana.bele@gmail.com

Received on:11-01-2009; Accepted on :04-02-2009

ABSTRACT

Topical drug delivery in the form of gel having antibacterial activity was formulated and characterized.Wound healing potential of herbal formulation for treatment of wound in rats was studied on excision wound model.Epithelization period along with wound contraction were used to evaluate the effect of herbal formulation on wound healing. The results obtained indicate that Herbal Formulation accelerates the wound healing process by decreasing the surface area of the wound. Silver sulfadiazine and ViccoTurmeric was used as a standard. Complete epithelization was observed within 14 days for formulation. Crude extracts of *Punica granatum* pericarp and *Curcuma longa* rhizome were used in the formulation with different concentration.

Key words: **Wound healing activity, Formulation, *Punica granatum* pericarp and *Curcuma longa* rhizome, concentration, epithelization.**

INTRODUCTION

Wounds are physical injuries that result in an opening or breaking of the skin. Wound healing is a complex process that results in the contraction and closure of the wound and restoration of a functional barrier (1) 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 (2) Repair of injured tissues includes inflammation, proliferation, and migration of different cell types (3) Inflammation, which constitutes a part of the acute response, results in a coordinated influx of neutrophils at the wound site[6]. In spite of tremendous advances in the pharmaceutical drug industry, the availability of drugs capable of stimulating the process of wound repair is still limited . The search for natural remedies for healing has drawn attention to herbals. *Punica granatum* pericarp[4,5] and *Curcuma longa* [3,7] has been reported to be used in the treatment of wounds and is loaded into hydrogel.

EXPERIMENTAL

Materials: The herbs used for study were obtained from Jadhavji Lallubhai and Co, 245, Kalbadevi road, Mumbai-2.The drugs were sun dried and ground into powder.

Extraction

Plant material were collected and washed with distilled water and sundried and ground to powder. Individual drugs 15gm each *Punica granatum* and *Curcuma longa* were subjected for methanolic extraction using a Soxhlet extractor. The methanolic extract was concentrated and evaporated under water bath. Dried powder of 2gm in case of *Punica granatum* and resinous mass of 3.5gm in case of *Curcuma longa* were obtained. From this required quantity was used for formulation of the gel.

Method:

Preparation of hydrogel :A water-soluble gel was prepared using the dried methanol extract of Pomegranate peel and Curcuma longa rhizome. The gel was composed of carbapol-934 - 2.5%, propylene glycol - 25.75%, propylparaben - 2.5%, Tri ethanol amine-0.8 ml and distill water in a quantity sufficient to prepare 100gm of gel in case of blank gel .Water required for these formulations was divided into two parts .In one part the exact amount of extract was dissolved and in other part, carbapol was soaked overnight And to this solution propylene glycol and propylparaben were added. Both these solutions were mixed in a beaker and triethanolamine was added to the mixture dropwise to obtain the proper gel consistency[4].

Animals:

Sprague Dawley rats weighing 170-190 gms of either sex were used for the study. The animals were procured and housed in the animal house of Bharati Vidhyapeeth's college of pharmacy Navi Mumbai at least 2 weeks prior to the study, so that animals could adapt to the new environment.Animal house was well maintained under standard hygienic conditions, at a temperature (22 ± 2°C), room humidity (60 % ± 10%) with 12 hours day and night cycle, with food and water *ad libitum*. Rats were housed in groups of 6 per cage. They were provided with commercial food

ISSN: 0974-6943

pellets and purified water. Cleaning and sanitation work was done on alternate days. Paddy husk was provided as bedding material, which was changed every day. The cages were maintained clean[2].All the pharmacological work was carried out after obtaining the approval from the Institutional Animal Ethical committee IAEC/PR/2008/21 CPCSEA-762.

Wound healing activity studies

In the present study, excision wound model was employed to study the rate of wound contraction and epithelization.

Work Plan

Adult Sprague Dawley rats of either sex, weighing between 170-190 gms were used for evaluation of wound healing activity. The animals were divided into five groups.

Group I: Positive control (blank gel) X 6

Group II: Negative control (not treated) X 6

Group III: Formulation X 6

Group IV: Silver sulfadiazine X 6

Group V: Vicco turmeric X 6

The hairs were removed from the dorsal thoracic region of the rats using depilitor, Anne French hair removing cream (Wyeth consumer health care division). A full thickness excision wound[1] of circular area of 300mm^2 and 2mm in depth was created along the markings under mild anesthesia.The Formulation was topically applied once a day till complete epithelization, starting from the day of the exicision. The areas of the wounds were measured by tracing the wounds on to a graph paper on the day of wounding and subsequently on 2nd, 6th, 10th, and 14th day post wounding. The number of days required for falling of the scar without any residual raw wound, gave the period of epithelization. The observations of the percentage wound contraction were made on 2nd, 6th, 10th, and 14th post wounding days. All the values were statistically analyzed by ANOVA and Tukey- Kramer multiple comparison tests.

RESULTS AND DISCUSSION

Wound Healing activity study

In the present study, the rate of wound contraction[6] and epithelization.was studied. It was found that, Formulation showed significant wound contraction from 14th day of topical application of the formulation when compared with the control group. Epithelization occurred faster in the Formula-

Table.1. Wound healing activity of gel formulation in comparision with marketed preparation

Treatment	Control	(Formulation)	(*Silver Sulfadiazine*)	(*Vicco Turmeruic*)
Day 2 %contraction	21.56±2.365	14.865±4.590	21.827±3.031	17.977±3.504
Day 6 %contraction	46.843±6.409	45.657±5.154	46.360±4.668	43.947±5.388
Day 10 %contraction	81.945±4.560	91.645±1.811	92.408±1.683	91.925±1.563
Day 14 % contraction	93.300± 0.6498	97.458± 0.5284***	97.477± 0.4955***	97.682± 0.7683***
Period of epithelialization (days)	16.400±0.8718	13.333±0.7601*	14.167±0.9098	13.667±0.8819

The Values are expressed as mean ± SEM; n= 6 animals in each group;For Day 14th Contraction;One-way Anova: P value found to be 0.0001 is considered extremely significant..,Tukey- Kramer multiple comparison test.,*** P < 0.001 when compared to control.,For Period of Epithelization.,*One-way Anova: P value found to be,0.0272 is considered significant.Tukey- Kramer multiple comparison test:* *P < 0.05 when compared to control.

Fig.1 Histogram showing wound healing activity of gel (Day-2)

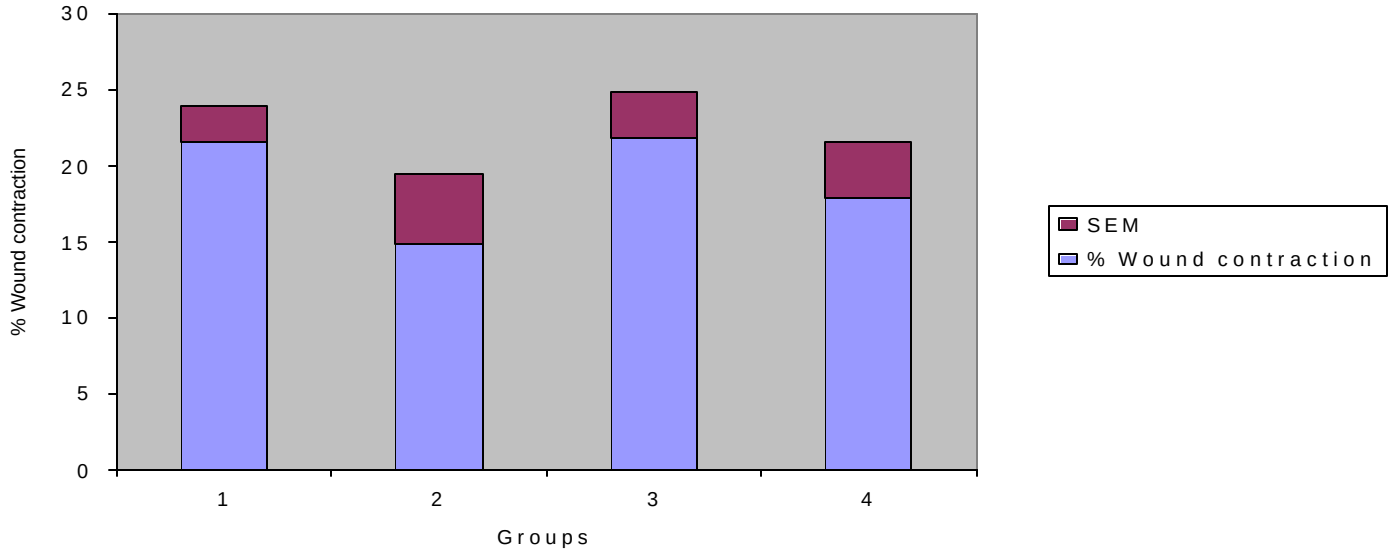


Fig.2Histogram showing wound healing activity of gel
(Day- 6)

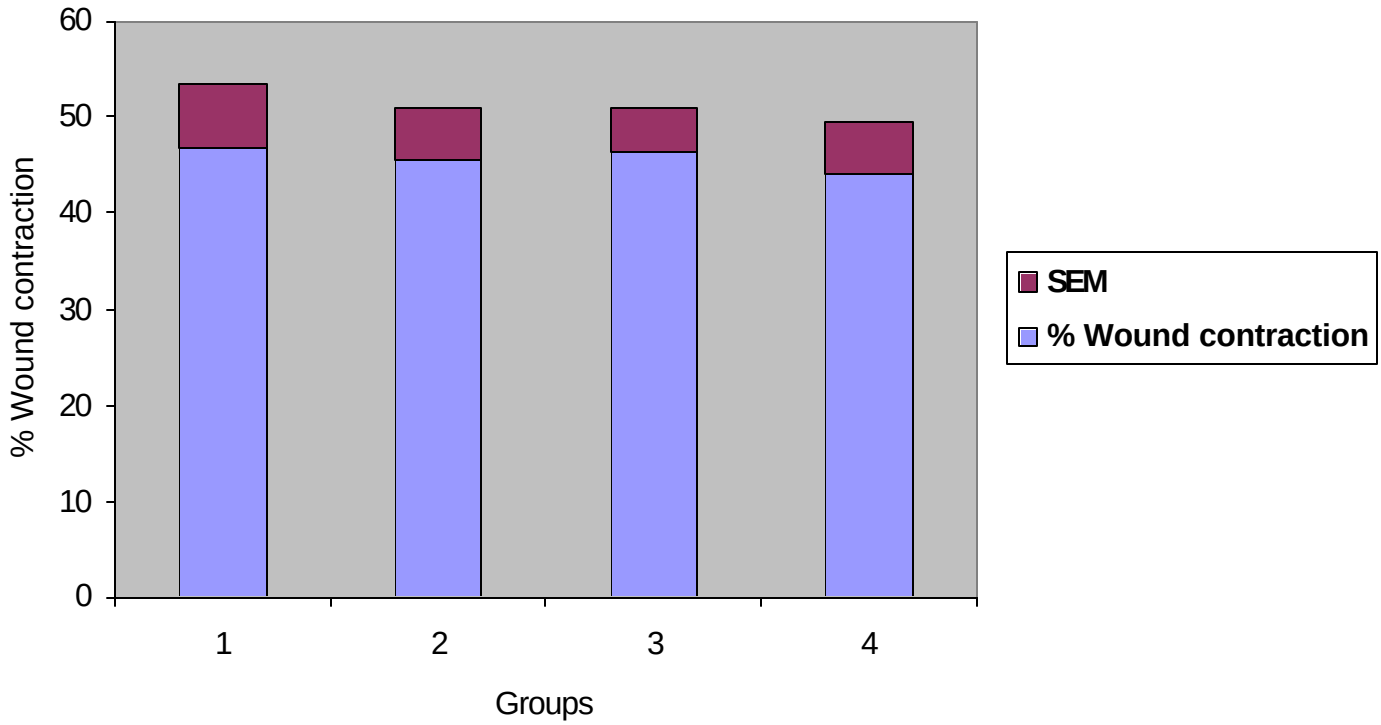
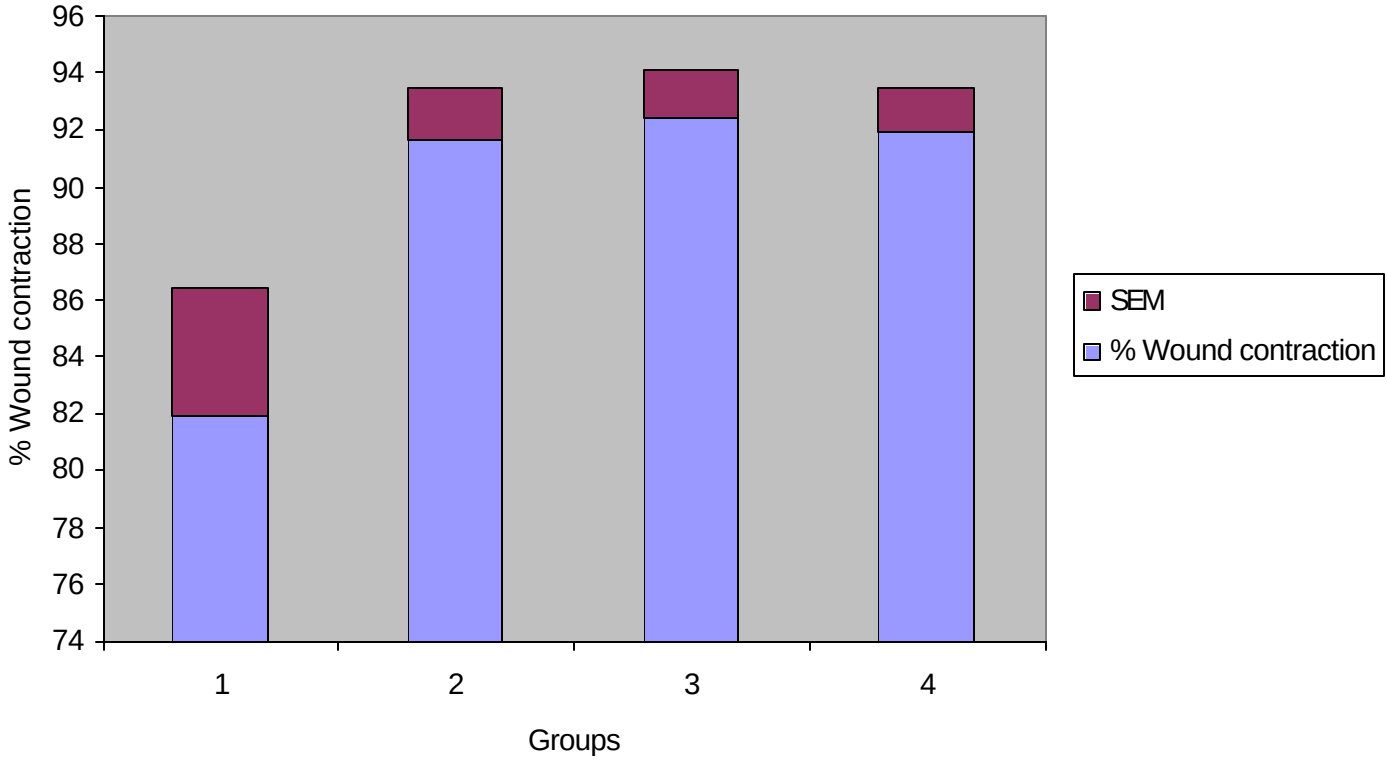
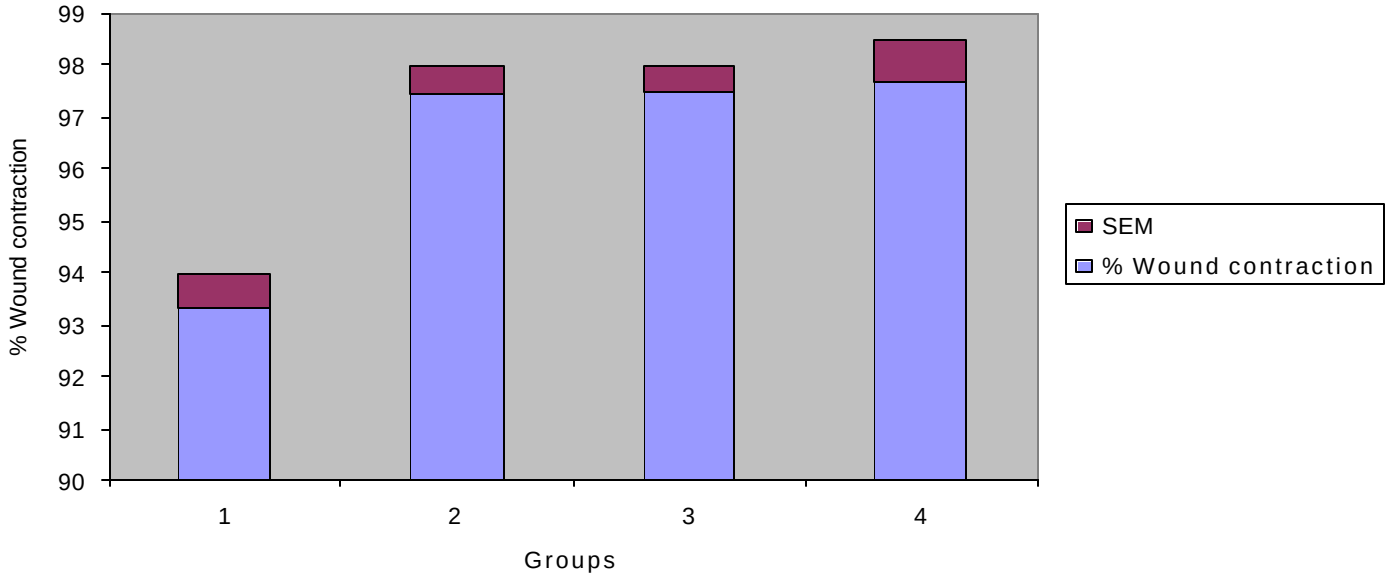


Fig.3. Histogram showing wound healing activity of gel .
(Day- 10)



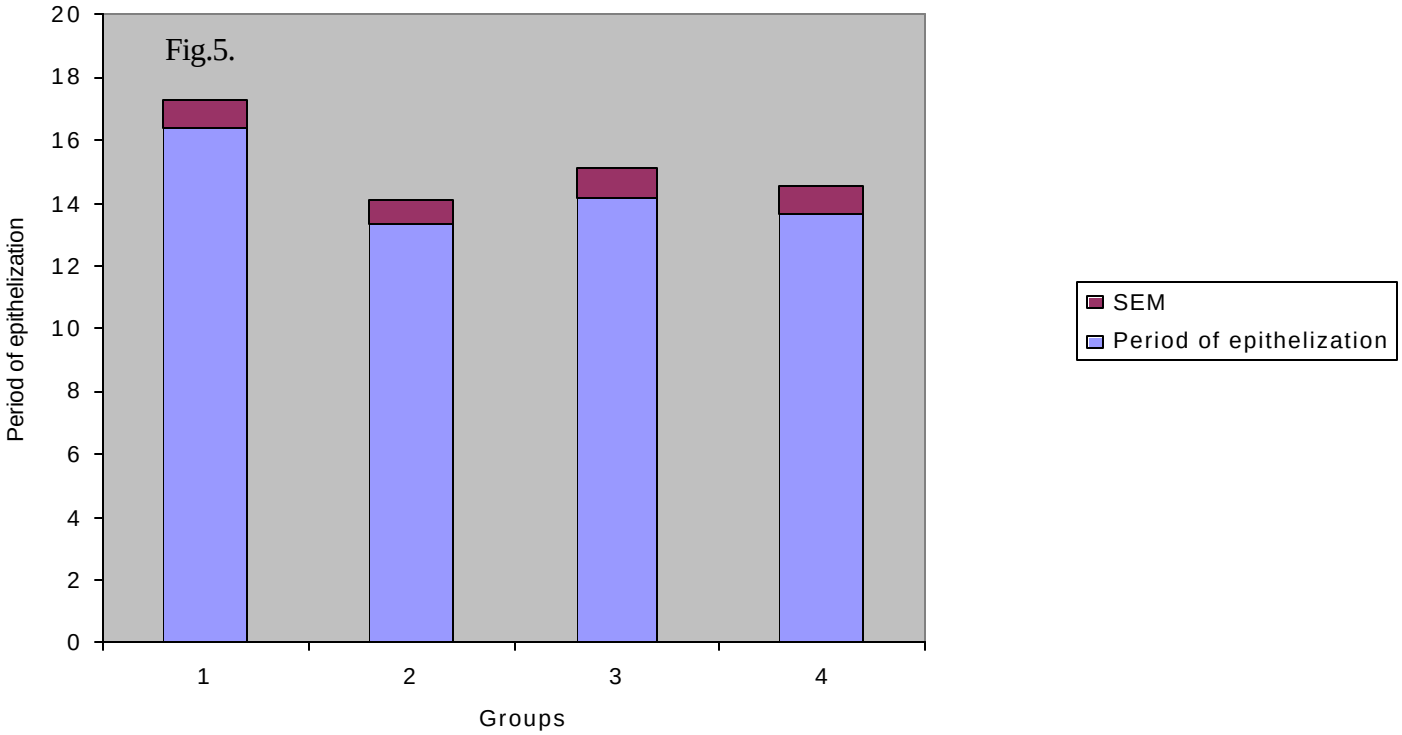
ISSN: 0974-6943

Fig.4. Histogram showing wound healing activity of gel (Day- 14)



Histogram showing wound healing activity of gel (Period of epithelization)

Fig.5.



In Figs. (01- 05) 1, 2, 3, and 4 represents control, Formulation, SilverSulfadiazine, and Vicco Turmeric groups respectively

tion groups when compared with the control group. The changes in wound area were measured at fixed time intervals, viz 2nd, 6th , 10th and 14h days post wounding. Period of epithelization was 14th days for the treatment groups, whereas it was 17 days for control group animals. The results of wound healing are presented in the Table.1.

REFERENCES

1. Nayak B.S, Pereira L P, Maharaj D, Indian Journal of Experimental Biology, Vol 45. August 2007, pg 739-743
2. Indian Journal of pharmamacology 2003 ; 35:257-274
3. Indian Herbal Pharmacopoeia Revised new edition 2002 published by Indian drug manufacturing association. Mumbai pg no 169-180
4.. Murthy K.N.C , Reddy V , Med Food 7 (2) 2004, 256-259
5. Quality standard of Indian Medicinal Plants2005, volume3, 299-306
6. Raghavan g, Vijaykumar M, Rao C.V, Acta Pharma 54 (2004) 331-338
7. Suman K.Das,Hari Har P.Cohly,United States Patent[19] patent number 5,401,504

Source of support: Nil, Conflict of interest: None Declared