



STANDARDIZATION AND EVALUATION OF VRANA ROPANA COMPOUND IN WOUND HEALING.

Shailendradatta Mishra¹, Anita Wanjari²

M.D. Scholar, Dept. RSBK, MGACH & RC, Salod (H), Wardha.
Prof. Dept. RSBK, MGACH & RC Salod (H), Wardha.

Corresponding Author: shailendradattamishra1988@gmail.com

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ABSTRACT

Wound healing is a physiological phenomenon of regeneration and repair after injury. It is a natural biological process, as wounds elicit a consistent response in the body. However, in some conditions, the body becomes unable to heal the wound, and medicines are needed to support the body's healing mechanism. *Ayurveda* has discovered many excellent remedies for wound healing.

Keywords: Wound Healing, Ointment, *Ayurveda*, Animal Study, Standardization.

INTRODUCTION

Ayurveda, the first systematic science to evolve worldwide, emphasizes physical and mental fitness, prevention, and preservation of health in a comprehensive manner. This ancient science, developed from the extrasensory logic of our great seers, is crowned with undoubted knowledge that is unchallenged to this day.

The concept of wound is as old as human life. The earliest reference to wounds is found in Vedic literature in the context of injuries. The basic idea of wound cleansing, closure and splinting has been described in various medical systems. Wounds occur when the skin is broken or damaged because of an injury. Causes of injury may be the result of mechanical, chemical, electrical, thermal or nuclear sources.

Inflammation is the skin's initial response to injury. Superficial wounds and abrasions leave deeper skin layers intact. These types of wounds are usually caused by friction, rubbing against an abrasive surface. Healing or closure of a wound has many associated complications like infection, scarring, gangrene, etc. In the case of the wound healing process, exposure to infection and prolongation of the inflammatory phase play the prime role in delaying the process, whereas creating the favorable conditions to allow the wound to heal properly is the ultimate aim. [1]

Proper wound care is necessary to prevent infection, ensure there are no other associated injuries, and promote skin healing. If possible, a good cosmetic result after the wound has completely healed is also a goal.

Materials: -

Table 1 contains the Vrana ropana Compound's properties, quantity and references.

Drug Name	Latin Name/English Name	Properties	Quantity in %	References
Ghrita kumari	<i>Aloe vera</i> Tourn. Ex. Linn.	<i>Madhur-rasa, Bhedan, Vrana ropana, Krimighna</i>		Bhavaprakash Nighantu Guduchyadi varga 118/229-230 [6]
Madhu	Honey	<i>Vilekhana, Vrana shodhan and ropana, Krimighna</i>		Bhavaprakash Nighantu Madhu varga 1/1-2 [7]
Yavakshara	<i>Potasii carbonas</i>	<i>Lekhana, Raktashodhak, Kaphanisararak</i>		Su. Chi. 1/39-40 [8]
Yashada Bhasma	Incinerated Zinc	Used in <i>dushta vrana, Vranasravarodhaka</i>		Rasatarangini 19/146-147 [9]
Petrolatum	-	Ointment Base	40%	Textbook of Bhaishajya Kalpana Chapter 43, Page-410 [10]
Preservative (Methyl Paraben)	-	Preservative	0.2%	-

Method: -

The ointment is prepared by incorporation. In this method, the components of the ointment, Ghrita kumari, Madhu, Yavakshara, Yashada Bhasma, and Petrolatum, are mixed together until uniform preparation has been attained.

Analytical Study: -

To obtain products of desired qualities, one must appreciate the various factors that introduce quality defects into the final product. In this phase of the study, the physicochemical analysis of the different samples of the Vrana Ropana Compound was conducted.

The present study is to study an anti-microbial activity and the wound healing property of the ointment prepared with the help of *Ghrita kumari* which has the properties of *bhedana, vrana ropana, krimighna* [2], *Madhu* has the properties of *vilekhana, Vrana Shodhana & Ropana, krimighna* [3], *Yavakshara* has *lekhana, raktashodhaka, kaphanisaraka* [4] properties and *yashada bhasma* which is used in *dushta vrana* and has *vranasravarodhaka* properties. [5]

Objectives: -

- i. Prepare and standardize the *Vrana Ropana* Compound.
- ii. To study the antimicrobial activity of the ointment.
- iii. To study the gross wound healing effect of the ointment.

Table no. 2: Parameters studied in ointment.

Organoleptic Characters	Physicochemical Parameters
<i>Sparsha</i>	pH
<i>Rupa</i>	Rancidity
<i>Gandha</i>	Spread Ability
	Thermal Stability
	Solubility
	Specific Gravity
	Viscosity
	Antimicrobial Study
	Total Microbial Count
	Total Yeast and Mould
	Sun Exposure Assessment

Pharmacological Study:

The drugs used in the *Vrana Ropana Compound* individually have a potent therapeutic effect on wound healing. The combination of drugs may have a synergistic action, which is a hypothesis of the study. An experimental study was carried out to establish this hypothesis. Further, drugs are often used therapeutically in any medical system based on their conceptual basis without experimental validation based on modern pharmacological concepts. There is a view that it would be helpful to re-evaluate them experimentally to ascertain whether a pharmacological basis as per modern concepts can be given for therapeutic use.

Criteria for undertaking experimental study:

Vrana Ropana Compound may be considered a very good wound healer. These results are also to be compared against a standard drug (Povidone-Iodine ointment) to evaluate its actual potency. Hence, the present study was planned to evaluate the experimental effect of the trial drug.

Preparation of trial drugs: The trial drug was prepared at Dattatray Ayurveda *Rasashala*, Mahatma Gandhi Ayurveda College Hospital & Research Center, Salod (H), Wardha. The details are given in the pharmaceutical part of this dissertation.

Selection of animals

Animal species: Wistar rats

Source: Animal house attached to Jawaharlal Nehru Medical College (DMIMS, DU), Sawangi Meghe, Wardha.

Approval: The experimental protocol was submitted to the institute's animal ethics committee, and approval was obtained for conducting the experiment (IAEC number DMIMSDU / IAEC / 2015-16 / 003) with Registration number 571 / a / CPCSEA.

Selection: 18 adult and healthy rats of either sex weighing 150 to 250 grams were selected for the study.

Excision wound model: Before the operative procedure, all the instruments (scissors, forceps, etc.) were autoclaved. The area to be exercised (on the back portion of the rats) was shaved carefully by scissors before the procedure without causing any abrasions. The rats were anaesthetized with the mixture of Xylazine 0.4ml and Ketamine 0.4ml by intraperitoneal route, and they were inflicted with excision wounds as described by Morton and

Malone. The fur of the dorsal region of the animals was shaved, and the area of the wound to be created was outlined on the back of the animals with a marker. The full thickness of the excision wound of circular area with 15mm (1.5cm) of diameter was created along the markings with a surgical blade.

Drug Administration: The trial drug was applied externally on the excision wound according to the wound area once daily.

The animals were randomly divided into three groups and kept in separate cages. The first group served as the control, treated with NS water; the second group was treated with Standard drug Povidone-Iodine (Betadine) Ointment; and the third group was treated with *Vrana Ropana* Compound. The vehicle, trial

drug and standard drugs were applied to respective groups once daily. The area of the wound was calculated in terms of millimeters (mm) with the help of a

scale. The duration required for complete healing was also noted down.

Observation & Result:

Table no. 3: Organoleptic Evaluation of *Vrana Ropana* Compound Sample.

S.N.	Organoleptic Evaluation	Observations		
		Sample 1	Sample 2	Sample 3
1.	<i>Sparsha</i>	Slightly Rough	Slightly Rough	Slightly Rough
2.	<i>Rupa</i>	Dark grey	Dark grey	Dark grey
3.	<i>Rasa</i>	Not specific	Not specific	Not specific
4.	Time Duration (Average)	15 to 30 minutes	15 to 30 minutes	15 to 30 minutes
5.	Weight of the final product	96.67 gms	95.53 gms	96.18 gms
6.	Weight Loss	3.33 gms	4.47 gms	3.82 gms

Table no. 4: Characteristics of several samples of *Vrana Ropana* Compound.

S.N.	Parameter	Sample			Average	
		Sample 1	Sample 2	Sample 3		
1.	pH	7.8	7.6	7.9	7.7	
2.	Rancidity Test	-ve	-ve	-ve	-ve	
3.	Spread Ability	6.3 g cm/sec	6.4 g cm/sec	6.6 g cm/sec	6.4 g cm/sec	
4.	Thermal Stability	Stable at 45°C ± 1°C for 48 hours.	Stable at 45°C ± 1°C for 48 hours.	Stable at 45°C ± 1°C for 48 hours.	Stable at 45°C ± 1°C for 48 hours.	
5.	Solubility	Water	Non-Soluble	Non-Soluble	Non-Soluble	Non-Soluble
		Ethanol	Soluble in 64 parts of boiling absolute alcohol	Soluble in 64 parts of boiling absolute alcohol	Soluble in 64 parts of boiling absolute alcohol	Soluble in 64 parts of boiling absolute alcohol
		Chloroform	Soluble	Soluble	Soluble	Soluble
6.	Specific Gravity	1.168	1.163	1.164	1.165	
7.	Skin Irritation	Non-Irritant	Non-Irritant	Non-Irritant	Non-Irritant	
8.	Viscosity	16 cps	14 cps	13 cps	14.33 cps	

Table no. 5: Anti-microbial activity of all the samples of *Vrana Ropana* Compound.

S.N.	Parameters	Samples			Average	
		Sample 1	Sample 2	Sample 3		
1.	Total Microbial Plate Count	92 cfu/gm	94 cfu/gm	91 cfu/gm	92 cfu/gm	
2.	Total Yeast and Mould Count	<10 cfu/gm	<10 cfu/gm	<10 cfu/gm	<10 cfu/gm	
3.	2 Gram +ve pathogens	<i>Staphylococcus aureus</i>	15mm	13mm	14mm	14mm
		<i>Bacillus subtilis</i>	13mm	11mm	15mm	13mm
4.	2 Gram -ve patho-	<i>Salmonella</i>	16mm	17mm	14mm	15.66mm

	gens	<i>Escherichia coli</i>	10mm	12mm	15mm	12.33mm
5.	Fungal Stain	<i>Aspergillus niger</i>	13mm	15mm	12mm	13.33mm

Total Pathogenic Count, Yeast, and Mould were also analysed and found to be within acceptable ranges. Thus, it can be assumed that the trial drugs are contamination-free and can be used safely in therapeutics.

Pharmacological:

Animals:

The Ethics Committee for animal experimentation approved this study. Healthy Wistar rats weighing 150-250gm were used for the study. They were individually housed and maintained on normal food and water *and libitum*.

The animals were divided into 3 groups, each containing six animals. The description of the animals is given below.

Table no. 6: Description of animals of different groups and wound size.

Description of Animals	Groups		
	Control	Standard	Trial
Names of animals	Wister Rats	Wister Rats	Wister Rats
Number	6	6	6
Weight (Average)	150-250gm	150-250gm	150-250gm
Wound Model	Excision	Excision	Excision
Drug Used	NS Water	Povidone-Iodine Ointment	<i>Vrana Ropana Compound</i>
Duration	Till the wound healing	Till the wound healing	Till the wound healing
Wound Size	15mm	15mm	15mm

Preparation of wound site by excision wound model:

The wound site was prepared following the excision wound model. Three groups of six animals were taken. The rats were anesthetized before and during the infliction of the experimental wounds. The surgical interventions were carried out under sterile conditions using diethyl ether. A wound was made in the dorsal region (15 mm). Animals were closely observed for any infection, but no signs of disease were seen during the study.

The excision model studied significantly improved wound healing activity observed with the prepared *Ayurvedic* ointment compared to the reference standard and control group of animals. In the excision wound model, *Ayurvedic* formulation (*Vrana Ropana Compound*) treated animals showed significant reduction in the wound area ($P < 0.05$) and a faster rate of epithelialization when compared with the standard and control group of animals. Contraction of the wound at the interval of 3 days is shown as follows:

Table no. 7: Contraction of Wound in mm of all the Groups (wound size 15mm).

Animals	Group 1					Group 2					Group 3				
	3 rd	6 th	9 th	12 th	13 th	3 rd	6 th	9 th	12 th	13 th	3 rd	6 th	9 th	12 th	13 th
Rat 1	14	13	11	8	6.5	13.5	11	9	6	3.5	12.5	10	6	2	00
Rat 2	14	12.5	11	8.5	6	13	11	8	6	3.7	12	10.5	6.5	1.8	00
Rat 3	13.5	12	10	8	6.8	13.5	11	9	6.5	3.4	12.6	10.2	6.3	1.9	00
Rat 4	14	12	11	9	6.6	13	11.3	8	6.1	3.2	12.4	10	6	2.1	00
Rat 5	13.7	12.6	10.8	8.4	6	13.6	11.3	9.4	6.7	3	12	9.8	5.9	2	00

Rat 6	13.3	12.2	11	8.5	6.5	13.5	11.6	9.4	6.8	3.6	12.3	10.2	5.8	2	00
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Photographic presentation of the wound:

Fig. no. 1 & 2: Measurement of wound day 0.



Pictures of the wound of the respective groups on the 3rd, 6th, 9th, 12th and 13th days:

Group 1: Control Group (Treated with NS water).

Fig. no. 3: Day 3

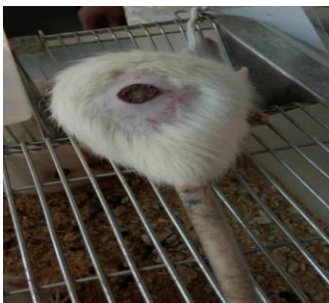


Fig. no. 4: Day 6



Fig. no. 5: Day 9

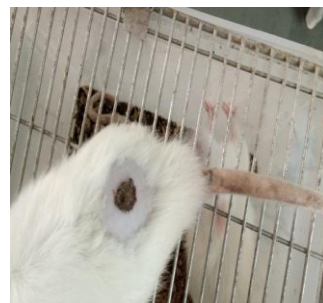
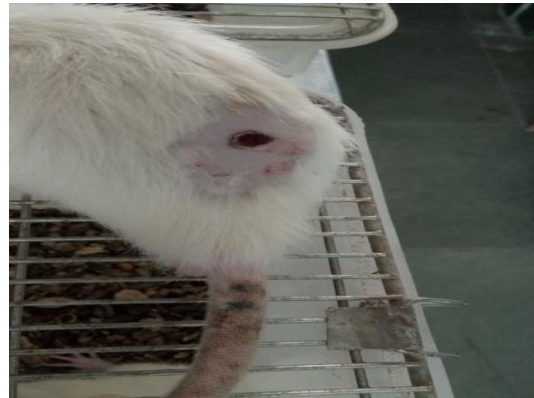


Fig. no. 6: Day 12



Fig. no. 7: Day 13



Group 2: Standard Group (Treated with Povidone-Iodine Ointment).

Fig. no. 8: Day 3

Fig. no. 9: Day 6



Fig. no. 10: Day 9



Fig. no. 11: Day 12

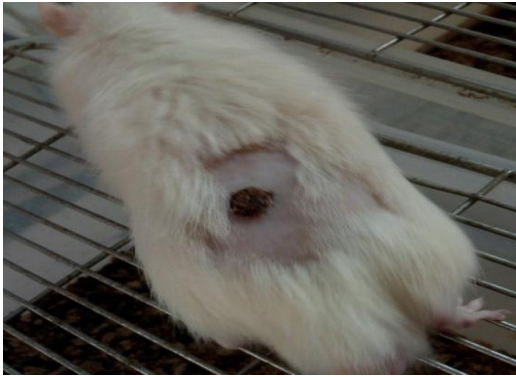
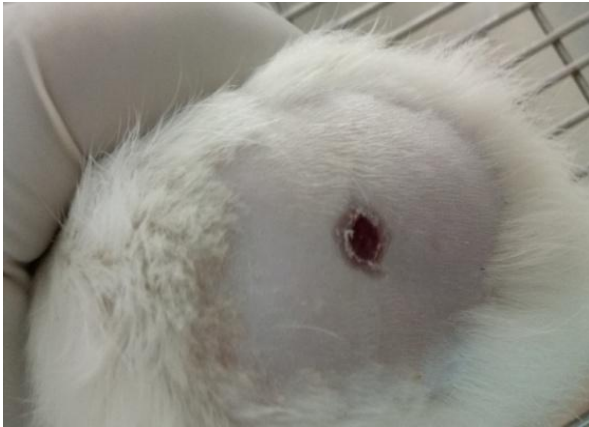


Fig. no. 12: Day 13



Group 3: Trial Group (Treated with *Vrana Ropana* Compound).

Fig. no. 13: Day 3

Fig. no. 14: Day 6



Fig. no. 15: Day 9

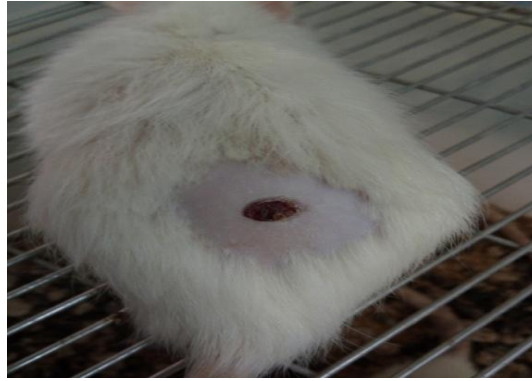


Fig. no. 16: Day 12



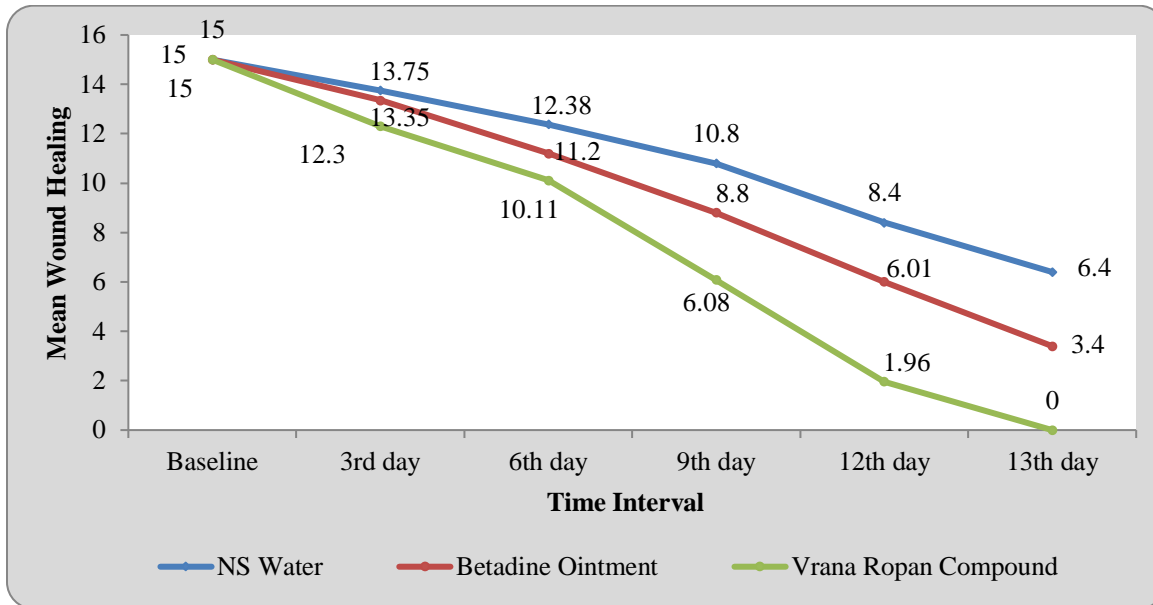
Fig. no. 17: Day 13



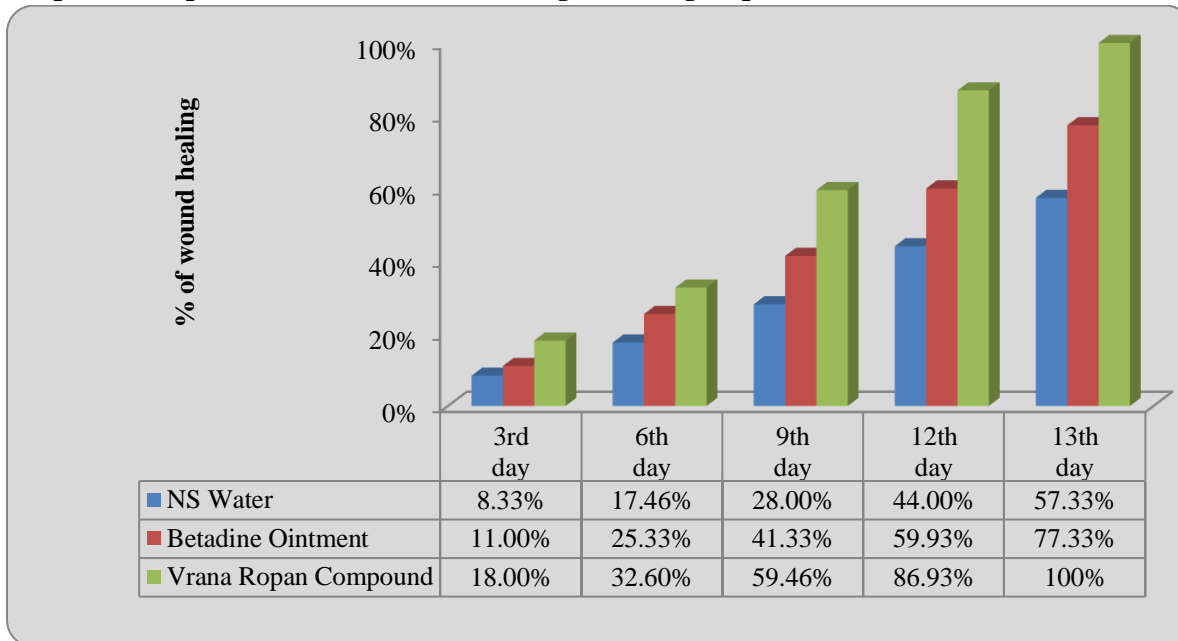
In the early days (up to 3 days), a moderately higher rate of contraction was observed with reference to the trial drug-treated group, whereas it was observed slightly less in the standard drug group. There was much difference noted among different groups. Around 24 days were required for complete healing in the control group, 18 days in the standard group and 13 days in the trial groups, which showed the significant wound healing activity of the Ayurvedic formulation (*Vrana Ropana Compound*).

Statistical analysis:

Graph 1: Comparison of wound healing in three groups.



Graph 2: Comparison of % of wound healing in three groups.



Mean wound healing at 3rd day in NS water group was 13.75±0.30, in Betadine Ointment it was 13.35±0.27 and in *Vrana Ropana Compound* group it was 12.30±0.25. By using One Way ANOVA, statistically significant variation was found in mean healing in three groups on the 3rd day (F=13.89, p=0.0001), and on comparing wound healing in three

groups, statistically significant difference was found in all groups except in NS water versus Betadine Ointment (p=0.060), which shows statistically no significant differences.

Mean wound healing at the 6th day in the NS water group was 12.38±0.39, in Betadine Ointment, it was 11.20±0.24, and in the *Vrana Ropana Compound* group, it was 10.11±0.24. Using One-Way ANOVA,

statistically significant variation was found in mean healing in three groups on the 6th day ($F=85.26$, $p=0.0001$). When wound healing was compared in three groups, a statistically significant difference was found in all groups ($p=0.0001$, S).

Mean wound healing at the 9th day in the NS water group was 10.80 ± 0.40 , in Betadine Ointment, 8.80 ± 0.64 , and in the Vrana Ropana Compound group, 6.08 ± 0.26 . Using One-Way ANOVA, statistically significant variation was found in mean healing in three groups on the 9th day ($F=156.24$, $p=0.0001$), and when wound healing was compared in three groups, a statistically significant difference was found in all groups ($p=0.0001$, S).

Mean wound healing at the 12th day in the NS water group was 8.40 ± 0.37 , in Betadine Ointment, it was 6.01 ± 0.82 , and in the Vrana Ropana Compound group, it was 1.96 ± 0.10 . Using One-Way ANOVA, statistically significant variation was found in mean healing in three groups on the 12th day ($F=229.87$, $p=0.0001$). When wound healing was compared in three groups, a statistically significant difference was found in all groups ($p=0.0001$, S).

Mean wound healing at 13th day in NS water group was 6.40 ± 0.32 , in Betadine Ointment it was 3.40 ± 0.26 and in Vrana Ropana Compound group it was 0 ± 0 . By using One Way ANOVA, statistically significant variation was found in mean healing in three groups at 13th day ($F=1048.63$, $p=0.0001$), and on comparing wound healing in three groups, statistically significant difference was found in all groups ($p=0.0001$, S)

DISCUSSION

Most of the Vrana Ropana Compound drugs have Krimighna, Vrana Ropaka, Vrana Shodhaka, Raktashodhaka, Raktaprasadaka, and Shothaghna properties. By nature, they have Kapha-Pitta, Vatahara, and Srotogami properties, which help in repairing all the blocked channels and aid in the proliferation of surrounding connective tissue elements and capillaries, which migrate into the site to be repaired.

The Rasayana, Krimighna, Shothahara, Vrana Ropana, and kandughna properties help in wound

healing, and they also prevent other complications of the wound, like inflammation, itching and infection. The Ruksha, Vrana Shodhaka and Ropaka, Sukshma properties of Madhu help in the drying up of the area and wound contraction, spreading into the deep and entire wound area due to which the wound heals fast. The Raktashodhaka, Srotogami, and Virechaka properties of Yavakshara help in wound healing through penetrating action and blood purifiers. As the Acharya Sushruta also said, the Virechana Karma is important in wound healing. The Raktashodhaka, Raktaprasadaka, and Vrana Sravarodhaka properties of Yashada Bhasma help in wound healing by purifying blood and improving the quality of blood. It also prevents wound secretions. This may be the cumulative effect of the Vrana Ropana Compound.

The statistical analysis applied to evaluate the results of the ointment showed that the value of P is 0.0001. Based on statistical analysis, the present study reveals that the Ayurvedic formulation (Vrana Ropana Compound) possesses potent wound-healing activity, which could be a good choice of remedy for wound healing compared to standard drugs.

CONCLUSION

The Vrana Ropana Compound was subjected to analytical parameters, of which stability and shelf life are essential. The trial drug has good wound healing activity. Vrana Ropana Compound has exposed better potency due to more therapeutic principles inherited during formulation manufacturing and the component drugs used. The physicochemical profile of the Vrana Ropana Compound was matched with official standards. The basic physicochemical profiles of the Vrana Ropana Compound developed in the study can be considered reference standards in future studies. Products were found to be free from microbial contamination. The antimicrobial analysis it was confirmed that Vrana Ropana Compound showed positive results against 2 gram positive and negative bacteria's such as *S. aureus*, *B. subtilis*, *Salmonella* and *E. coli* and in fungi such as *A. niger*. The pharmaceutical study observed that no changes occurred during the preparation of ointment, and it is a very good op-

tion for preparing the drug, which is time-saving and commercial. In Experimental trials, *Vrana Ropana* Compound showed an upper hand over the Standard drug in pacifying the signs and symptoms of *Vrana*. Comparison between the groups is statistically significant. No adverse reactions to the trial drug were reported in any animals during the study period.

REFERENCES

1. Lakshman Singh: Concept of vrana in Ayurveda page no. 1-2 Chaukhamba Orientalia 1st edition 2007.
2. K.C. Chunekar-Bhavprakash Nighantu page no. 404-Chaukhamba Bharati Academy Reprint edition 2013.
3. K.C. Chunekar-Bhavprakash Nighantu page no. 772-Chaukhamba Bharati Academy Reprint edition 2013.
4. Ambikadatta Shastri-Sushrut Samhita (Su. Chi. 1/39-40-page no. 9)-Chaukhamba Sanskrit Sansthan Reprint edition 2012.
5. Kashinath Shastrina-Rasatarangini (R.T. 19/146-147-page no. 483)-Motilal Banarasidas 11th edition 1979.
6. K.C. Chunekar-Bhavaprakasha Nighantu page no. 404-Chaukhamba Bharati Academy Reprint edition 2013.
7. K.C. Chunekar-Bhavaprakasha Nighantu page no. 772-Chaukhamba Bharati Academy Reprint edition 2013.
8. Ambikadatta Shastri-Sushruta Samhita (Su. Chi. 1/39-40-page no. 9)-Chaukhamba Sanskrit Sansthan Reprint edition 2012.
9. Kashinath Shastrina-Rasatarangini (R.T. 19/146-147-page no. 483)-Motilal Banarasidas 11th edition 1979.
10. Ravindra Angadi, Textbook of Bhaishajya Kalapana Vijnana (Pharmaceutical Science), Chapter 43, Page no. 410, Chaukhamba Surbharati Prakashan, Reprint edition 2011.

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