

FORMULATION AND EVALUATION OF HERBAL BURN GEL CONTAINING COMBINATION OF *ALOE BARBADENSIS* MILL AND *LAVANDULA OIL*

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ABSTRACT

The main aim of our research was to develop an herbal burn gel formulation and evaluation consisting of combination of aloe barbadensis mill, lavender oil, honey and turmeric for treatment of burn. The developed herbal burn gel consisting of combination of all herbal ingredients was found to safe a d effective for treatment of skin burn.

KEYWORDS: herbal burn gel, aloe barbadensis mill, Lavandula oil, Apis mellifera, Curcuma longa linn.

INTRODUCTION

A **gel** is a solid that can have properties ranging from soft and weak to hard and tough. . By weight, gels are mostly liquid, yet they behave like solids due to a three-dimensional cross-linked network within the liquid. It is the cross linking within the fluid that gives a gel its structure (hardness) and contributes to the adhesive stick (tack).

Burn gel is a handy product to have anywhere there is the possibly of an accident that can include any type of burn. There are literally hundreds of different brands and types of burn gels on the market, but there are also some that are specific for different types of burns. For example, a few types of burn gels are specific for the treatment of phosphorous burns. These burns are much more problematic because small particles of phosphorous can be lodged in the skin and continue to burn even after a typical burn treatment is applied.

Generally, all burn gels are a gelatin like substance that contains a high percentage of water along with soothing and pain-relieving ingredients. It is not an oil-based product like Vaseline and does not smother the burn, rather it allows the heat to dissipate into the gel, cooling and soothing the damaged skin and allowing protective moisture layer over the burn. This helps with immediate protection of the area from secondary bacterial infections and also helps to reduce the discomfort of even a minor burn. Generally, most burn gels are designed to avoid any possible problems with medications that may be required if medical attention follows use of the gel. Using burn gel is very simple and easy. Burn gel can be

used for minor burns or sun burn, even if the skin is not open and there is no significant damage to the skin. Early treatment with the soothing, cooling, and hydrating features of gel will assist with healing and comfort the patient until he is able to get to the hospital or doctor.

MATERIALS AND METHODS

Carbopol 934 and Carbopol 940 were obtained from Loba Chem. Pvt Ltd, Mumbai. Methyl paraben sodium and propyl paraben sodium were obtained from Hi Media laboratories. Glycerol and triethanolamine were obtained from Nice chemicals Pvt. Ltd, Mumbai. lavender oil and Aloe vera both are authenticated.

Animals

A total of 78 12-week old healthy wistar strain rats weighing 150-200 g of either sex, bred locally in the animal house were selected for the wound healing studies and 9 albino rabbits (average wt. 2.2 kg) were used for primary skin irritation test. They were housed under controlled conditions of temperature (23-2) humidity (50-5) and 10-14 hours of light and dark cycles. The animals were housed individually in polypropylene cages containing sterile paddy husk bedding and free access to food and water ad libitum. The study was conducted after obtaining the approval from Institutional Animal Ethical Committee.

STUDY DESIGN

The animals were randomly allocated in to 3 groups of six animals each for the wound healing studies of the extract and 10 groups of six animals each for the wound healing studies of the formulation as follows-

For wound healing studies of extract

Group I: Solvent control - treated with the solvent alcohol;

Group II: Test - treated with 4% alcoholic extract of Lavandula leaves & aloe barbadensis mill;

Group III: Untreated control - assigned as negative control.

For wound healing studies of the formulation

Group I: A1 treated with gel formulation of 4% alcoholic extract with 1% Carbopol 934;

Group II: A2 treated with gel formulation of 4% alcoholic extract with 1.5% Carbopol 934; Group III: A3 treated with gel formulation of 4% alcoholic extract with 2% Carbopol 934; Group IV: A4 treated with gel formulation of 4% alcoholic extract with 2.5% Carbopol 934; Group V: B1 treated with gel formulation of 4% alcoholic extract with 1% Carbopol 940;

Group VI: B2 treated with gel formulation of 4% alcoholic extract with 1.5% Carbopol 940; Group VII: B3 treated with gel formulation of 4% alcoholic extract with 2% Carbopol 940; Group VIII: B4 treated with gel formulation of 4% alcoholic extract with 2.5% Carbopol 940; Group IX: Control of Carbopol 934 treated with dummy gel of Carbopol 934;

Group X: Control of Carbopol 940 treated with dummy gel of Carbopol 94.

Wound healing studies of extract

Rats were anaesthetized with ketamine xylazine (50 mg/kg+5mg/kg) and the hair on the back was clipped with electric clippers. Burn wounds were created by using a device with an iron piece and a wooden handle placed on the back of the rat. It was heated to red hot over flame and was placed in contact with the back of anaesthetized rat up to 10 seconds without any pressure. After this, each animal was placed in a separate cage for full recovery from anesthesia before being returned to holding rooms. The wound of the test animal was applied with extract in glycerol and the control group I was applied with glycerol as the solvent control and control group 2 were left untreated. The application was repeated daily for the next 20 post-operatives

(1) Epithelization period: It was monitored by noting the number of days required for scar to fall away, leaving no raw wound behind;

(2) Wound contraction: To monitor this, progressive changes in wound area were followed planimetrically.

leaving the wounding day, wounds were traced on a transparent paper on an alternate day. The animal was restrained in proper position during tracing. The tracings were then transferred to 1 mm² graph sheet. From this, wound areas were read and the percentage of wound contraction was calculated taking the initial size of wound (250 mm²) as 100%.

FORMULATION OF GEL

Eight different formulations were prepared using different concentration of Carbopol 934 and Carbopol

940. The gel was prepared using the fresh juice of aloe barbadensis mill leaves, oil from Lavandula plant, curcuma longa Linn. And Apis mellifera. The gel was prepared using carbopal-940, propylene glycol 400, methanol methyl paraben, propylparaben, EDTA, Tri ethanolamine and distilled water in a quantity sufficient to prepare 100g of gel in case of blank gel. Water required for this formulation was divided into two parts. In one part the exact amount of extract was dissolved and to this calculated quantity of propylene glycol 400 and ethanol was added. In other part Carbopol 940 was dissolved and this solution methyl paraben, propyl paraben and EDTA was added. Both of these solutions were mixed on a beaker and tri ethanol amine was added to the mixture drop wise to obtain the gel consistency.

EVALUATION OF THE GEL

- **Estimation of drug content:** Each formulation (1 g) containing approximately 40 mg of drug was taken in a 50 mL volumetric flask and diluted with ethanol and shaken to dissolve the drug in ethanol. The solution was filtered through Whatman filter paper; 0.1 mL of the filtrate was pipette out and diluted to 10 mL with ethanol. The content of the drug was estimated spectrophotometrically by using standard curve plotted at 270 nm (λ max of extract). The gel formulations were observed for their visual appearance, transparency and homogeneity.
- **Extrudability:** A closed collapsible tube containing about 20 g of gel was pressed firmly at the crimped end and a clamp was applied to prevent any rollback. The cap was removed and the gel was extruded until the pressure was dissipated.
- **pH measurements:** pH measurements of the gel were carried out using a digital pH meter by dipping the glass electrode completely in to the gel system to cover the electrode.
- **Viscosity:** Viscosity of the gels was determined using Brookfield viscometer (Spindle type, S-24; model LVDV-E) at 10 rpm. 200 g of the gel was taken in a beaker and the spindle was dipped in it for about 5 minutes and then the reading was taken.
- **Spread ability:** Two sets of glass slides of standard dimensions were taken. The herbal gel formulation was placed over one of the slides. The other slide was placed on the top of the gel, such that the gel was sandwiched between the two slides in an area occupied by a distance of 7.5 cm along the slide. 100 g weight was placed upon the upper slides so that the gel between the two slides was pressed uniformly to form a thin layer. The weight was removed and the excess of gel adhering to the slides was scrapped off. The two slides in position were fixed to a stand without slightest disturbance and in such a way that only the upper slide to slip off freely by the force of weight tied to it. A 20 g weight was tied to the upper slide carefully. The time taken for the upper slide to travel the distance of 7.5 cm and separated away from the lower slide under the influence of the weight was noted. The experiment

was repeated by three times and the mean time taken for calculation. Spread ability was calculated by using the following formulas = $m \sqrt{l/t}$ Where, S - Spread ability, m - Weight tied to the upper slide (20 g), l - Length of the glass (7.5 cm), t- Time taken in seconds.

➤ **Skin irritation test:** Test for irritation was performed in human volunteers. For each formula, five volunteers were selected and 0.1 g of formulated gel was applied on an area of 2 square inch.

RESULT

Table 1: Wound healing effect of Lavandula and aloe barbadensis mill extract in burn wound model.

Treatment (n=6)	% of wound contraction (mean± SD)					Epithelization time(days)
	Day 4	Day8	Day 12	Day 16	Day 20	
Solvent control	3.10±0.72	24.25±1.24	32.57±2.02	48.10±1.59	64.43±2.75	33.00±1.69
Alcoholic extract	5.25±1.36	28.60±2.13	58.10±3.69	87.10±1.88	95.53±2.37	23.00±2.43
Untreated control	2.90±1.21	12.40±0.92	24.20±0.81	34.25±1.29	54.51±2.03	40.00±1.06

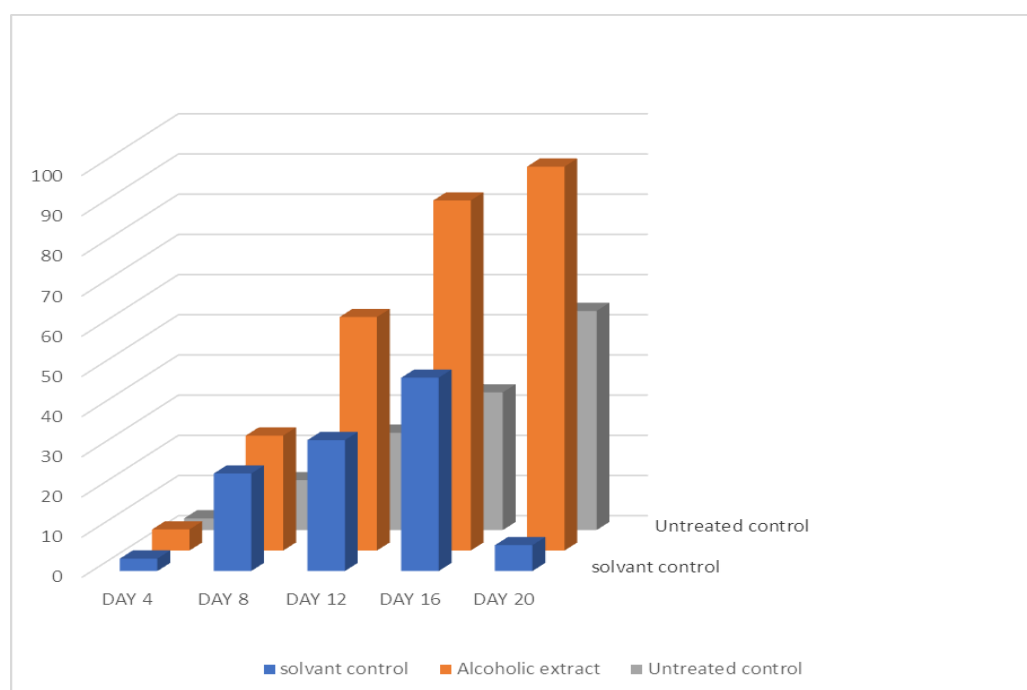


Table 2: Characteristics of Lavandula and Aloe vera gel formulation.

S. No	Formulation	pH	Viscosity	Spread ability	Drug content % w/w	Extrudability	Nature of gel
1.	A1	6.8	32170	37.52	93.26	+++	Yellowish brown transparent, homogenous
2.	A2	6.9	48240	25.45	101.97	+++	Yellowish brown transparent, homogenous
3.	A3	6.4	53180	22.123	89.47	+++	Yellowish brown transparent, homogenous
4.	A4	6.5	64250	18.47	97.86	++	Yellowish brown transparent, homogenous
5.	B1	7.2	55380	30.00	102.50	+++	Yellowish brown transparent, homogenous
6.	B2	7.0	65640	17.79	91.61	+++	Yellowish brown transparent, homogenous
7.	B3	6.4	78720	16.45	103.61	++	Yellowish slightly translucent homogenous
8.	B4	6.2	81548	18.75	95.66	++	Yellowish slightly translucent homogenous

The fresh juice aloe barbadensis mill plant, extracted Apis mellifera, turmeric and extracted oil of Lavandula plant gel are prepared by using Carbopol 940 composition of herbal gel table.1. From the result it is concluded that all the gel formulation showed food apperance and homogeneity. The physical appearance of the gel formulation light brown in nature. The pH of gel formulation was in the range of 6.15- 6.98, which lies in the normality pH of skin and wit time no skin irritation was observed by small amount odd shear diameter after 1 min of herbal gel was between 38-55 mm which indicate good spread ability of herbal gel. The result showed that combination of Aloevera and Lavandula oil for formulation of burning gel was better than the effect of the other gel.

CONCLUSION

The main aim of our research was to develop an herbal burn gel formulation and evaluation consisting of combination of aloe barbadensis mill, Lavandula, Apis mellifera, & curcuma longa linn for treatment of burn. The developed herbal burn gel consisting of combination of all herbal ingredients was found to safe and effective for treatment of skin burn. It is inferred from results that gel formulation are good in appearance, homogeneity and easily spread a lead shower good effect on burn skin. Because aloe barbadensis mill and Lavandula oil are both considered good for healing of burns. Combination of aloe barbadensis mill and lavender is an excellent idea. Aloevera use as its healing properties and Lavandula oil used as its soothing effect on skin so that combination of both two drug provide an effect action on burn skin for healing burn. C.longa linn and Apis mellifere are also used were used for its antiseptic properties and decrease damage from burns and Apis mellifere is used for its soothing properties.

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