



**RESEARCH ARTICLE**

**Formulation and Evaluation of Herbal Cream for Burn**

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**ABSTRACT**

Ayurveda is a complete self being system, which provides knowledge about living a good and healthy life style that does not have any imbalance in the harmony and system of the body. Since from the ancient time the society rely on plants not only for dietic purpose but also for medicinal purpose and plant origin drugs have played a fundamental role in prevention and treatment of diseases. *Sandroos* (*Trachylobium hornemannianum*) is an important resin which is obtained from Sal tree, botanically known as *Shorea robusta*. Since millennia, it has been used, in Unani & ayurveda system of medicine for different conditions like obesity, haemoptysis, ulcer, lipid metabolic disorders & for healing of wounds. Cream is the most suited formulation for treatment of skin disorders. Burn healing cream was prepared by using '*Shorea robusta*' by traditional trituration method as an O/W emulsified cream. Quality evaluation of the product was assessed by using different evaluation methods and the cream showed good spreadability, no skin irritation, no changes of the physical properties, no evidence of phase separation and good consistency during study period. The cream was also evaluated for its antimicrobial activity against various strains of micro-organisms and the antimicrobial activity of the cream was comparable with commercial Silver Sulphadiazine 1% cream. Based on the observations & result, it was concluded that this cream could be used as an alternative for synthetic creams for burn.

**KEYWORDS**

Shorea Robusta, Sandrose, Burn, Herbal Cream

**INTRODUCTION**

Since ancient time plant origin drugs have played a fundamental role in prevention and treatment of diseases.<sup>1</sup> WHO estimates that about 80% of the world's population use traditional medicine for most of the diseases by administration of plant products.<sup>2</sup> *Sandroos* (*Trachylobium hornemannianum*) is an important resin which is obtained from Sal tree, botanically known as '*Shorea robusta*', belongs to the family *Leguminosae*. It is abundantly found in forests of Africa, Australia, Spain and India.<sup>3</sup>

In India, it is found in Punjab, Sub-Himalayan regions, Nagpur, Orissa, and in Western Ghats. The resin leaks from bark and branches of the tree. It is smooth, yellowish-white or yellowish brown in color, brittle, faintly aromatic, translucent, usually available in the form of small, pale yellow, dusty tears. The resin masses have wrinkled surface, chonchoidal fracture and glossy in appearance.

It has a fresh, clean smell together with the typically resinous scent of plant gum, soluble in alcohol and turpentine oil. The yellow tears of *Sandroos* produce aroma when heated which has very relaxing effect. *Sandroos* has been used since millennia in Unani system of medicine in

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various ailments like obesity, haemoptysis, ulcers and lipid metabolic disorders.<sup>3,4,5</sup>

Burns are one of the most devastating conditions which affect all ages and assault on all aspects of the patient from the physical to the psychological. It is a problem in both the developed and developing world. Over two million burn injuries are thought to occur each year in India (population 500 million), but this may be a substantial underestimate.<sup>6</sup>

Mortality in the developing world is much higher than in the developed world. Burn produces visible physical and the invisible psychological scars which are long lasting and often lead to chronic disability. Burn injuries represent a diverse and varied challenge to medical and paramedical field. Correct management requires a skilled multidisciplinary approach that addresses all the problems facing a burn patient.<sup>6</sup>

Skin burns are occurring by variety of non-mechanical sources including chemicals, electricity, heat, sunlight or nuclear radiation.<sup>9</sup> Overall burn severity is based on the degree of tissue damage and size of the area affected. Burns can be categorized as first degree, second degree and third degree depending on the intensity of damage that has been caused. Approximately 500,000 burns are treated each year by hospitals and 40,000 required prolonged hospitalization.<sup>7</sup>

Infection of burns is common because the skin, physical barrier against microbes, has been compromised. Risk of infection increases proportionately with the size of the burn.<sup>9</sup> Bacteria & fungi are the most common pathogens of burn wounds. These micro-organisms form multi-species biofilms on burn wounds within 48-72 hrs of injury.<sup>8,9</sup> Gram +ve bacteria are some of the first to colonize burns, followed by Gram -ve, fungal infection tends to occur in the later stages after the majority of bacteria have been eliminated by topical antibiotics<sup>7</sup>.

For a long time, silver-containing compounds were used to eliminate burn wound infection and inflammation. These compounds are available in many forms, including creams, ointments and

bandages. Moreover, silver operates over a broad-spectrum, and is effective against both fungi and bacteria, including MRSA. However, in the early twenty-first century it was realized that silver compounds actually slow the healing process and can be toxic to certain host cells. Since the goal of burn treatment is to close the wound as quickly as possible.

The use of silver-containing products has experienced a dip in popularity<sup>7</sup>. Currently, the most widely accepted methods of treatment of moderate and severe burns include wound excision and the application of topical antimicrobial agents<sup>8</sup>.

Synthetic burn healing creams which contain drugs like silver sulphadiazine, silver nitrate, sulfamylon or combinations of these drugs are found to be associated with systemic toxicity over long period use. Also, the burn marks may not vanish by use of these drugs alone. Local irritation at the site of application is most common side effect of these synthetic drugs<sup>7</sup>.

Therefore there is an immense need of an alternative, safe natural product to avoid or alleviate the resistance and adverse effects of such modern synthetic antibiotics. Sandroos or *Shorea robusta* has been used, since millennia in Unani & ayurveda system of medicine for healing of wounds<sup>3</sup>. Present work includes formulation of herbal cream for burn wounds as a safe alternative to the available synthetic antibiotic creams.

## MATERIAL AND METHODS

### Method of Preparation<sup>10,11</sup>

All the ingredients were accurately weighed as given in Table 1. In beaker water heated up to 75°C and *Shorea robusta* dissolved in it. In a porcelain dish emulsifying wax was melted and then sesame oil added to it and heated up to 75°C.

When the temperature of both oil and aqueous phase reached to 75°C, oil phase triturated with aqueous phase in a mortar. At about 45°C methyl paraben and propyl paraben added to the mixture and triturated continuously for few minutes till the mixture turns semisolid.

Table 1: Formula for Herbal Cream

Sr.	Ingredients	Quantity Taken
1	<i>Shorea robusta</i> (Raal)	1.5g
2	Sesame oil	2ml
3	Emulsifying wax	0.5g
4	Methyl paraben	q.s
5	Propyl paraben	q.s
6	Distilled water	6ml

**Evaluation Tests<sup>10,12,13</sup>**

After formulation, the herbal cream was evaluated for following parameters:

**Physical Properties**

The formulated herbal cream was evaluated for colour, odour and appearance.

**Type of Emulsion**

It was checked by Dilution Test. A small quantity of cream was taken in test tube and diluted with oil & water to check the type of emulsion.

**pH of Cream**

The pH meter was calibrated using standard buffer solutions and pH of cream was measured.

**Stability Study**

The stability of cream to maintain its consistency was determined by keeping it at 25°C for 30 days.

**Spreadability**

A fix amount of cream was applied on dorsal skin surface of human and properties were observed.

**Skin Irritation Test**

Mark the area on the left hand dorsal surface. The cream was applied to the specific area and time was noted. Irritancy was checked if any for regular interval up to 24 h and reported.

**Water Washability**

A portion of cream was applied on the skin and examined by washing with the tap water.

**Antimicrobial Activity of Herbal Cream<sup>14</sup>**

The antimicrobial activity of the formulated herbal cream against strains of aerobic and anaerobic micro-organisms was evaluated by standard cup-plate method. *Bacillus subtilis*, *Staphylococcus aureus*, *E.coli* & *Salmonella typhi* were used for testing the antimicrobial activity.

Nutrient agar medium was used for bacterial cultures (Table 2). Plates were incubated at 37<sup>0</sup>± 0.2°C for 24 h under aerobic conditions. In each plate 100µl of bacterial culture was poured with the help of micro pipette and spread all over plate uniformly by means of sterilized spreader. Then a well was made by the sterile cork borer having diameter 8mm. 0.1ml of standard [1% Silver Sulphadiazine] & test samples were poured into the well. The plates were kept in refrigerator for 2 h and then incubated at 37°C for 24 h.

Table 2: Composition of Agar Medium

Sr. No.	Ingredient	Quantity
1)	Beef Extract	0.6g
2)	Peptone	1g
3)	Sodium Chloride	1g
4)	Agar-Agar	3g
5)	Distilled water	200ml

The zone of inhibition of bacterial growth around the cup/well measured in mm with the help of scale (Figure 1, 2, 3, 4). The readings were taken at four different planes and then mean was calculated. The results are shown in Table 3.



Figure 1: Zone of Inhibition for *Bacillus Subtilis*



Figure 2: Zone of Inhibition for *Staphylococcus Aureus*



Figure 3: Zone of Inhibition for *E. Coli*

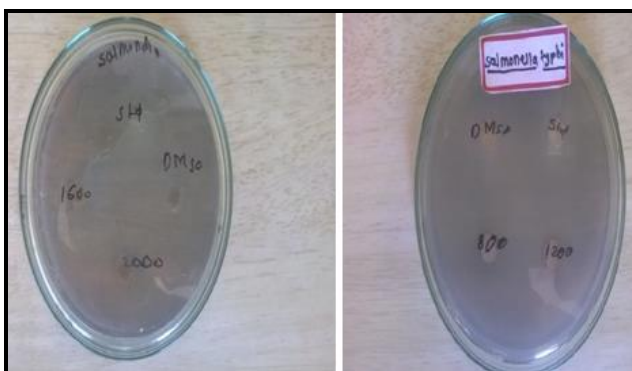


Figure 4: Zone of Inhibition for *Salmonella Typhi*

Table 3: Zone of Inhibition

Conc <sup>n</sup>	Zone of inhibition			
	<i>Staphylococcus aureus</i>	<i>E. coli</i>	<i>Bacillus subtilis</i>	<i>Salmonella typhi</i>
800 µg/ml	-----	-----	-----	-----
1200 µg/ml	-----	-----	-----	-----
1600 µg/ml	12mm	-----	11mm	-----
2000 µg/ml	14mm	-----	13mm	-----
STANDARD	16mm	15mm	17mm	16mm
DMSO	-----	-----	-----	-----

## RESULTS

The formulated herbal cream was O/W type as confirmed by dilution test of emulsion. The pH of herbal cream was 6 as confirmed by the pH meter. The stability, homogeneity and spreadability of the cream was good. The irritancy test had shown the formulation is safe with respect to irritation and allergic sensitization. Table 4 showing the result of evaluation of herbal cream. The cream also evaluated for its antimicrobial activity, among different dilutions 1600 µg/ml and 2000 µg/ml concentrations were effective in killing the micro-organisms. The cream was effective against the Gram +ve bacteria only like *Bacillus subtilis* & *Staphylococcus aureus* when compared with standard 1% cream of Silver Sulphadiazine.

Table 4: Result of Evaluation Tests

Sr. No.	Parameter	Observation
1	<b>Physical properties</b>	
	a) Colour	Slight Brown

	b) Odour	Characteristic
	c) Appearance	Homogenous
2	Type of emulsion	O/W
3	pH	6
4	Stability	Good
5	Spreadability	Good
6	Skin irritation	Non irritant
7	Water washability	Good

## CONCLUSION

The herbal cream for burn was successfully prepared using *shorea robusta*. The cream was slight brown in colour and homogenous. The drug content, pH, stability, spreadability was found to be within acceptable range and also not showed any type of skin irritation. The cream was effective against Gram +ve bacteria, some of the first to colonize burns, when compared with standard 1% cream of Silver Sulphadiazine. Therefore this cream could be the good alternative for synthetic antibiotic creams to cure the burn wounds.

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