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## “FORMULATION AND EVALUATION OF HERBAL WOUND HEALING CREAM”

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### ABSTRACT:

About 80% of people on the planet utilize herbal medicines for primary healthcare, mostly in underdeveloped nations. Wound healing agents speed up wound closure, lessen trauma and the chance of subsequent infections, and promote the body's natural healing process. The present study was to formulate and evaluate the wound healing activity of developed polyherbal formulation in the form of cream by using extract of turmeric, neem, tulsi, Aloe Vera with excipients. Several researches revealed the antibacterial, antioxidant, and anti-inflammatory properties of these plants. Formulation of Herbal Skin Cream for wound healing was successfully developed that met the relevant pharmaceutical characteristics. The prepared formulations are then evaluated for parameters like physical properties, pH, viscosity ,spreadability and stability of the formulated cream. The prepared formulations showed good. spreadability, no evidence of phase separation and good consistency during the study period. The formulations had pH values in the satisfactory range of 5.5-6.2. The extracts were uniformly distributed in all the formulations without causing edema, irritation, and redness. The results of this study suggest that creams containing plant extracts with wound-healing capabilities could be developed and applied as a skin barrier.

**KEYWORDS:** Wound healIng, Azadirachtaindica ,Turmeric, Aloe vera, Tulsi. Formulation, Evaluation .

### INTRODUCTION:

Creams are semi-solid dosage forms and are intended for topical use on the skin. These preparations are used for the localized effects produced at the site of their application by drug penetration in to the underlying layer of skin or mucous. Creams are semi-solid emulsions of oil and water.<sup>1</sup> Creams, the most commonly used formulations, are liquid-type oil emulsions. <sup>2</sup> The need for a safe and effective herbal skin cream is to treat various skin diseases like wounds, acne vulgaris, cracks, psoriasis and various types of skin diseases. World Health Organization (WHO) as well our country has been promoting traditional medicine because they are less expensive, easily available and comprehensive, especially in developing countries.<sup>3</sup> Herbal products are becoming increasingly popular in wound healing due to their high acceptance and good tolerability. Natural remedies for wounds promote the growth of fibroblasts and increase collagen levels, leading to quicker healing of the wound.<sup>4</sup>

Medicinal plants are the most abundant source of bioresources in relation to ancient treatments, contemporary drugs, and dietary supplements. Chemical compounds for created substances, food supplements, as well as conventional treatments.<sup>5</sup> The use of medicinal plants in the management of acute and chronic wounds is common in most conventional medicine practices in the world. Plants and their extracts have immense potential for the management and treatment of wounds.<sup>6</sup>

### Wound:

Anatomical, cellular, and functional integrity of living tissue can be lost or broken as a result of wounds, which are inevitable events in life.<sup>7</sup> A loss or interruption of the cellular, anatomical, or functional continuity of the deep skin tissue or the living tissues may be referred to as a wound.<sup>8</sup> Wound healing is defined as a complex process occurring by regeneration or reconstruction of damaged tissue.<sup>9</sup>

### Type of Wound:

Wounds can be classified in number of ways, depending on Healing time they can be acute or chronic

1. **Acute Wound :** Acute wound is defined as the traumatic loss of normal structure and function to recently uninjured tissue.<sup>10</sup> Those wounds that get healed in short period of time.<sup>11</sup>
2. **Chronic Wound:** Chronic wounds are defined as wounds that have not healed through the regular phases and have instead entered a state of pathologic inflammation. These wounds either take a long time to heal or keep coming .

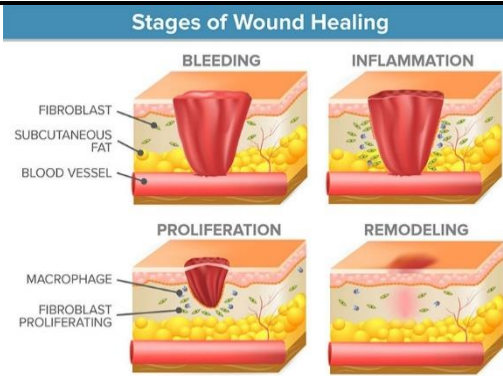
### Wound Healing :

Wound healing is an integrated cellular and biochemical process of restoring normal structure functions of damaged tissue.<sup>12</sup> Wound healing or wound repair is an intricate process in which the skin or organ or tissue repairs itself after injury.<sup>13</sup> Wound healing consists of a complex, well-organised cascade of biochemical And cellular events that involves tissue repairs and regeneration.<sup>14</sup>

### Normal Wound Healing Process:

Wound healing is a dynamic process that involves the interaction of matrix and cellular components to restore the integrity of damaged tissue and replace missing tissue.<sup>10</sup> The process of regular wound healing is complicated and used the coordination of different events likes coagulation, inflammation and proliferation of connective tissues.

- **Hemostasis:** Hemostasis being promptly following an injury and stop bleeding by creating platelets. It included vascular constriction , platelet aggregation and the formation of fibrin.
- **Inflammation:** It lasts for 4-6 days. It involves hemostatic mechanism to prevent blood loss from the site of wound.
- **Proliferation:** It starts after inflammation which lasts for 5-21 days. It involves the formation of granulation tissue, angiogenesis, re -epithelialization.
- **Remodeling:** This phase lasts for 3 weeks -2 years. It involves the Synthesis of Collagen and scar formation.



**Fig. 1 : Stage Of Wound Healing**

### Factor Affecting Wound Healing:

- Improper diet.
- Infection at the wound site.
- Insufficient oxygen supply and tissue perfusion to the wound area.
- Drugs
- Elderly age
- Diabetes and other diseases condition.

### Benefits of herbal wound healing cream:

- Promote healing
- Reduce inflammation
- Antimicrobial action
- Reduced Risk of Side Effects
- Herbal wound healing creams are generally safe for use on all skin types.
- Herbal creams often contain ingredients that help keep the wound area moisturized, creating an optimal environment for healing.
- Herbal wound healing creams offer a natural and potentially effective alternative for promoting wound healing while minimizing the risk of side effects.

### HERBAL INGREDIENTS USED IN FORMULATION :

#### NEEM (*Azadirachta Indica*)

In India, Africa and the United States, neem trees are common. It's been used in Ayurvedic medicine for 4,000 years, thanks to its healing properties. It's a fast growing tree, it can reach heights of 15 to 20 meters. Arista is a Sanskrit name for Neem. In 1992 the US National Academy of Sciences recognized the importance of neem tree and issued a report, *The Neem Tree for Solving Global Problems*.<sup>15</sup>

Leaves, bark and gum are wood products.

#### Roles:

- Promote wound healing
- Itching and Redness
- Relieves skin Dryness



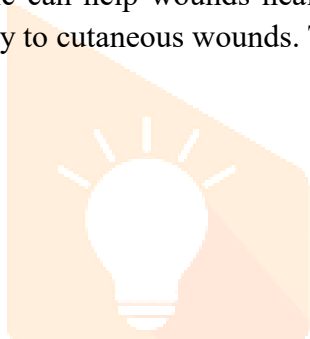
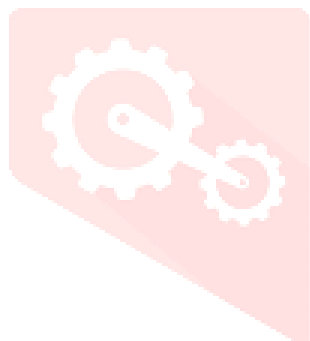
**Fig 2. : Neem**

### **TURMERIC (*Curcuma Longa*)**

The curcumin found in turmeric can help wounds heal by decreasing inflammation and oxidation. It also lowers the response of your body to cutaneous wounds. This results in your wounds healing more quickly.

#### **Roles:**

- Anti-inflammatory
- Anti-oxidant
- Anti-microbial
- Anti-ageing



**Fig. 3: Turmeric**

### **ALOE VERA (*Aloe barbadensis miller*)**

Aloe Vera is a sensitized or very short stem plant that grows to a height of 60-100 centimeters. The leaves are thick and fleshy, greygreen. Alovera is a species of aloe known primarily for its medicinal properties. Aloe species are common on the continents of Eastern Europe and spread almost everywhere in the world.

#### **Roles :**

- Soothes irritated skin
- Anti-inflammatory
- Reduce pain, swelling, and soreness of wounds



**Fig.4 Aloe vera**

### **TULSI (*Ocimum Tenuiflorum*)**

Tulsi, which has been used in Ayurvedic medicine for over 3,000 years, is one of the most widely recognized Lamiaceae herbs from Asia. Holy basil is an upright, 30-60 cm tall, branchy, hairy undershrub. It's green or purple leaves. There are a lot of medicinal properties in the tulsi plant. Tulsi leaves are nervine tonics, nerve tonics, and also sharpen memory.

#### **Roles:**

- Used in curing wounds
- Anti-inflammatory properties that help healing wounds quickly.



**Fig. 5 Tulsi**

#### **MATERIAL :**

| <b>Sr. No</b> | <b>Ingredients</b> | <b>Quantity</b> |
|---------------|--------------------|-----------------|
| 1             | Neem               | 1.7ml           |
| 2             | Turmeric           | 2.7ml           |
| 3             | Aloe vera          | 2.8ml           |
| 4             | Tulsi              | 1ml             |
| 5             | Bees wax           | 5.45 gm         |
| 6             | Borax              | 0.36 gm         |
| 7             | Liquid paraffin    | 18.1ml          |
| 8             | Methyl paraben     | 0.03 gm         |
| 9             | Distilled water    | q.s             |
| 10            | Rose water         | q.s             |

**Table 1 formula for formulation**

## METHOD OF PREPARATION:

### Extraction of Turmeric:

In 250 ml of volumetric flask mix 1gm of turmeric powder with 10 ml of distilled water that has been treated for 5 to 10 min at 80°C to 100°C in water bath. After filtering it, turmeric extract is produced.

### Extraction of Neem:

The leaves of neem have been picked and washed with pure water, dehydrated in an air oven. The leaves had been powdered after drying properly. For 5 to 10 minutes, take 5 grams of neem powder in 20 ml of ethanol at 100°C. Then it's filtered through a filter paper, and the solution is clear.

### Extraction of Aloe Vera:

Distilled water has been used to collect and wash mature, healthy and fresh aloe vera leaves. Then the outermost part of the leaf was cut longitudinally with a sterile knife after it had been properly dried in an oven at high temperature. Then the aloe Vera gel that is the colorless Parenchymatous tissue was removed using the sterile knife. Then, to remove the fibers and impurities, it is filtered using a cloth of muslin. Then the filtrate or the filter product which is a clear aloe Vera gel was used in the preparation.

### Extraction of Tulsi:

Tulsi leaves were collected and washed with distilled water and dried hot air oven. The leaves were then powdered after a proper drying. In a volumetric flask, 1g tulsi leaf powder + 10 ml ethanol was taken. Then the solution was heated on water bath at 80 to 100°C for 5 to 10 minutes. Filtered the solution using filter paper and a clear extract of tulsi leaves at 80 to 100°C for 5 to 10 minutes.

## FORMULATION OF CREAM:

The Herbal Cream was prepared by the 4 extracts (turmeric extract, Tulsi extract, Neem extract, Aloe vera extract). The ingredients for the herbal cream preparation were weighed accurately. The formulation trials were done as per formula given in (Table 1). Take Liquid paraffin and bees wax and heat at 75°C in a borosilicate glass beaker (oil Phase). In another instance, methyl paraben and borax should be dissolved in distilled water. beaker while using a water bath to keep the temperature at 75°C. The aqueous phase of the solution should be stirred with a glass rod until all solid particles are dissolved. While continuing to mix, slowly pour the hot aqueous phase into the heated oily phase. Aloe-vera extract, Tulsi extract, Neem extract, and turmeric extract should be added right away after combining the two stages. Glass rod blending should continue until a smooth cream emerges. As a fragrance Rose water should be added as once a cream has formed.



**EVALUATION PARAMETERS:**

The formulation was evaluated for different pharmaceutical parameters.

**1. Physical evaluation of the formulation:**

Appearance: Semisolid in nature.

Color: faint Green.

Transparency: Non-transparent.

Odor: pleasant

**2. Spreadability:**

The back of the hand was rubbed with a small quantity of cream, making it easier. It was observed how the substance is distributed on the skin.

**3. Determination of pH:**

The pH value of freshly formulated emulsion was determined using a digital pH meter at room temperature. According to the results the pH of the formulation was found to be nearer to skin pH so it can be safely used on the skin.

**4. Homogeneity Test:**

Homogeneity of formulation was studied by visual inspection and touched.

**5. Washability:**

A small amount of cream was rubbed on the back of the hand, after which it was washed off with warm water.

**6. Consistency:**

A small amount of ointment was slowly rubbed between the thumb and fore finger to gauge consistency of the cream. The consistency of cream is smooth.

**7. Phase separation:**

Cream prepared in a sealed container was stored at a temperature of 25-100°C keep away from light at 100 °C. Phase separation was then monitored for a period of 24 hours 30 days. Results show that no phase separation is observed.

**8. Irritancy test:**

The cream was applied to that area and the time was noted. Next, a verification process is conducted. Irritation, redness, and swelling can persist for up to 24 hours. The results indicated that the formulation displayed no indication of any issues Irritation, redness and swelling.

**9. Antimicrobial Activity:**

When a burn injury has taken place, there is a possibility that infection caused by bacteria or other microorganisms found in the environment and Aloe Vera Turmeric demonstrates antimicrobial and anti-inflammatory properties.

**10. Test for Thermal stability:**

The formulation's thermal stability was evaluated using the humidity chamber.

Regulated between 60-70% relative humidity and maintained at a temperature of 37±1°C 3)

**RESULT:**

This cream has the potential to be utilized as a medium for maximizing the effectiveness of these medicinal properties. Just as easily as a basic form of medication.

Natural Remedies are preferred because they are safer and have fewer side effects. A herbal wound healing formulation is safer and less toxic than synthetic alternatives. Enhance and boost patient adherence due to its inclusion of herbal components. : The internet has revolutionized the way we communicate and access information. The way we communicate and obtain information has been completely changed by the internet. The olden days.

These prepared herbal wound healing cream formulations complied with the physical evaluation parameters like pH, physical stability, viscosity, spreadability, skin irritancy test, determination of consistency, antimicrobial activity, wash ability Stability studies were found to be acceptable which were notified in Table 2.

| EVALUATION PARAMETERS | OBSERVATION         |
|-----------------------|---------------------|
| Appearance            | Semisolid in nature |
| Colour                | Faint green         |
| Odour                 | Pleasant            |
| PH                    | 6.57                |
| Spreadability         | Easily spreadable   |
| Consistency           | Smooth              |
| Skin Irritation test  | No Irritation       |
| Washability           | Easily washable     |
| Phase separation      | No phase separation |

**Table 2 : Result**

**SUMMARY:**

The objective of the present work was to formulate and evaluate a skin cream for wound healing. Even though different kinds of cream are being considered for wound healing, they are still being studied. It still seems to have constraints on how quickly tissues can regenerate. Plants have stronger healing properties. Since they enhance the natural repair mechanism. In the present study, skin cream was prepared using herbal plants such as Azadirachta indica, Curcuma longa, Tulsi and Aloe vera. Initially, the research work started with a wide and thorough literature survey. The formulation was prepared by using various excipients such as beeswax, liquid paraffin, borax, methyl paraben, rose water. Successful development of herbal wound healing cream that met relevant pharmaceutical characteristics. The prepared formulations are then evaluated for parameters like physical properties, pH, viscosity, spreadability and stability of the formulated cream.

**CONCLUSION:**

Formulation of Herbal Skin Cream for wound healing was successfully developed that met the relevant pharmaceutical characteristics. The cream demonstrated wound healing effects from the usage of turmeric, aloe vera, neem, and tulsi, and all of the herbal constituents showed various noteworthy actions. The prepared formulations showed good spreadability, no evidence of phase separation and good consistency during the study period. The current research indicates that it is feasible to create creams that contain herbal extracts can serve as a barrier to provide protection covering of the body. Plants are stronger healers because they stimulate the body's natural healing process. The wound healing property of the formulated herbal skin cream has yet to be experimented.



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