



## Original Research Article

# Development and Optimisation of Polyherbal Anti-Scar Lotion

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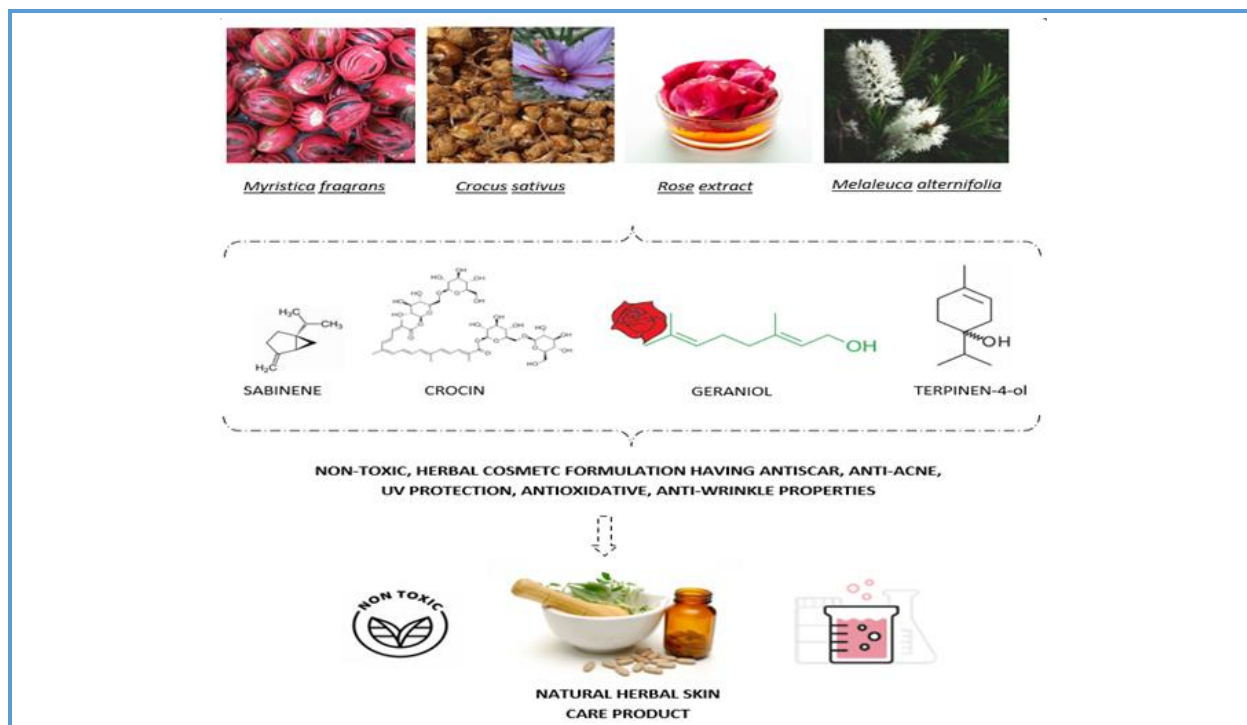
### KEYWORDS

Polyherbal formulation  
Anti-scar lotion  
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### ABSTRACT

This study's current disclosure is to create polyherbal Anti Scar lotion from plant extract and plants such as *Myristica fragrans*, *Crocus sativus*, Glycerol, *Melaleuca alternifolia*, Rosa extract, and *Cinnamomum camphora*. The use of more than one plant in a therapeutic preparation is known as polyherbal formulation (PHF). Multiple herbs in a specific ratio may be employed in the treatment of illness in Ayurvedic and other traditional medicinal systems. The formula is intended to keep the skin hydrated and fresh, hence preventing hypertrophic scarring. Several physical properties were incorporated into the formulation. The formulation is visually appealing and has a high physical stability. The lotion sensitivity test findings showed that it is safe, with no itching or inflammation. Because they are natural materials, PHFs are less expensive, more environmentally friendly, and more widely available than prescription drugs. Polyherbal formulation are more socially and culturally acceptable because to their cheaper cost and increased accessibility, which is responsible for rising global demand. Polyherbal formulation has increased patient compliance while also improving therapeutic efficacy. In dermatological research and public health, polyherbal anti scar cream has a promising future.

## Graphical Abstract



## Introduction

Herbal medicine is a type of medicine that uses plant parts such roots, stems, leaves, blooms, or seeds to treat illness, improve health, and prevent disease spread. Even in locations where advanced therapy is available, interest in and usage of herbal medicines has expanded dramatically in recent years. Plant compounds and natural medicines are currently drawing a lot of interest due to their flexible applications because herbs include a lot of bioactive components that are employed in both traditional and modern therapies.

Herbal plant materials provide the basis of many scientific treatments for humans. The use of many herbs in a single therapeutic preparation, known as a polyherbal formulation, provides synergistic benefits to the patient. Multiple herbs, combined in a certain proportion, are a common component of

Ayurvedic and other forms of traditional medicine. The popularity of polyherbal formulations has been largely attributed to their widespread success in treating a wide range of ailments. Despite their broad therapeutic range, low risk of side effects, inexpensive cost, and convenient availability, polyherbal formulations are safe.

Now, because herbal extracts have anti-inflammatory, antioxidant, and anti-scar qualities, they are commonly used in cosmetic formulations [1]. You can treat all skin issues, such as wrinkles, fine facial lines, blackheads, acne, blemishes, and pigmentation spots, in addition to get radiant and glowing skin using herbal beauty products. When used consistently, the outcome is flawless, clear skin that glows with health. Lotions (suspensions and emulsions) are typically applied topically and used as a base for externally applied

medications that have therapeutic, protective, or aesthetic effects in addition to heal or sooth the skin.

Lotions keep the skin hydrated and stop it from drying out, which maintains the skin's softness and health. Compared to creams, lotions are less greasy and contain more water. Eliminating your flaky, dry skin has added benefits [2]. A scar is an imperfection or defect resulting from a burn, wound, sore, or previous condition. When fibrous tissue replaces normal skin during the course of a wound's healing process, scarring results. Scar tissue behaves and looks different from normal skin [3]. Anatomy of the Skin is demonstrated in [Figure 1](#).

*According to the International Advisory Panel, scar is classified as follows:*

1. *Mature scar:* Light-coloured, flat scar.
2. *Immature scar:* Remodelling scars are red, itchy, or painful and may be slightly raised. Over time, many of them will mature naturally and flatten out.
3. *Linear hypertrophic scar:* A linear hypertrophic scar is a red, elevated, and sometimes itchy scar that forms around the border of the original surgical incision and typically fades away within a few weeks after surgery.
4. *Widespread hypertrophic scar:* A wide, red, elevated, and occasionally irritating scar within the original boundaries of the burn.
5. *Minor Keloid:* Scarring that is elevated locally, itchy, and that extends across otherwise healthy tissue might appear up to a year after an injury and does not go away on its own.
6. *Major keloid:* The term "major keloid" refers to a huge, elevated (0.5 cm) scar that extends over normal tissue and is sometimes uncomfortable or itchy [3].

7. *Contractures:* When there is significant tissue loss or when a cut spans a joint, scarring can cause the skin and underlying tissue to pull together and limit range of motion.

8. *Superficial macular scar:* The epidermis and the top layer of dermis must be involved for this to happen and manifest as patches of redness or pigmentation.

9. *Ice pick scar (cone-shaped):* Epithelial tracts are narrow, deep, and have sharp margins, extending vertically to the deep dermis or subcutaneous tissue.

10. *Rolling scar (wavy):* Dermal tethering is the cause of seemingly healthy skin. Superficial shadowing and a rolling or undulating appearance to the overlying skin are caused by abnormal fibrous anchoring of the dermis to the subcutis.

11. *Boxcar scar:* Boxcar scars (similar to chicken pox scars) are depressed areas that are either round or oval in shape and have highly defined vertical edges. Unlike ice pick scars, rolling scars are clinically broader at the top and narrow to a point at the bottom [4]. Mechanism of action for anti-scar formulation is depicted in [Figure 2](#).

The occurrence of the hypertrophic scar complicates scar treatment. Therefore, there is a need for effective therapies for hypertrophic scarring that are not yet available. The reports of preventive [5] include mention of topical medical treatment, cryotherapy, silicone gel sheets, steroid injection, radiation, and early surgery for wound closure. Over the past ten years, interest in indigenous medical practices has increased due to the realization that many regions of the world have limited access to conventional medical care [6]. For a variety of reasons, including their longer historical significance and lower cost, herbal remedies have frequently maintained their popularity

despite the availability of contemporary treatments [7].

Recent research has suggested using phytochemical compounds and extracts made from medicinal plants as a way to address these problems [8]. Extracts are utilized in various categories. For example, terpinen-4-ol, the primary active chemical compound in *Melaleuca alternifolia*, dominated with a content of 40.3%. Renowned for its ability to heal scars left by anything from sunspots to acne. Because it is so moisturizing and exfoliating, it can also help with dry skin [9]. *Cinnamomum camphora* main active chemical constituents' eucalyptol was dominant with a content (17.2%), -suggested uses include acne, antiseptic, pain management, warts, cold sores, hemorrhoids, osteoarthritis, anti-chest, increased local blood flow, and anti-irritant [10]. *Cinnamomum camphora* is a topical antitussive approved by the FDA (anti-cough) [11].

*Cinnamomum camphora* is a topical analgesic approved by the FDA [12]. Glycerin main active chemical constituent stearic acid was dominant with content (17.5%) - (Humectants) Glycerol helps to remove the scar, maintain the water of the skin and is also good for wrinkles, dark spots, and skin lightening [13]. Here are a few ways you can use glycerin on your face to fight dryness this winter [14]. Rosamain active chemical constituent geraniol was dominant with (30.74%), extract helps maintain the pH balance of the skin and also controls excess oil. Rosa extract's anti-inflammatory characteristics make it useful for soothing inflamed skin and bringing down the redness it causes [15]. Vitamin E active chemical constituent [alpha-tocopherol](#) was dominant with content (50%), is beneficial for reducing UV damage to the skin. It acts as a

serum and provides enough moisture to your face during the night [16]. *Prunus dulcis* main active chemical constituent oleic acid was dominant with content (19.5-30.5%), - contains a lot of healthy fats; fiber, protein, magnesium, and vitamin E [17].

*Prunus Dulcis* has been shown to reduce glucose and insulin levels, as well as blood pressure and cholesterol [18]. Though it may cause a slight narrowing of the airway, talc is used to treat idiopathic spontaneous pneumothorax because of its powdered form's ability to absorb moisture and minimize friction [19]. *Crocus sativus* main active chemical constituent crocin was dominant with content (36.41 %)- With its wonderful anti-bacterial and anti-inflammatory properties, *Crocus sativus* is the ideal ingredient for the treatment of acne and breakouts. It has medicinal properties that can help clear acne-prone skin [20].

Most acne scars originate deep within the skin, but sabinene, the main active chemical element of *myristica fragrans*, has been shown to reduce the appearance of hypertrophic (raised) scars. Tea tree oil may lessen the severity of acne and the likelihood of scarring if used during an active eruption [22]. Scarring may result from using *myristica fragrans* on a healing wound [23]. Injuries, acne, burns, and surgery are only few of the many potential causes of facial scars [24]. Scars on the face may take longer to heal because of the continual exposure it gets to the elements [25]. Unlike other parts of your body that you can cover or protect while a wound heals, your face is always exposed to the elements [26].

The development of new medications now heavily depends on the creation of efficient drug delivery systems. Therefore, scientists are always searching for novel approaches to deliver drugs gradually and with a precisely

regulated release profile. Furthermore, topical medication is often considered the first avenue to be investigated in the search for novel pharmacological entities and pharmaceutical preparations, due to the patient manufacturing process, as well as their acceptability, convenience, and affordability.

## Method

### Extraction

The drugs of Fresh Rosa (petals), Crocus sativus (petals), Prunus dulcis (dried fruit), Melaleuca alternifolia (dried fruit) were collected from local market of 9CRG+9RR, Mandal Vihar, Rajendra Nagar, Bareilly, and Uttar Pradesh 243122, India. Dried drugs were

coarsely powdered in an electrical grinder. A known amount of all herbs of dried Fresh Rosa, *Crocus sativus* petals, *Prunus dulcis*, and *Melaleuca alternifolia* were exposed to the "Soxhlet apparatus" to obtain an extract utilizing ethanol as a solvent. As a result a crude green coloured semi solid extract was obtained. Both cold-pressing and warm-pressing can be used to extract oil from seeds; in the former, no heat is applied to the seeds, while in the latter, heat is used in Soxhlet Assembly extraction process, as demonstrated in Figure 3. Therefore, cold pressing results in a higher percentage of residual oil in the press cake, whereas warm pressing increases yield but degrades oil quality. By the help of extraction process, we get the extract of the crude drugs. is showing in the Figure 3.

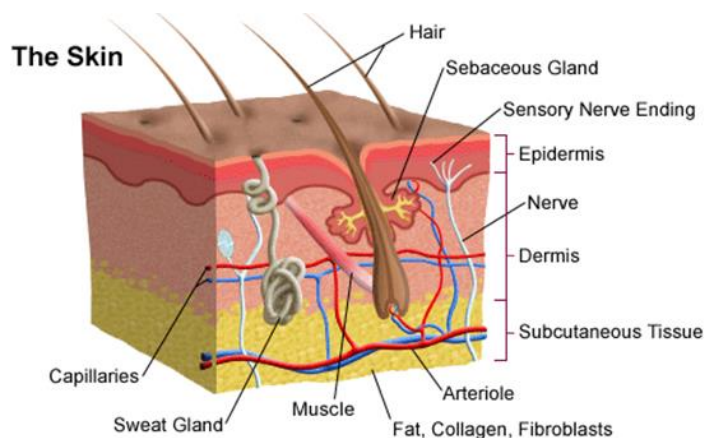


Figure 1. Skin anatomy.

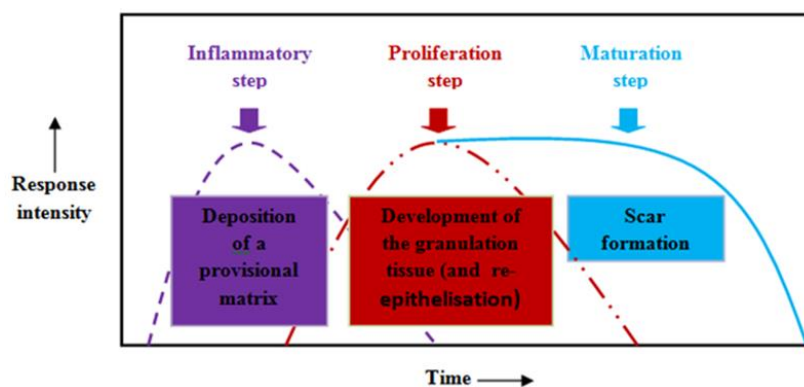


Figure 2. Mechanism of action anti-scar formulation.



**Figure 3.** Soxhlet Assembly showing extraction process.

**Table 1.** Ingredients used for anti-scar lotion

Drugs	Quantity(Gm)	Quantity (ML)	Materials	Description
Saffron( Crocus sativus )	-	0.5 mL	Dried Petals	Drug
Rose(Rosa)	-	0.5 mL		Drug
Camphor(Cinnamomum camphor)	0.10 (g)		excipient	diluents
Talc	0.30 (g)		excipient	Glidant
Almond (Prunus dulcis)	-	0.7 mL	Dried Fruit	
Glycerol	-	0.4 mL	excipient	humectants(moisturizing agent )
Vitamin. E	0.2 (g)		Excipient	Emollients
Tea tree (Melaleuca alternifolia )	-	0.6 mL	Dried Leaves	Drug
Nutmeg (Myristicafragrans)	0.5(g)		Dried Fruit	Drug
Phenonip	0.3(g)	%3 to 1%.	Excipient	Preservative

**Materials and methods**

*Collection of Material*

The material required for preparation of lotion was purchased and collected from local market.

*Method of preparation*

Emulsion Oil in water (O/W) based lotion (semisolid formulation) was formulated. All herbal ingredients were dried and grounded using a domestic mixer. All ingredients used in the formulation are presented in Table 1.

The required quantity of ingredients was weighed and taken in mortar Pestle, Fresh Rosa extracts and add 5-6 *Crocus sativus* petals after some times extracted out and 1 ml was added with stirring, talc powder 0.30 (g), *Cinnamomum camphora* 0.10 (g) Vitamin E 0.2 (g), *Prunus dulcis* Oil 7-8 drops, Glycerol-2 drops (humectants), *Melaleuca alternifolia* 5-6 drops, *Myristica fragrans* 0.5 (g), and 0.3(g) "Phenonip," with continuous stirring.

#### *Evaluation parameters of lotion*

We conducted the following preliminary pharmaceutical evaluation of lotion formulations:

1. *pH*: A digital pH metre [27] was used to analyses the pH level of the lotion. The lotion's pH was determined by dipping a pH metre into a 10% solution of the moisturizer [28].

2. *Viscosity*: The LV-64 spindle of a Brookfield viscometer was used to measure the fluid's viscosity [29]. The speed was lowered to 25 revolutions per minute. The spindle was submerged in the lotion's final form while the viscosity was measured [30].

3. *Spreadability*: Lotion spreadability was measured using the parallel plate technique [31].

Two 20 cm glass slides were chosen. One of the slides had around 1 g of the lotion formulation applied to it [32]. The lotion was poured on one slide, and then another slide was placed on top of the lotion, creating a sandwich, and a 125 g weight was placed on the top slide to press the lotion between the slides into a consistently thin layer [33]. After the load was

taken off, the diameter of the opening was calculated [34,35].

$$S = m \cdot l / t$$

M= Weight on upper slide

L= Length of glass slide

T= Time in s

4. *Stability Test*: Three months were spent testing the pH, viscosity, and spreadability of the prepared lotion at two different temperatures and humidity levels: 25.2 °C (at room temperature) and 75.5 percent relative humidity (accelerated temperature). Six volunteers had a little amount of lotion applied to their forearms and remained on for 20 minutes to undergo a sensitivity test. Itching, if present, was detected after 20 minutes [37].

5. *Washability Test*: For 10 minutes, [38] lotion was spread over the hands and allowed to run off in the stream of running water. The precise moment that the lotion was no longer detectable was recorded [39].

6. *Appearance*: The lotion's hue, scent, and consistency were evaluated by sight alone [40].

Quantity of saponification: Add 2 grammes of the drug and allow it to reflux in 25 millilitres of 0.5 N alcoholic KOH for 30 minutes. Add 1 millilitre of phenolphthalein and titrate with 0.5 N HCL right away.

$$\text{Saponification value} = (b-a) \cdot 28.05 / w$$

The volume in ml of titrant= a

The volume in ml of titrant=b

The weight of substance in g= w

#### *Physical Examination in the formulation of anti-scar lotion*

*Appearance*: Anti-scar lotion creamy in colour.

*Homogeneity*: Applying it daily it's help to keep skin smooth.

*Taste*: Characteristic

*Odour*: Characteristic

## Results and Discussion

The herbal formulation of anti-scar balm was made from a mixture from the natural source.

*pH:* The pH of anti-scar lotion is 6.3-7 measured with a digital pH meter. Company pH of anti-scar lotion finds to be "Labman digital pH meter, labtronics LT-10 digital pH meters.

*Spreadability:* The anti-scar lotion is the net result of a combination of rheological contributions, of which viscosity is just one. Spreadability apparatus, Brookfield viscometer, and spectrofluorometer obtained from horiba jobin yvon, kyoto. The generally preferred

*Stability: (Stable)* Centrifugation and freeze-thawing are used to ascertain the formulation's long-term viability. Phase separation was monitored during a 10-minute centrifugation at 3500-13.5k rpm in 500-rpm increments. Freeze-thaw testing involves alternating storage of scar cream between 20 and 40 °C, after which the lotion is examined for color shifts and phase separation. The maximum load and flow values of bituminous mixes are determined using the marshall stability test machine with proving ring. UTAS-1052 has a 50 kn breaking strength. Ace instruments Delhi has been found to be a reliable supplier of scar cream.

*Sensitivity: Sensitive skin, e-skin:* There was no irritation and itching found on the skin using anti-scar lotion. Company sensitivity analyzer of anti scar lotion finds to be invento robotics. Invento robotics was founded by balaji viswanathan in 2016.

*Washability:* Allow flowing tap water to completely removed lotion from the skin.

*Appearance:* After using anti scar lotion, its looks like natural skin.

## Conclusion

In the conclusion of polyherbal antiscare lotion is that the scar treatment by the help of numerous compounds that extracted from the medicinal plants. The combination of extracts is petals of *Rosa sativus*, *Crocus sativus*, *Cinnamomum camphora*, and the other natural ingredients in varying proportions to provide skin-lightening, anti-aging, anti-wrinkle, and UV protection qualities. The use of more than one herb in a medicinal preparation is known as polyherbal formulation (PHF). Multiple herbs in a specific ratio may be used in the illness treatment in Ayurvedic and other traditional medicinal systems. The various parameters of the formulas were all within the specified limits. Based on these findings, it is concluded that the lotion is better effect and has greater potential on scar. This study investigates that polyherbal antiscare lotion has good effect on scar, cost-effective, patient compliance, safe, and effective.

## Conflict of interest

The authors declare that there is no conflict of interest.

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## Orcid

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