



Formulation & Evaluation of antioxidant Herbal moisturizing cream as an alternative remedy for Skin diseases

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Antioxidant, anti-inflammatory, poly-herbal formulation, skin dryness, vitamin E.

ABSTRACT:

Since the skin acts as the defender of the body, it is important to keep it healthy to protect the body. The water content of the stratum corneum and the lipids on the skin's surface work in harmony to maintain skin function. Use of synthetic ingredients compromise the skin's protective barrier, leading to dryness, roughness, scaling, cracking, itching and other conditions. The research aims to formulate a brand new herbal cream with antioxidant and anti-inflammatory properties that moisturizes skin, this reduces oxidative stress and nourishes skin and prevent from severe drying of skin which is the main reason for various skin diseases. As many herbs have potency to moisturize skin, various herbal extracts like macadamia oil, jojoba oil, Moringa oil, Tamanu oil, Avocado body butter and tocopherol were used to formulate the herbal cream. With all these new key ingredients, a herbal moisturizing cream was formulated by varying the concentrations of herbal extracts and evaluated. The developed formulation possesses a characteristic odour and white in color. pH lies between 6-6.5 which is suitable to skin pH. The formulation showed thermal stability. The antioxidant and anti-inflammatory components of the herbal cream formulation help reduce oxidative stress and inflammation. In addition, it contains a lot of vitamin E, which moisturizes and nourishes the skin, preventing excessive drying of the skin.

Introduction

The most important and largest organ that protects the human body and other organs is the skin. It is a larger organ in the body and one of the most delicate human organs. Since the skin acts as the defender of the body, it is important to keep it healthy to protect the body.

The water content of the stratum corneum and the lipids on the skin's surface work in harmony to maintain skin function. Since the skin is the top layer of the human body, it is subject to different external and internal conditions. Using soaps, detergents and other topical products deplete the lipids from the skin's surface and

can compromise the skin's protective barrier, leading to dryness, roughness, scaling, cracking, itching and other conditions [1].

Treating dermatoses and maintaining healthy skin are important aspects of the skin care regimen. In addition to hydrating the skin, moisturizers containing active ingredients have anti-inflammatory, antioxidant, antipruritic, antimitotic, and healing properties. The additional properties of a moisturizer are crucial for moisturizing the skin [2].

Since there were no cosmetic procedures or other expensive cosmetics before, herbs for cosmetic use are



in great demand. Herbal cosmetics, commonly referred to as Ayurvedic cosmetics, protect the skin from a variety of environmental elements, including ultraviolet rays, solar radiation, and pollution [3].

Most moisturizers contain synthetic chemicals, which can have a number of negative consequences. The all-natural polyherbal formulations were safe, pure, effective in moisturizing the skin and healing skin conditions, as well as cost-effective [1]. Several

formulations have been shown to be effective in treating dermatitis caused by harmful radiation [4]. Its selection takes into account the traditional systems of each herbal extract used in this blend. Here an attempt is made to create a herbal cream with antioxidant properties that will protect the skin against all kinds of dangers.

Table 1: Herbal oils and their potencies

Sl.No	Product	Source	Use	Reference
1	Macadamia nut oil	Nuts of <i>Macadamia integrifolia</i>	Anti-oxidant, and rich in vitamin E	5
2	Moringa oil	Leaves of <i>Moringa olifera</i>	Anti-inflammatory	6
3	Tamanu oil	Seeds of <i>Calophyllum inophyllum</i>	antioxidant and UV protection	7
4	Jojoba oil	Seed of <i>Simmondsia chinensis</i>	Anti-oxidant rich in Vitamin -E & A	8
5	Avocado butter	Fruit extract of <i>Persea americana</i>	anti-inflammatory, anti-oxidant	9
6	Vitamin -E oil	Tocopherol	Anti-oxidant	10

Materials and Methods

Materials

From Veda Oils in New Delhi, we bought macadamia oil, moringa oil, tamanu oil, jojoba oil, avocado butter and oil of vitamin E. From Sigma Aldrich, Mumbai, other ingredients included petroleum jelly, stearic acid, cetyl alcohol, propylene glycol, glycerine, methylparaben and propylparaben.

Formulation of Herbal Cream

This multi-herb combination contains macadamia, Tamanu, Moringa, and jojoba oils. Different formulations of herbal cream was developed which are having different concentrations of active components. During formulation, the aqueous and oily phases of the cream were separated. All components of the aqueous phase were placed in one beaker, while the ingredients of the oil phase were placed in another beaker. The oil and water phase ingredients were both heated in a water bath until the combination reached 70°C. After reaching the desired temperature, the contents of the oil phase were heated while continuously stirring the contents of the water phase to create a homogeneous

combination. The homogeneous mixture was then stirred for 30 minutes using a mechanical stirrer [11].

Evaluation of Herbal Cream

According to ICH recommendations, accelerated stability experiments are conducted over a period of three months, evaluating organoleptic properties such as color, appearance and odor.

Appearance and Color: A clear watch glass containing approximately 2 grams of herbal moisturizer was exposed to white light to check the color and appearance of the cream.

Odour: The aromas of the formulations were assessed.

pH: A calibrated pH meter was used to measure the pH of an accurately weighed formulation of approximately 0.5 g dissolved in 30 ml of pure water.

Viscosity: A Brookfield digital viscometer was used to test the viscosity of the formulations developed. Two iterations of the LV-6 spindle operating at an average speed of 100 rpm were considered.

Spreadability: Spreadability is a factor in the therapeutic effectiveness of a cream. A glass slide was placed on top of the created formulation, which weighed approximately 1 g and placed at the center of glass slide



marked in circle with 1cm diameter. A 500gm weight was placed on the upper glass plate and rested for 5 minutes. The Spreadability of the cream, which is determined by the following formula, is the time it takes for the cream to slide off the two blades.

$$\text{Spreadability} = m \times l/t$$

Where m is the mass of sample, l is the length of the sample spreaded & t is the time taken to slip off.

Homogeneity: By rubbing the cream in the hands, the homogeneity of the poly-herb mixture was tested. The cream has been shown to have a smooth consistency and uniform.

Patch test: For each skin allergy, the formulation of the cream has been evaluated.

Stability: According to ICH requirements, stability tests are performed on the herbal formulation [12]. The prepared cream is placed in a container and kept for three months in a humid chamber at a temperature of $40 \pm 2^\circ\text{C}$ and a relative humidity of $75 \pm 5\%$. After three months, the samples were examined for Appearance, Colour, Odour, pH, Spreadability, Homogeneity & Patch tests.

Antioxidant studies using DPPH method [13]

Study on the antioxidant activity of the formulations was performed using DPPH radical scavenging activity. It was necessary to dilute a 9 ml sample of the 22% methanolic DPPH standard solution with methanol to 50 ml. Five separate strengths of each formulation - 400, 200, 100, 50 and 25 mcg - were created using a 1:1 mixture of water and acetone. With sample concentrations measured against blanks, the study was performed in a 96-well ELISA plate. % inhibition was calculated using the formula

$$\% \text{ Inhibition} = \frac{\text{Control} - \text{Sample}}{\text{Control}} \times 100$$

RESULTS

Formulation of poly herbal anti-oxidant cream

White petrolatum, stearic acid, cetyl alcohol, glycerin monostearate, propylene glycol, water and glycerin were used as excipients to make four separate herbal formulations. The concentration of vegetable oils is changed to create formulations. Compared to F1, F2 and F3 of the four formulations, F4 showed promising results and antioxidant activity.

Table 2: Formulation of poly herbal antioxidant cream

Sl. No.	Ingredients	F1	F2	F3	F4
1	Macadamia nut oil	4 ml	3 ml	3 ml	4 ml
2	Moringa oil	2 ml	4 ml	3 ml	4 ml
3	Tamanu oil	4 ml	2 ml	3 ml	4 ml
4	Jjoba oil	2 ml	3 ml	3 ml	4 ml
5	Avocado butter	8 gm.	8 gm.	8 gm.	8 gm.
6	Vitamin -E oil	2 ml	2 ml	2 ml	2 ml
7	White petroleum jelly	14 gm.	14 gm.	14 gm.	14 gm.
8	Steric Acid	4 gm.	4 gm.	4 gm.	4 gm.
9	Cetyl Alcohol	8 gm.	8 gm.	8 gm.	8 gm.
10	Glycerol monostearate	3 gm.	3 gm.	3 gm.	3 gm.
11	Water	28 ml	28 ml	28 ml	28 ml
12	Propylene glycol	14 ml	14 ml	14 ml	14 ml
13	Glycerin	6 ml	6 ml	6 ml	6 ml
14	Methyl Paraben	0.2 gm.	0.2 gm.	0.2 gm.	0.2 gms
15	Propyl Paraben	--	--	0.2 gms	0.2 gms



An Analysis of Evaluation of poly herbal anti-oxidant cream

Physical assessment

Organoleptic evaluations of appearance, color, taste, aroma, smear and removal were performed for all

formulations. All formulations F1, F2, F3 and F4 were found to have a semi-solid appearance, a characteristic odor and a light yellow tint. Table 3 of the report shows the results.

Table 3: poly herbal cream's physical characteristics

S. No.	Properties	F1	F2	F3	F4
1	Appearance	Semisolid	Semisolid	Semisolid	Semisolid
2	Colour	Light Yellow	Light Yellow	Light Yellow	Light Yellow
3	Odour	Characteristic	Characteristic	Characteristic	Characteristic
4	Type of smear	Non greasy	Non greasy	Non greasy	Non greasy

pH of Formulation:

The results of the pH analyzes for the formulations produced were tabulated in Table 4 and were determined to be between 6 and 6.5, which corresponds to the pH of the skin.

Spreadability:

The generated formulation, which weighed approximately 1 g and was placed in the center of a glass slide marked with a 1 cm diameter circle, was placed on top of the glass slide. A 500 g weight was placed on the top glass plate and left for five minutes. The term "spreadability" describes the area over which the cream sample spreads evenly. The results in Table 4 for formulation F4 show that it has a high spreadability.

Viscosity:

The viscosity of the developed compositions was measured using a Brookfield digital viscometer with an LV-6 spindle rotating at 100 rpm. An average of two replicates were collected and the results are summarized in Table 4.

Patch test:

To check for allergic reactions, a small amount of formulations were collected and applied to the skin. The formulations used in the patch test did not cause any allergic reactions or rashes.

Table 4: Evaluation parameters of formulations

Sl. No.	Formulation	pH	Patch test	Spreadability (g cm/s)	Viscosity (at 100 rpm)
1	F1	6.1	Negative	5.75	2175
2	F2	6.5	Negative	6.13	2796
3	F3	6.0	Negative	7.09	2986
4	F4	6.3	Negative	7.85	3260

Thermal stability of formulation:

Using ICH criteria, the thermal stability of the produced formulations was tested. To perform stability experiments, the formulations were stored for three months in hermetically sealed containers in a humidity chamber at a temperature of $40 \pm 2^\circ\text{C}$ and a relative humidity of $75 \pm 5\%$. Materials were tested three months later for appearance, color, odor, pH, spreadability, homogeneity and patch testing. All the formulations

showed good stability with no change in appearance, color or odor, and phase separation.

DPPH Radical Scavenging activity:

Study on the antioxidant activity of the formulations was performed using DPPH radical scavenging activity. Table 5 presents the results. Compared to other formulations, F4 has been shown to have the strongest antioxidant activity. According to current research, F4 has the strongest antioxidant activity where the results were tabulated in below.

**Table 5:** Antioxidant studies of developed formulations

Sl. No.	Formulations	% Inhibition (at 400 mcg)	IC ₅₀ Value
1	F1	65.58	94
2	F2	75.98	81
3	F3	84.56	77
4	F4	91.41	69

Discussion

According to scientific research, herbal medicines are more effective healers because they support the body's natural preparedness mechanisms. Traditional herbal concepts are combined with state-of-the-art technology in the current study to provide patient safety, product safety and improved therapeutic product effectiveness. White petrolatum, stearic acid, cetyl alcohol, glycerin monostearate, propylene glycol, water and glycerin were used as excipients to create four different cream formulations. Based on the test batch, the formulation was divided into batches F1, F2, F3 and F4. The thermal stability of the developed cream formulations is tested at room temperature $40 \pm 2^\circ\text{C}$ and $75 \pm 5\%$ relative humidity. Of the four alternative formulations, F4 shows strong results that are stable, promising and show no phase separation during stability testing. The antioxidant activity of the F4 formulation was more potent, with an IC₅₀ value of 94 and a higher percentage of inhibition.

Conclusion

Over the past decade, the use of herbal medicines has increased in both therapeutic and commercial settings. Ayurveda, homeopathy and the traditional Indian medical system all rely heavily on herbal treatments. According to a recent study, the moisturizer produced has significant antioxidant activity, making it useful to improve skin health and prevent dry skin. In addition, since it contains tamanu oil, the composition helps to protect the skin from UV rays. Jojoba and moringa oil are rich in vitamin E and contain antioxidant properties that nourish the skin. This study raises the possibility that poly-herbal formulations play an important role in the treatment of skin conditions such as excess dryness, dermatitis, psoriasis.

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Conflict of Interest

Authors declare no conflicts

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