



DESIGN AND ANALYSIS OF A POLYHERBAL SKIN WHIPPED CREAM**BHATT F*, SHAH N, GOHIL D, PATIL S, JOSHI K, GOHIL D, SAJAN C AND
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Gujarat, India***Corresponding Author: Ms. Foram Bhatt: E Mail: forbhatt2103@gmail.com**Received 7th July 2023; Revised 9th Aug. 2023; Accepted 1st Nov. 2023; Available online 15th Dec. 2023<https://doi.org/10.31032/IJBPAS/2023/12.12.1052>**ABSTRACT**

Aloe vera (aloe barbadensis miller), neem (azadirachta indica), and turmeric (curcuma) are all examples of medicinal plants that have been utilised for ages in herbal remedies such as Ayurveda, Siddha, and homoeopathic remedies. Aloe vera gel, a mucilaginous substance found in the centre of aloe vera leaves, is used to make cosmetics and some medicines. Aloe vera is both calming and anti-inflammatory. As a result, it is one of the most organic treatments for burned or sunburned skin. Neem has the power to control oil production, heal injuries, promote collagen production, lessen acne scarring, and reduce skin inflammation. It functions as a natural option to treat skin tissue from the inside out while also minimising hyperpigmentation and scarring. One of the key skin-whitening ingredients mentioned in Ayurveda is turmeric. It is known to lighten dark spots and give the skin a healthy glow. Strong antioxidants are probably to blame for these brilliant advantages and anti-inflammatory substances working together to restore the skin's natural health.

Keywords: Semisolid Emulsions, Herbal Cream, Anti Inflammation, Antifungal, Pigmentation, TDDS

INTRODUCTION

Oil in water (o/w) or water in oil (w/o) type semisolid emulsions that are designed for external application are what are referred to as cream. Cream is categorised as an emulsion of water and oil [1]. It is applied to the outermost or most superficial layer of the skin, and its main benefit is that it lasts longer at the application site. The

purpose of a skin cream is to protect the skin from various environmental factors, including weather, and to provide calming effects. There are many various kinds of creams, including hand, body, cleansing, cold, foundation, disappearing, night, and massage creams [2, 3]. Our primary goal is to create a herbal cream with multiple uses. Effects of moisturisers include reducing acne and skin irritation, eczema, psoriasis, dry skin, wrinkles, rashes, and other skin conditions, as well as bringing radiance to the face. Three herbal ingredients- Aloe

Vera gel, Neem, and Neem have been included in our formulation. Aloe Vera gel is used as a moisturiser, to lessen acne and pimples, and to cure burn wounds. Neem is used to treat inflammation and fungal infections as well as scarring, pigmentation, redness, and itching of the skin [4, 5].

MATERIALS AND METHODS

Collection of plant material:- Neem leaves and aloe vera were taken from the Sumandeep Vidhyapeeth deemed to be University.

Table 1: Ingredients

S. No	Ingredients	Role
1	Aloe vera gel	Anti-ageing, antiinflammatory, moisturizer, reduce acne and pimple
2	Turmeric	nhibit the production of melanin, Skin whitening
3	Neem	Promote wound healing, relieves skin dryness, itching and redness
4	Bees wax	Emulsifying agent, stabilizer and gives thickness to the cream.
5	Liquid paraffin	Lubricating agent
6	Borax	Alkaline agent which reacts with emulsifying agent to form soap
7	Methyl paraben	Preservative
8	Glycerin	Humectant, moisturizing agent
9	Zinc oxide	Anti-inflammatory
10	Vitamin E Capsule	Antioxidant
11	Jasmine oil	Fragrance

Cosmetological Importance of Aloe:-

Since ancient times, aloe vera has been used to treat burns and infections. Aloe vera is now recognised as a crucial ingredient in cosmetics thanks to advancements in cosmetology. It has about 20 amino acids, sufficient amounts of minerals including calcium, magnesium, and salt, enzymes, vitamins, and polysaccharides. nitrogen and additional elements that make it a miracle herb for beauty [6, 7]. Here is a brief explanation of

some of the most significant uses of aloe vera for cosmetic purposes.

Itching and Blisters

Furthermore, aloe vera decreases itching and aids in the recovery of blisters. Vitamins B1, B2, B6, B12, and C found in aloe give skin a calming and soothing sensation [8].

Skin Aging

Elastin and collagen synthesis can be started by aloe vera. These amino acids are required to stop the skin from ageing [8].

Acne

Aloe vera acts as an immune enhancer and an anti-inflammatory to help reduce acne scars. Aloe vera-containing cosmetics may lessen the severity of acne. Additionally, it has chemical components that have a knack to prevent acne from starting on the skin. Youth Aloe vera produces the feeling of modernity. It aids in improving blood flow, which makes it simpler for cells to transfer oxygen with one another and replenish themselves [9].

Sun-burns

Aloe Vera is incredibly effective at lessening sunburn pain. It is rubbed topically on skin for this purpose. Sunburns can be treated with the plant's fresh fluid or after-sun medications containing Aloe vera [10].

Moisturizing Agent

Aloe vera can also be used to exfoliate and soften skin. To get your skin in exceptionally soft condition after taking a shower, there are a myriad of creams on the market that contain aloe vera. When aloe vera gel, cream, or lotion is applied to the face, it creates a wonderful barrier that protects the skin from debris and other potentially harmful environmental factors [11].

Pigmentation The pigment melanin is in charge of giving human skin its colour. A condition known as hyper pigmentation occurs when a lot of melanin is produced.

The skin's excessive exposure to the sun is typically to blame for this. Melanocytes, which are skin cells, begin to synthesise melanin in response to UV radiation from sunbeams. The development of darker spots on the skin is caused by this enhanced melanin synthesis. Aloe vera has the ability to lighten dark spots and pigmentation on the face [12].

Skin Eruption

Creams with aloe vera are helpful for skin outbreaks. The most effective treatment for burns and wounds has been demonstrated to be aloe vera gel. Aloe vera is actually helpful for skin eruptions due to its ability to regenerate cells and its anti-bacterial and anti-fungal properties [12].

Cosmetological Importance Of Neem

In order to treat dry skin and wrinkles, neem products are frequently suggested in conjunction with skincare and beauty regimens. Your skin's melanin production is decreased by the antioxidants, improving your skin's tone. Additionally, it aids in reducing skin redness, dryness, and dark spots [11].

cures acne Neem's antibacterial properties aid in the reduction of acne. It treats breakouts and soothes itchiness in the skin. Because it contains chemicals that combat bacteria that cause acne, it is efficient for curing acne. Neem does all of this without making your skin dry, which is the finest

part. Neem therapy is one of the best treatments for acne scars [12].

Whiteheads and Blackheads Neem and turmeric have both been used for a long time as skin treatments. When used long-term in conjunction with turmeric, neem can treat whiteheads. Additionally, it will help to avoid a number of skin illnesses. Apply a dry mixture of neem and turmeric on your face, paying careful attention to any troublesome areas [11].

Reduces the onset of ageing Neem's anti-aging properties are among its most significant advantages. It is well renowned for minimising fine lines and wrinkles as well as preserving moisture levels. Neem's antioxidant properties protect the skin from damaging UV rays, pollution, and other environmental factors. Promotes collagen production Vitamin C is abundant in neem, which aids in the natural creation of collagen and infuses the skin with antioxidants to reduce fine wrinkles [12].

Cosmetological Importance of Turmeric

the flavour Many civilizations have long believed that turmeric has both culinary and therapeutic advantages; it is a key ingredient in curry. It has been praised for its antibacterial, anti-inflammatory, antioxidant, and anti-tumor properties for hundreds of years. Acne and turmeric's antimicrobial properties Propionibacterium acnes, the most

prevalent bacterium on human skin, is a significant factor in acne. Antibiotics like erythromycin and clindamycin are frequently administered in conjunction with azelaic acid to treat severe acne. But as antibiotic resistance increases, scientists are continuously testing novel antimicrobial substances [11].

turmeric and skin discoloration Curry powder's characteristic colour is derived from the bright yellow colour of turmeric. Actually, one of the first applications for turmeric was to colour clothing [13].

Skin Bruising Turmeric topically used may lessen skin irritability. turmeric extracts have been indicated by certain research as potential irritant-alleviators for breast tumour therapies [14].

antioxidant ability Antioxidants are abundant in turmeric. Reliable Source Antioxidants can prevent free radicals from harming healthy cells when it comes to facial care. This could delay the appearance of scars, hyperpigmentation, and other chronic skin issues [15].

diminution of hyperpigmentation Topical turmeric studies have focused on hyperpigmentation among other things. Hyperpigmentation occurs when areas of your skin are darker than the healthy surrounding tissue. According to one of these studies, a cream with turmeric as its main ingredient reduced hyper-

pigmentation by more than 14% over the course of four weeks [16].

Studies on wrinkle treatment Turmeric has been recommended by a reputable source

as a potential therapy for wrinkles and fine lines. It might help to enhance the texture of the skin overall, which could make wrinkles less obvious [16].

Table 2: Formulations

S. No.	Ingredients	Formulation1	Formulation2	Formulation3	Formulation4
1	Aloe vera gel	2ml	1.6ml	1.2ml	1ml
2	Turmeric	0.5gm	0.3gm	0.8gm	0.5gm
3	Neem	1ml	0.8ml	0.5ml	0.5ml
4	Bees wax	3.5gm	3.2gm	3gm	3gm
5	Liquid paraffin	10ml	12ml	11ml	9ml
6	Borax	0.3gm	0.4gm	0.2gm	0.2gm
7	Methyl paraben	0.02gm	0.04gm	0.03gm	0.02gm
8	Glycerin	1ml	2ml	2.5ml	1ml
9	Zinc oxide	0.6gm	0.7gm	0.5gm	0.7gm
10	Vitamin E Capsule	1cap	1cap	1cap	1cap
11	Jasmine oil	q.s.	q.s.	q.s.	q.s.
12	Distilled water	q.s.	q.s.	q.s.	q.s.

Extraction Processes

Aloe Vera

Aloe Vera leaves that were mature, healthy, and fresh were gathered and cleaned with distilled water. The exterior portion of the leaf was then dissected longitudinally using a sterile knife after being properly dried in a hot air oven [16]. Then, a sterile knife was used to cut away the aloe Vera gel, which is the colourless parenchymatous tissue. After that, muslin cloth is used to filter out the fibres and contaminants. The process then uses the filtrate, or filter product, which is a transparent aloe vera gel [17].

Neem

Neem leaves were collected, cleaned with purified water, and then cooked in a beaker with 10g of distilled water over direct heat until the concentration reached 5ml. and after that, contaminants were screened

using filter paper. The prepared filtrate, which is a clear solution or extract of neem leaves, was then employed as a filter product [18].

Preparation of cream

The Making Of Cream In a borosilicate glass beaker, heat liquid paraffin and beeswax to 75 °C and keep it there throughout the heating process. (Phase oil). Borax and methylparaben should be dissolved in distilled water and heated in a separate beaker to 75 °C to produce a clear solution. Phase of water [17, 19]. The heated oily phase will then gradually receive this watery phase. After that, stir vigorously while adding measured amounts of aloe vera gel, neem extract, and turmeric extract to create a smooth cream. Then, as a scent, add a few drops of jasmine oil. To give the slab a smooth texture, spread this cream on it and, if

necessary, add a few drops of distilled water. Then, combine the cream in a geometric pattern on the slabs. the cream and to thoroughly combine all the ingredients. Slab technique or extemporaneous cream preparation is the name of this technique [19].

Evaluation Of Cream

Physical evaluation

In this test, the cream was observed for color, odor, texture, state [5].

Irritancy

Mark the left-hand dorsal surface region (1 cm² Wash ability). After that, the cream was administered there, and the duration was recorded. Then, for up to 24 hours, it is examined for irritation and erythema [7].

Wash Ability

A small amount of cream was applied on the hand and it is then washed with tap water [11].

pH

0.5 g cream was taken and dispersed in 50 ml distilled water and then PH was measured by using digital Ph meter [10].

Viscosity

Viscosity of cream was done by using Brooke field viscometer at a temperature of 25 °C using spindle No. 63 at 2.5 RPM [11].

Phase separation

Prepared cream was stored in a covered container away from light at a temperature of 25 to 100 °C. Phase separation was then

monitored for 30 days, 24 hours a day. The phase separation was monitored and evaluated for any changes [13].

Spread ability

The spreadability was measured in terms of how long it took two slides operating under a specific load to separate from the cream positioned in between the slides. The spreadability is improved by separating the two slides more quickly. Glass slides with uniform dimensions were selected from two sets. The cream formulation was then placed on a slide that was cut to the proper size [15]. The formulation was then covered by another slide. The cream between the two slides was then uniformly compressed to produce a thin layer after a weight or specific load was applied to the upper slide. The extra formulation that had adhered to the slides was scraped off once the weight was removed. The weight that was linked to the upper slide gave it the push it needed to fall off freely. It was noted how long it took the upper slide to detach [16].

Spread ability= $m \times l/t$

Where, m= Standard weight which is tied to or placed over the upper slide (30g)

l= length of a glass slide (5 cm)

t= time taken in seconds

Greasiness Here, a smear of cream was put to the skin's surface, and its grease- or oil-likeness was assessed [15].

Compatibility

study IR spectroscopy was used to conduct a compatibility research on the herbal APIs, and the solid state IR spectra was measured. The range of the IR spectrum that was measured is 4000.12 to 525.03. 75 was the sensitivity [16]. The IR spectra of the mixture of herbal APIs show the following characteristic peaks: 1026.79, 1368.24, 1438.73, 1604.78, 1728.45, and 3289.05 cm⁻¹. Individual herbal APIs' IR spectra showed the same peaks as well.

RESULTS AND DISCUSSION

Evaluation results of all the 3 formulations are gives below.

Physical evaluation In this test color, odor, texture and state of the three formulations were checked [17].

Irritancy

Mark the area (1 cm²) on left hand dorsal surface. Then the cream was applied to that area and the time was noted. Then it is checked for irritancy, erythema, and edema if any for an interval up to 24 h and reported [3]. According to the results all the three formulations that is F1H, F2H, F3H and F4H showed no sign of irritancy, erythema and edema.

Table 3: In this test color, odor, texture and state of the three formulations was checked

S. No.	Parameters	Formulation1	Formulation2	Formulation3	Formulation4
1	Color	Faint green	Faint green	Faint green	Faint green
2	Odor	Pleasant	Pleasant	Pleasant	Pleasant
3	Texture	Smooth	Smooth	Smooth	Smooth
4	State	Semisolid	Semisolid	Semisolid	Semisolid

Table 4: Irritancy Study Observation

S. No.	Formulations	Irritant Effect	Erythema	Edema
1	F1	Nil	Nil	Nil
2	F2	Nil	Nil	Nil
3	F3	Nil	Nil	Nil
4	F4	Nil	Nil	Nil

Table 5: Washability Observations

S. No.	Formulations	Washability
1	F1	Easily Washable
2	F2	Easily Washable
3	F3	Easily Washable
4	F4	Easily Washable

Table 6: pH Observation Table

S. No.	Formulations	Ph
1	F1	8.7
2	F2	7.4
3	F3	6.9
4	F4	7

Table 7: Viscosity Observation Table

S. No.	Formulations	Viscosity (cps)
1	F1	21020
2	F2	11810
3	F3	18820
4	F4	17760

Table 8: Phase Separation Observation Table

S. No.	Formulations	Phase Separation
1	F1	No Phase Separation
2	F2	No Phase Separation
3	F3	No Phase Separation
4	F4	No Phase Separation

Table 9: Spreadability Observation Table

S. No.	Formulations	Time(sec)	Spreadability
1	F1	10	22.8
2	F2	7	32.4
3	F3	15	15.18
4	F4	12	20.14

Table 10: Greasiness Observation Table

S. No.	Formulations	Greasiness
1	F1	Non-Greasy
2	F2	Non-Greasy
3	F3	Non-Greasy
4	F4	Non-Greasy

CONCLUSION

By using Aloe Vera gel, Neem and Tulsi the cream showed a multipurpose effect and all these herbal ingredients showed significant different activities. Based on results and discussion, the formulations F1, F2, F3 and F4 were stable at room temperature and can be safely used on the skin.

The present research was the formulation and evaluation of polyherbal cream. The evaluation parameters were coming under results, like the physical evaluation of polyherbal cream, pH of the cream, Spread-ability, Washability, non-irritancy test, viscosity and phase separation of the polyherbal face cream was prepared as shown in **Figure 4**.

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