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Formulation and Evaluation of Multipurpose Herbal Cream

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Abstract

The remedies used to improve a person's look are called herbal cosmetics. The current study set out to create a herbal cream with antifungal, antibacterial, anti-acne properties, as well as moisturizing, nourishing, lightening, and treating a range of skin conditions. Various unrefined medications were consumed, including Curcuma longa (turmeric rhizomes), Nirgundi (Vitex negundo Linn), Azadirachta Indica (neem leaves). The cream is prepared by slab Technique. Final samples underwent accelerated stability testing in an environmental chamber with a temperature of 25 ± 10^0C and a humidity of 60 ± 10% RH. It was discovered that every productwas stable, showing no evidence of phase separation or color change. Additionally, a patch testwas performed for sensitivity testing, and there was no indication of any allergic reactions or skin irritation. This work primarily it focuses on evaluating the microbiological quality of prepared cosmetics. To everyone's amazement, both formulations passed the microbiological limit tests according to international standards. It has been established that the formulation of herbal cosmetics is safe for use and can be applied as a barrier to protect skin.

Objective: To formulate and evaluate herbal cream using Nirgundi, Curcuma and Neem to give multipurpose effect on health.

Keywords: Turmeric, Neem, Nirgundi, Herbal Cosmetic, Multipurpose Cream.

Introduction

Plant material is a valuable resource for treating a number of severe diseases across the entireworld. Traditional practices in medicine, particularly the use of medicinal herbs as pastes, powders, etc. In developing countries, medicinal herbs serve as vital for fulfilling basic healthdemands. The chemically active substances found in plants and secondary metabolites that canhave a specific physiological effect on the human body are what give these herbs their therapeutic importance[1]. Various plant species used in herbalism (also known as "herbology"or "herbal medicine") are included under the phrase "medicinal plant." Various plant species used in herbalism (also known as "herbology" or "herbal medicine") are included under the phrase "medicinal plant." The word “herb” has been derived from the Latin word, “herba” andan old French word “herbe”. These are formulations manufactured as finished herbal products or combination herbal products that may contain excipients in addition to the active herbal constituents, as defined by the world health organization[2]. Cream is defined as semisolid emulsions of the water in oil (w/o) or oil in water (o/w) type that are meant to be applied externally. Cream is divided into two categories: water in oil emulsion and oil in water. Its primary function is to stay longer at the application site when applied to the outer or superficiallayers of the skin. A skin cream's purpose is to protect the skin

from various environmental factors and weather conditions while also providing calming effects. There are various kindsbof creams, including massage, night, vanishing, cleansing, cold, and hand and body creams. Our primary goal is to create a herbal cream that has multiple uses, like moisturizer, reduce acne and skin irritation, reduce skin diseases like eczema, psoriasis, dry skin, wrinkles, rashesetc and also adding glow to the face. We have used four herbal ingredients in our preparationwhich are Neem, Nirgundi & Curcuma to reduce pimples and acne and also used for treatmentof burn wounds. Neem is used as an antifungal and anti-inflammatory and it is also used to reduce scar, pigmentation, redness and itching of the skin. Curcuma is used to add glow to theskin and to promote wound healing, Nirgundi leaves are beneficial in managing in bacterial and parasitic skin infection and treating acne[3].

Plant Profile

1. *Vitex Negundo Linn.*

Figure 1 : *Vitex Negundo Linn.*

Botanical Name : *Vitex Negundo Linn.*

Family : Verbenacease

Synonyms : Sambhalu , Sephali, Nirgundi, Panjgusht, Five leaved chaste tree.

Biological Source : It is obtained from the leaves of the plant *Vitex Negundo*.

Geographical Source: It is widely spread around the world in Afghanistan, Pakistan, India, Sri Lanka, Thailand, Malaysia, Eastern Africa, Madagascar, America, Europe, China, and theWest Indies. It grows in humid environments or alongside water courses in wastelands and mixed open forests[9].

Chemical Constituents: Leaves contains an alkaloid nishindine, flavanoids like flavones, luteolin-7, glucoside, casticin, iridioid, glycosides, an essential oil and other constituents like vitamin C, carotene,gluco-nonital, benzoic acid, B-sitosterol, and C-glycoside. Seeds contain hydrocarbons, B-sitosterol and benzoic acid and phthalic acid (Hussain *et al.*, 1992). Anti- inflammatory diterpene, flavanoids, artemetin and triterpenoids[6].

Medicinal uses of Nirgundi: Anti-inflammatory, antioxidant, anticonvulsant, hepa- toprotective and CNS depressant activity. It also exhibits antimicrobial, anti-tumor, insecticidal, hypoglycemic, anti-arthritic. In modern practices, the application of flowers of V.Negundo cures fever, diarrhoea, and hepatic problems and the fruits are given in headaches[7].

2. Azadirachta Indica

Figure 2 : Azadirachta Indica

Botanical Name: Azadirachta Indica
Family: Meliaceae
Synonyms: Neem
Biological Source: Fresh or dried leaves and seed oil of Azadirachta Indica.
Geographical Source: It is one of two species in the genus Azadirachta, and is native to the Indian subcontinent. It is typically grown in tropical and semi-tropical regions. Neem trees alsogrow on islands in Southern Iran.
Chemical Constituents: Natural compounds present in Neem are Triterpenes or Limonoids Azadirachtin, salannin, meliantriol and nimbin are well known the bitter constituents The nimbin contains an acetoxy, a lactone, an ester, a methoxy and an aldehyde group[3].
Medicinal uses of Neem: Acne treatment, Oral, skin and hair care, Anti-wrinkle and anti- aging, Skin disorders, Dermatitis prevention, Skin whitening.[5]

3. Turmeric

Figure 3 : Curcuma Longa

Botanical Name: Curcuma longa and Curcuma aromatica**Family**: Zingiberaceae
Synonyms: Haldi, manjal, Indian saffron curcuma
Biological Source: It is a dried rhizomes of Curcuma Longa
Geographical Source: Turmeric thrives in rainy tropical areas such as the Indian subcontinent and Southeast Asia[s]
Chemical Constituents: Turmeric powder is about 60-70% carbohydrates 6-13% water, 6-8%proteins, 5-

10% fat, 3-7% dietary mineral, 3-7% essential oils, 2-7% dietary fibre, 1-6% curcuminoids. Phytoconstituents of turmeric include diarylheptanoids, a class including numerous curcuminoids – curcumin, demothoxycurcumin, and bisdemethoxycurcumin.

Medicinal uses of Turmeric : When applied topically to aseptic and septic wounds, it seems to have good promise as a wound healing powder. Additionally, it is used to prevent, treat, or manage psoriasis as well as other skin disorders such acne, burns, eczema, UV damage to theskin, and early ageing. These qualities could provide the skin brightness and shine. Additionally, turmeric may benefit your skin by enhancing its natural brightness[3].

Methodology Material and Methods

1) Collection and Extraction of Plant

1.1) Collection of Nirgundi (Vitex Negundo) leaves

Nirgundi leaves were collected from the local botanical garden in Pune.

1.2) Extraction of Powdered Nirgundi (Vitex negundo) leaves

The collected Nirgundi leaves were thoroughly washed in distilled water to remove contaminants. The leaves were chopped into small pieces and dried in the shade for 1 week Coarsely powder using a mechanical mixer. Powdered leaves of Nirgundi with a total weight of 20 g were extracted by maceration method using 20 ml of 70% ethanol as solvent for about 2 days by covering with aluminum foil with occasional shaking. The ethanolic extractof Nirgundi leaves was filtered and concentrated to dryness under reduced pressure and controlled temperature using a rotary evaporator. The extract was stored in airtight containers in a refrigerator at 4^0C until further use[8] .

1.3) Collection of Neem (Azadirachta indica) leaves

Neem leaves are collected from herbal garden of Vidya Niketan College Of Pharmacy, Lakhewadi, Indapur, Pune

1.4) Extraction of powdered Neem (Azadirachta Indica) leaves

20 g of fresh Neem leaves paste prepared above was taken. The leaves were extracted with water for 12 hours at room temperature. Extraction was carried out by Maceration method. Thesupernatant after 4-5 days was filtered out [7].

1.5) Collection of Turmeric (Curcuma long) Rhizomes

Turmeric rhizomes are collected from herbal garden of Akluj.

1.6) Extraction of Powdered Turmeric (Curcuma long) Rhizomes

Preparation of turmeric extract: Take 1 g of turmeric powder in 10 ml of distilled water and shake in a 250 ml volumetric flask heated in a water bath at 80°C to 100°C for 5 to 10 minutes.It is then filtered and turmeric extract is obtained[11].

Figure 4 : Filtered extract of herbs

2) Development of Multipurpose herbal Cream Formulation

The following table contains ingredients used in a cream formulation.

Table 1: Ingredient used in a Cream Formulation.

Sr.No.	Ingredients	Roles
1	Nirgundi	Antibacterial, Anti parasitic, Anti fungal.
2	Neem	Promote wound healing, relives skin dryness, itching and dryness
3	Turmeric	Anti bacterial, Anti parasitic, Anti fungal.
4	Liquid Paraffin	Lubricating agent
5	Borax	Emulsifying agent to form soap
6	Methyl Paraben	Preservatives
7	Bees Wax	Emulsifying agent, Stabilizer, and give thicknessto cream
8	Rose Oil	Fragrance
9	Water	Vehicle

Method

The cream was created using a base consisting of beeswax, liquid paraffin, borax, methylparaben, distilled water, rose oil, nirgundi and neem leaves, and curcumin. Using the slab technique, often referred to as the important approach, all of the excipients and herbal extracts were combined in a geometric and homogenous combination to make the cream. We have used the slab approach to produce three batches of our herbal cream, designated F1, F2 and F3. Each of the three batches was evaluated based on a number of factors, such as phaseseparation, viscosity, pH, and appearance[4].

Formulation of Cream

Slab method

The ingredients are combined until a homogenous mixture is achieved. One small-scalemethod uses an ointment mill, while the other uses impromptu compounding. Hard rubber spatulas can be used if an ointment's ingredients react with metal. Place this cream onto the slab, stir it in a geometric pattern to combine all the components and giveit a smooth texture, and add a few drops of distilled water as needed. This process ofpreparing cream is known as the slab technique or the extemporaneous approach. Heat liquid paraffin and beeswax in a borosilicate glass beaker at 75^{O}C and maintain that heating temperature (Oil phase). In another beaker, dissolve borax, propyl paraben indistilled water and heat this beaker to 75^{O}C to dissolve borax and Propyl paraben and toget a clear solution (Aqueous phase). Then slowly add this aqueous phase to heated oilyphase. Then add a measured amount of Neem extract, Nirgundi extract, turmeric extract and stir vigorously in a ice containing water bath until it forms a smooth cream. Then addfew drops of rose oil as a fragrance. Put this cream on the slab and add few drops ofdistilled water if necessary and mix the cream in a geometric manner on the slab to givea smooth texture to the cream and to mix all the ingredients properly. This method iscalled as slab technique or extemporaneous method of preparation of cream[10].

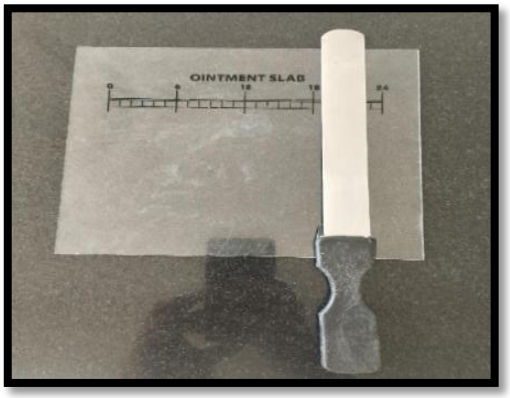

Figure 5 : Slab

Figure 6 : Cream Prepared by Slab Technique

Table 2: Formulation of Multipurpose Herbal Cream [10][14].

Sr.No.	Ingredients	Batch F1	Batch F2	Batch F3
1	Nirgundi Extract	0.9 ml	1 ml	1.1 ml
2	Neem Extract	0.4 ml	0.5 ml	0.6 ml
3	Turmeric Extract	1.7 ml	2.1 ml	2.5 ml
4	Bees Wax	3.5 gm	4.5 gm	5.5 gm
5	Borax	0.4 gm	0.5 gm	0.6 gm
6	Propyl Paraben	0.4 gm	0.5 gm	0.45 gm
7	Liquid Paraffin	16 ml	16.5 ml	17 ml
8	Rose Oil	Q.S.	Q.S.	Q.S.
9	Distilled Water	Upto 30 gm	Upto 30 gm	Upto 30 gm

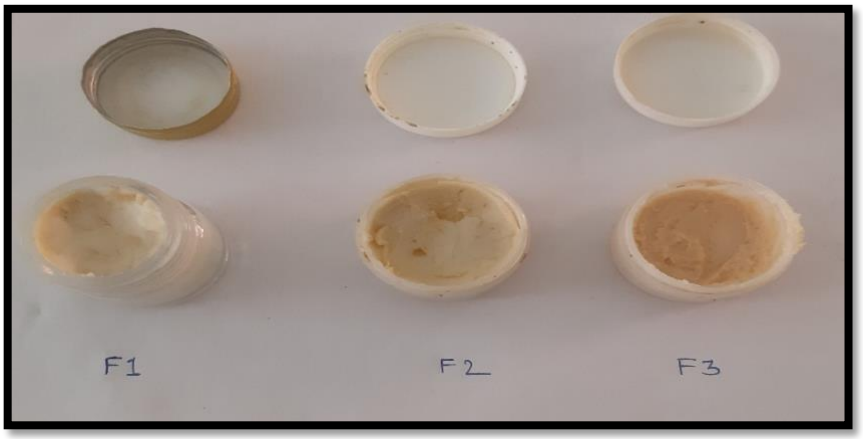

Figure 7 : Developed Cream Formulation (F1,F2,F3)

3) Evaluation of Developed Cream Formulation1. Physical Evaluation:

In this test, the cream was observed for color, odor, texture, state[15].

Irritancy:

Mark the area (1 cm^2) on the left-hand dorsal surface. Then the cream was applied to that areaand the time was noted. Then it is checked for irritancy, erythema, and edema if any for an interval up to 24 hrs and reported .

Wash Ability:

A small amount of cream was applied on the hand and it is then washed with tap water[15].

pH:

0.5 g cream was taken and dispersed in 50 ml distilled water and then PH was measured byusing digital pH meter[17].

Phase Separation:

Prepared cream was kept in a closed container at a temperature of 15-45^{0}C away from light. Then phase separation was checked for 24 hrs for 30 days. Any change in the phase separation was observed/ checked[1].

Spread Ability:

The spreadability was expressed in terms of time in seconds taken by two slides to slip off fromthe cream, placed in between the slides, under certain load. Lesser the time taken for separationof the two slides better the spreadability. Two sets of glass slides of standard dimension were taken. Then one slide of suitable dimension was taken and the cream formulation was placed on that slide. Then other slide was placed on the top of the formulation. Then a weight or certainload was placed on the upper slide so that the cream between the two slides was pressed uniformly to form a thin layer. Then the weight was removed and excess of formulation adhering to the slides was scrapped off. The upper slide was allowed to slip off freely by the force of weight tied to it. The time taken by the upper slide to slip off was noted[16].

Spread Ability = m × l/t

Where,

m= Standard weight which is tied to or placed over the upper slide (50g)l= length of a glass slide (5 cm)
t= time taken in seconds.

Greasiness :

Here the cream was applied on the skin surface in the form of smear and checked if the smearwas oily or grease-like.

Stability Study:-

Stability testing is done for the formulation batches conducted for various conditions likenature, texture, colour, odour, etc for definite period of time and check the stability of the cream.

RESULT

1. Physical parameter

Table No 3: Result of Physical parameter:

Parameter	Batch A	Batch B	Batch C
Colour	Yellowish white	Yellowish white	Yellowish white
Odour	Characteristics	Characteristics	Characteristics
Texture	Smooth	Smooth	Smooth
State	Semi solid	Semi solid	Semi solid

2.Irritancy:

The formulated cream does not cause any type of irritancy, erythema, and edema in aninterval up to 24 hrs and reported.

The picture showing result after 24 hours.

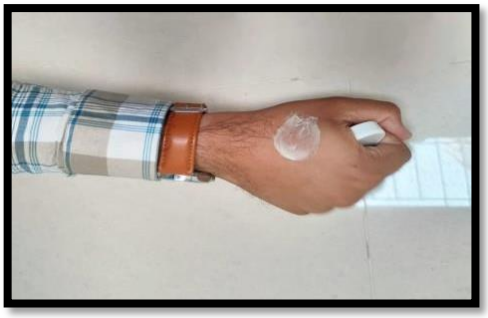

Figure 8 : Result of Applying cream

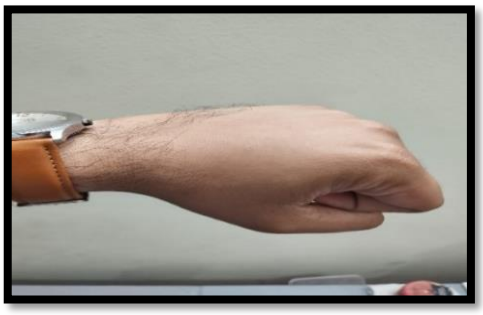

Figure 9 : Result of After Applying cream

3. Washability Study

Washability test was carried out by applying a small amount of cream on the hand and thenwashing with the help of tap water.

Formulation were easily washable.

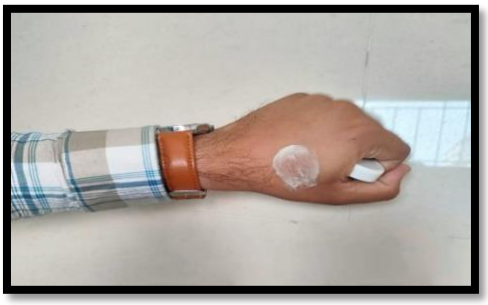

Figure 10 : Result of Applying Cream

Figure 11 : Result of After Applying Cream

4. pH

Table 4 : pH

Parameter	Batch A	Batch B	Batch C
pH	6.02	6.20	6.03

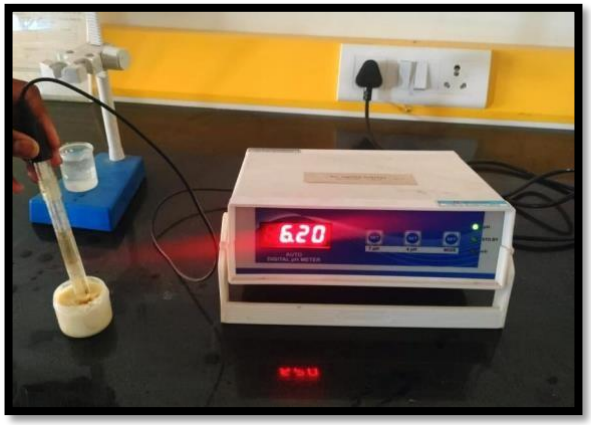

Figure 12 : Determination of pH

5. Phase Separation

Table 5 : Phase Separation

Formulation	**Observation**	**Inference**
F1	No phase separation	Stable
F2	No phase separation	Stable
F3	No phase separation	Stable

6. Spsread Ability Study Result

Figure 13 : Etermination Of Spread Ability

Spread Ability = m × l/t
Spread Ability = 50 × 2.6/15Spread Ability = 8.66 g.cm/s

7. Greasiness

We applied the cream on the skin surface in the form of smear and checked if the smear isgrease like.

8. Stability Study

Stability testing for all formulated batches was conducted under various environmental conditions and check nature, texture, colour, odour, etc. For definite period of time.and we observed no any changes in formulation.

Table 6 : Stability Study

Parameter	Iniatial stage	15 days	30 days	45 days
Nature	Sticky	No change	No change	No change
Colour	Yellowish White	No change	No change	No change
Odour	Characteristics	No change	No change	No change
Texture	Smooth	No change	No change	No change

Conclusion

The cream exhibited a multifunctional impact through the use of turmeric, neem, and nirgundi, and each of the herbal constituents shown distinct and noteworthy activities.We can conclude from the results that all three formulations- F1C, F2C, and F3C-werestable at room temperature and could be applied to the skin without risk. Thus, it can beconcluded that the formulation of F2C herbal cream is superior to that of F1C and F3C.The potential of plant extracts for cosmetic purposes is the main focus of the currentstudy. The personal care system has seen a multiplication in the usage of cosmetics. Theuse of bioactive ingredients in cosmetics affects the skin's biological processes and supplies the nutrients required for healthy skin. Throughout the trial period, the producedformulation shown high consistency, good spreadability, and no signs of phase separation. The best qualities and nutritional value of the prepared herbal cream areachieved with minimal chemicals, protecting the skin from a variety of skin problems. Thecream is also inexpensive because it was made with basic materials and a straight forward procedure. The herbal cosmetic formulation can be applied as a barrier to protect skin and is safe to use. The results of various cream tests indicated that the formulation may be applied topically to shield skin from harm. Natural cures are more widely accepted because it is thought that they are less harmful and have fewer adverseeffects than synthetic ones. Additional investigation will be conducted to verify the formulation's synergistic effect scientifically.

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