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Research Paper

Formulation And Evalution of Herbal Peel Off Face Mask Gel Using Shankhapusphi Flower and Beal Leaves

Dhanyashree K*, Hemavathi N, Chaithra M P, Rakshith K J

Bharathi College of Pharmacy, Bharathinagara, Maddur, Mandya, Karnataka, India 571422.

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ABSTRACT

Herbal peel-off face masks have gained considerable attention in cosmetic formulations due to their natural origin, ease of application, and potential skin-beneficial properties. The present study was undertaken to formulate and evaluate a herbal peel-off face mask gel containing aqueous extracts of Shankhapushpi flower and Bael leaves for potential antioxidant and skin-rejuvenating activity. Shankhapushpi and Bael were selected due to their phytochemical constituents and reported antioxidant properties. Polyvinyl alcohol (PVA) was used as a film-forming agent, while hydroxypropyl methylcellulose (HPMC) was incorporated to improve the viscosity and consistency of the gel. Glycerine and propylene glycol were used as humectants and moisturizing agents, while rose water was incorporated to provide a pleasant fragrance and additional cosmetic benefits. Tunbergia erecta was used as a natural colouring agent, and benzyl alcohol was incorporated as a preservative. Different formulations were prepared and evaluated for organoleptic characteristics, homogeneity, pH, spreadability, drying time, peelability, folding endurance, washability, stability, phytochemical constituents, and antioxidant activity. The antioxidant potential of the herbal extracts was assessed using the DPPH free-radical scavenging assay. The developed formulations showed satisfactory physical characteristics, acceptable pH, good spreadability, satisfactory drying and peel-off properties, and stability up to 40°C. the developed herbal peel-off face mask gel demonstrated promising characteristics and may serve as a natural cosmetic formulation for antioxidant protection and skin rejuvenation

INTRODUCTION

Previous studies have indicated that Shankhpushpi (Convolvulus pluricaulis) flowers and Bael (Aegle marmelos) leaves are promising sources of

naturally occurring antioxidant phytoconstituents. These plants contain various bioactive compounds, including flavonoids, phenolic compounds, tannins, polyphenols, and other secondary metabolites, which may contribute to

***Corresponding Author:** Dhanyashree K

Address: Bharathi College of Pharmacy, Bharathinagara, Maddur, Mandya, Karnataka, India 571422.

Email ✉: dhanyashreegowda2001@gmail.com

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their antioxidant activity. These antioxidant constituents can scavenge free radicals and may help reduce oxidative damage associated with environmental stress and ultraviolet (UV) exposure.

Premature skin aging is characterized by visible changes such as wrinkles, fine lines, reduced elasticity, and alterations in skin texture. Prolonged exposure to UV radiation can stimulate the formation of reactive oxygen species (ROS), which may cause oxidative damage to skin cells and contribute to photoaging. Excessive free-radical formation can result in oxidative stress and accelerate changes associated with skin aging. Therefore, antioxidant-rich herbal ingredients may be useful in topical cosmetic formulations for supporting skin protection and maintaining a healthy appearance.

In the present study, Shankhpushpi flower and Bael leaf extracts are incorporated together into a peel-off gel mask to explore their potential antioxidant, skin-protective, and skin-rejuvenating properties. Although these herbal ingredients have previously been investigated individually and their combination has been reported in a face-gel formulation, their incorporation into the present peel-off gel mask provides a different topical dosage-form approach. The formulation is intended to utilize the complementary properties of the selected herbal extracts while providing the practical benefits of a peel-off mask.¹

Cosmetics:

The peel-off gel mask may provide several cosmetic benefits, including refreshing and softening the skin, supporting skin-cell activity, removing superficial impurities and dead skin cells, and improving the overall appearance and texture of the skin. After application, the formulation forms a thin film upon drying that can be gently peeled from the skin without extensive rinsing, facilitating the removal of superficial

debris and dead skin cells. Thus, the proposed Shankhpushpi–Bael herbal peel-off gel mask may serve as a promising natural cosmetic formulation for antioxidant protection, skin rejuvenation, and supporting the reduction of visible signs associated with premature skin aging.²

The word "cosmetics" originates from the ancient Greek term *kosmētikos*, pearance of the skin, hair, nails, and other external parts of the body. which means "skilled in adornment" or "having the ability to arrange and beautify." It is derived from the verb *kosmein*, meaning "to adorn" or "to arrange," and the noun *kosmos*, meaning "order," "harmony," or "ornament." This origin reflects the historical purpose of cosmetics in enhancing personal appearance, maintaining beauty, and promoting aesthetic harmony. Over time, the term has come to encompass a broad range of products used for cleansing, protecting, and improving the appearance of the skin, hair, nails, and other external parts of the body.³

Herbal cosmetics are cosmetic preparations that incorporate natural ingredients derived from plants to enhance appearance while also supporting skin and hair health. These products may provide moisturizing, soothing, nourishing, and protective effects due to the presence of biologically active compounds found in medicinal plants. Herbal cosmetics are widely used for maintaining healthy skin, improving complexion, and managing common skin conditions such as acne. Their growing popularity is largely attributed to their natural origin, perceived safety, and reduced likelihood of causing adverse effects compared to some synthetic products. The long-standing use of medicinal plants in traditional healthcare systems has further contributed to the development of modern herbal cosmetic formulations.⁴

Herbal cosmetics are cosmetic formulations prepared using plant-derived ingredients such as extracts, essential oils, fixed oils, gums, waxes, and other natural substances. These products are



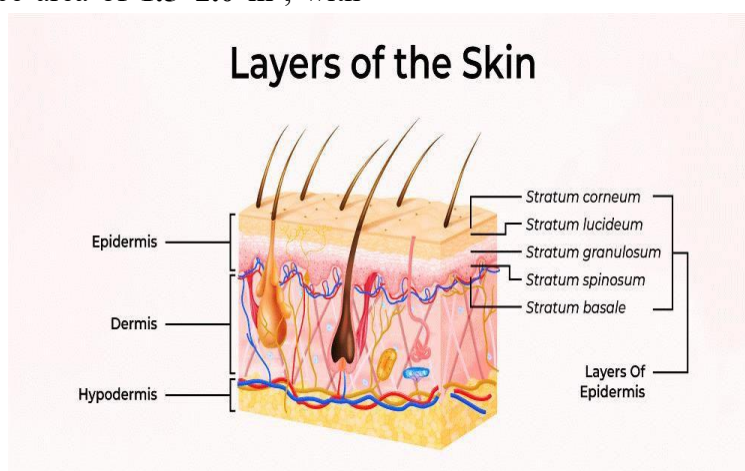
designed to enhance appearance while simultaneously improving skin and hair health through the biological activities of medicinal plants. Herbal cosmetics are increasingly preferred because they are considered safer than many synthetic products and are generally associated with fewer adverse effects when used appropriately.⁵

Physiology of Skin

The skin is the largest organ of the human body and serves as the first line of defense against external environmental factors. In adults, it covers an approximate surface area of **1.5–2.0 m²**, with

thickness varying according to the anatomical location. On average, the skin is about **1.3 mm thick in males** and **1.26 mm in females**. Besides providing physical protection, the skin plays a vital role in maintaining homeostasis by regulating body temperature, preventing excessive water loss, and performing sensory and metabolic functions. It has a slightly acidic surface pH ranging from **4.5 to 6.0**, commonly known as the acid mantle, which helps preserve the skin barrier and inhibits the growth of pathogenic microorganisms.

Layers of the Skin



A. Epidermis

The epidermis is the outermost layer of the skin and functions as the primary protective barrier against physical injury, harmful chemicals, microorganisms, and ultraviolet (UV) radiation. This layer is **avascular**, receiving nutrients and oxygen through diffusion from the underlying dermis. It is mainly composed of **keratinocytes**, along with **melanocytes**, **Langerhans cells**, and **Merkel cells**, each contributing to skin protection and sensory functions.

The epidermis consists of five distinct layers:

a.StratumCorneum:

The stratum corneum is the outermost layer composed of flattened, dead keratinized cells

embedded in lipids. It forms a strong protective barrier that minimizes water loss while preventing the entry of harmful microorganisms and chemicals.

b.StratumLucidum:

This thin, transparent layer is present only in thick skin, such as the palms and soles. It provides additional protection against mechanical stress and friction.

c.StratumGranulosum:

Cells in this layer contain keratohyalin granules that promote keratin formation and contribute to the development of the skin's waterproof barrier.

d.Stratum Spinosum:

Known as the prickle-cell layer, the stratum spinosum consists of polygonal keratinocytes connected by desmosomes, providing structural integrity and mechanical strength to the epidermis.

e.Stratum Basale(Stratum Germinativum):

The deepest epidermal layer contains actively dividing basal cells responsible for continuous epidermal renewal. It also houses melanocytes, which synthesize melanin to protect the skin from ultraviolet radiation, and Merkel cells involved in tactile sensation.

B. Dermis

The dermis lies immediately beneath the epidermis and is composed primarily of connective tissue rich in collagen and elastin fibers. It provides structural support, elasticity, and nourishment to the epidermis through an extensive network of blood vessels. The dermis also contains hair follicles, sebaceous glands, sweat glands, sensory nerve endings, lymphatic vessels, and blood vessels that collectively contribute to skin function and repair.

C. Hypodermis (Subcutaneous Tissue)

The hypodermis, also known as the subcutaneous layer, is situated beneath the dermis and, although not considered a true part of the skin, plays an important supportive role. It consists mainly of adipose tissue and loose connective tissue containing fibroblasts, macrophages, and adipocytes. This layer provides thermal insulation, mechanical cushioning, energy storage, and anchors the skin to the underlying muscles and bones.

Types of Skin and Their Characteristics

Normal Skin

- Possesses a balanced level of oil and moisture.
- Appears smooth, soft, and evenly toned with fine pores.

- Generally free from excessive dryness, oiliness, or sensitivity.

Dry Skin

- Produces insufficient sebum, resulting in roughness, tightness, and flaking.
- May appear dull and is more susceptible to irritation and sensitivity.

Oily Skin

- Characterized by excessive sebum production, giving the skin a shiny appearance.
- Enlarged pores are common, along with an increased tendency for acne and blackheads.

Combination Skin

- Exhibits both oily and dry characteristics.
- The T-zone (forehead, nose, and chin) is typically oily, whereas the cheeks remain normal or dry.

Functions of the Skin

1. Serves as a protective barrier against physical injury, microorganisms, chemicals, and ultraviolet radiation.
2. Helps regulate body temperature through sweating and changes in blood circulation.
3. Provides sensory perception by detecting touch, pressure, pain, heat, and cold through specialized nerve endings.
4. Prevents excessive loss of body water, thereby maintaining hydration and electrolyte balance.
5. Facilitates the absorption of certain topical medications and cosmetic preparations.
6. Acts as a waterproof barrier that protects underlying tissues and internal organs from environmental damage.



7. Participates in the synthesis of **vitamin D** when exposed to sunlight, contributing to calcium metabolism.
8. Supports immune defense through the presence of specialized immune cells that recognize and combat invading pathogens.⁶

Peel-Off Face Masks

Peel-off face masks are topical skincare formulations that are applied as a thin layer to the skin and allowed to dry, forming a flexible film that can be removed by peeling. These masks are widely used for facial cleansing and cosmetic care because they effectively eliminate accumulated dirt, excess sebum, dead skin cells, and other surface impurities. The film-forming property of peel-off masks enables close contact with the skin, facilitating the removal of debris while leaving the skin smooth, clean, and refreshed.

In addition to their cleansing action, peel-off masks help improve skin texture, enhance hydration, and provide a temporary tightening effect that promotes a healthy and radiant appearance. The occlusive film formed during application increases the contact time of active ingredients with the skin, allowing better penetration and improved efficacy. Herbal peel-off masks are particularly popular because they incorporate natural plant extracts possessing antioxidant, anti-inflammatory, antimicrobial, and skin-conditioning properties.

Exposure to ultraviolet (UV) radiation and environmental pollutants generates reactive oxygen species (ROS) and free radicals, which accelerate oxidative stress and contribute to premature skin aging, pigmentation, erythema, and loss of skin elasticity. Peel-off masks containing antioxidant-rich herbal ingredients help neutralize these free radicals, thereby protecting the skin from oxidative damage and supporting overall skin health. Owing to their convenience, ease of application, and ability to deliver multifunctional

benefits, peel-off masks have become an important category of modern cosmetic and cosmeceutical products.^{6,7}

Types of Peel-Off Face Masks

a. Peel-Off Masks

Peel-off masks are applied uniformly over the face and allowed to dry until they form a continuous film. Once dried, the film is gently removed in a single layer, carrying away dead skin cells, excess oil, and impurities from the skin surface. These masks provide deep cleansing and leave the skin feeling smoother and revitalized.

b. Sheet Masks

Sheet masks consist of fabric, hydrogel, or bio-cellulose sheets impregnated with concentrated serums. They are designed to deliver moisturizing, soothing, brightening, or anti-aging ingredients directly to the skin while minimizing evaporation and enhancing ingredient absorption.

c. Charcoal and Clay Masks

Charcoal- and clay-based masks are formulated to absorb excess sebum, remove impurities, and unclog pores. Activated charcoal and natural clays possess excellent adsorptive properties that help detoxify the skin and improve complexion, making these masks particularly suitable for oily and acne-prone skin.

d. Leave-On Masks

Leave-on masks are moisturizing formulations that remain on the skin for an extended period, ranging from 15–30 minutes to overnight. They are enriched with humectants, emollients, and nourishing ingredients that provide prolonged hydration and improve skin softness without requiring immediate removal.⁷



Benefits of Peel-Off Face Masks

1. Effectively remove dead skin cells, excess oil, and surface impurities, promoting cleaner skin.
2. Help unclog pores and reduce the formation of blackheads and whiteheads.
3. Improve skin smoothness, softness, and overall texture.
4. Enhance skin hydration and provide a refreshed, healthy-looking complexion.
5. Support skin tightening and improve the appearance of fine lines and wrinkles.
6. Increase the contact time of active ingredients with the skin, improving their effectiveness.
7. Provide antioxidant protection when formulated with herbal extracts, helping to reduce oxidative stress and premature skin aging.
8. Offer a convenient, non-invasive, and easy-to-use skincare treatment suitable for regular cosmetic care.⁸

Precautions Before Using a Herbal Peel-Off Face Mask

- Perform a patch test before the first application to check for possible allergic or hypersensitivity reactions.
- Avoid applying the mask near the eyes, lips, eyebrows, and other sensitive areas.
- Do not use the product on broken, inflamed, infected, or sunburned skin.
- Discontinue use immediately if irritation, burning, itching, or redness develops.
- Apply a thin and uniform layer to ensure proper drying and easy removal.
- Use the mask only one to two times per week unless otherwise recommended.
- Store the formulation in a cool, dry place away from direct sunlight and excessive heat.

Keep the product tightly closed and out of the reach of children

OBJECTIVES OF THE FORMULATION

- To formulate a herbal peel-off face mask gel containing Shankhpushpi flower and Bael leaf extracts as herbal active ingredients.
- To incorporate suitable excipients such as PVA, HPMC E15, glycerin, propylene glycol, *Thunbergia erecta*, benzyl alcohol and rose water to obtain a stable and user-friendly formulation.
- To evaluate the formulated face mask gel for its organoleptic and physicochemical properties such as colour, appearance, consistency, pH, spreadability, drying time, peelability, folding endurance and washability.
- To investigate the phytochemical constituents and antioxidant activity of the herbal extracts incorporated in the formulation.
- To select the optimized formulation based on its overall evaluation results and assess its potential as a natural cosmetic preparation for skin rejuvenation and anti-aging applications.

MATERIALS AND METHODS

Materials

Shankhpushpi flowers and Bael (*Aegle marmelos*) leaves were collected from a suitable local source and authenticated before use. The collected plant materials were cleaned, shade-dried and powdered separately. The powdered materials were used for the preparation of aqueous extracts. Polyvinyl alcohol (PVA), hydroxypropyl methylcellulose (HPMC E15), glycerin, propylene glycol, *Thunbergia erecta* flower extract, benzyl alcohol and rose water were used for the preparation of the herbal peel-off face mask gel. All other chemicals and excipients used were of laboratory grade.

1. **Shankhpushpi flower extract:** It was used as a herbal active ingredient because of its



reported phytoconstituents and antioxidant potential, supporting the intended skin-rejuvenating and anti-aging activity of the formulation.^{10,11,12}

2. **Bael leaf extract:** It was incorporated as a herbal active ingredient due to its bioactive constituents, particularly phenolic and flavonoid compounds, which are associated with antioxidant and other skin-beneficial properties.^{13,14}
3. **Polyvinyl alcohol (PVA):** PVA was used as a film-forming polymer. It forms a uniform and flexible film on drying, providing the characteristic peel-off property of the face mask.^{16,17}
4. **Hydroxypropyl methylcellulose (HPMC E15):** HPMC was used as a thickening and stabilizing agent. It improves the viscosity, consistency and uniformity of the formulation.¹⁸
5. **Glycerin:** Glycerin was incorporated as a moisturizing and humectant agent. It helps retain moisture and reduces excessive dryness of the skin.²¹
6. **Propylene glycol:** Propylene glycol was used as a humectant and co-solvent. It assists in maintaining moisture and promotes uniform incorporation of the formulation ingredients.²²
7. ***Thunbergia erecta* flower extract:** It was used as a natural colouring agent to impart an attractive natural colour to the herbal peel-off face mask gel. The flower also contains plant-derived phytoconstituents with potential antioxidant activity.¹⁵
8. **Benzyl alcohol:** Benzyl alcohol was used as a preservative to protect the formulation from microbial contamination and improve its storage stability.²⁰
9. **Rose water:** Rose water was incorporated as a fragrance and cosmetic base component to

provide a pleasant odour and improve the sensory characteristics of the formulation.¹⁹

METHOD OF PREPARATION

- All the ingredients were accurately weighed and measured according to the formulation composition and kept ready for preparation.
- PVA was added to heated distilled water with continuous stirring until a clear and uniform polymeric solution was obtained, followed by cooling of the solution.
- Shankhapushpi flower extract, Bael leaf extract and *Thunbergia erecta* flower extract were added to the cooled PVA solution. Glycerin and propylene glycol were then incorporated and mixed thoroughly to obtain a uniform mixture.
- The prepared HPMC E15 gel base was gradually added to the above mixture with gentle and continuous stirring until a smooth and homogeneous gel was obtained.
- Finally, benzyl alcohol and rose water were added as preservative and fragrance, respectively. The formulation was gently mixed to obtain a smooth, homogeneous and lump-free herbal peel-off face mask gel and transferred into a clean, dry, airtight container for further evaluation.



Table 01: Formulation of Herbal Peel off Face Mask Gel.

Ingredients	F ₁	F ₂	F ₃	F ₄
Shankhapusphi	10ml	10ml	10ml	10ml
Beal Leaf	5ml	5ml	5ml	5ml
Thunbergia erecta	0.5ml	0.5ml	0.5ml	0.5ml
PVA(Polyvinyl Alcohol)	10gm	16gm	10gm	16gm
HPMC(Hydroxy Propyl Methyl Cellulose)	1gm	1gm	3gm	3gm
Glycerin	5ml	5ml	5ml	5ml
Propylene Glycol	3ml	3ml	3ml	3ml
Benzyl Alcohol	0.5ml	0.5ml	0.5ml	0.5ml
Rose Water	5ml	5ml	5ml	5ml

Procedure of Peel off Face mask Application

- Clean the face thoroughly to remove makeup, dirt, and excess oil. Make sure the skin is dry.
- Open the container and take a suitable amount of gel using clean fingers or a brush.
- Apply a thin, even layer on your face, avoiding eyes, eyebrows, and lips.
- Let the mask dry naturally for 15–20 minutes.
- Once dry and firm, gently peel off the mask starting from the edges.
- Rinse off any remaining residue with lukewarm water and pat your skin dry with a clean towel.[7]

EVALUATION PARAMETERS

A. Organoleptic Evaluation

The prepared herbal peel-off mask was evaluated for basic physical characteristics:

- **Color:** A small amount was placed on a white surface to check its shade and uniformity.
- **Appearance:** Examined carefully to ensure the mask was smooth and free of lumps.
- **Consistency:** A thin layer was applied on the skin to assess smooth spreading.

- **Texture:** Felt between fingers to confirm it was soft and non-gritty.
- **Odor:** Mixed with a little water and smelled to ensure a pleasant, mild fragrance.²³

B. Physiochemical Evaluation

- **pH Measurement:** A small sample was mixed in distilled water, tested with pH strips, and compared with a standard chart to ensure skin-friendliness.²⁴
- **Spreadability Test:** 1 g of the mask was placed on butter paper, covered with a glass plate, and pressed with 50 g weight for 2 minutes. The diameter of spread (D) was measured and calculated.^{25,26}

Formula

Where,

D = Diameter of formulation after compression (cm)

$\pi = 3.14$ (Approximate value)

- **Drying Time:** A thin layer was applied on the skin, and the time taken to dry completely was noted.²⁶
- **Folding Endurance:** A dried strip of mask was folded repeatedly at the same point until it



broke, the number of folds indicated flexibility.²⁶

- **Peelability:** A uniform layer was applied on the hand, dried for 10–30 minutes, and peeled; smooth peeling confirmed good film formation.²⁷
- **Washability Test:** The dried mask was rinsed with plain water to ensure it removed easily without leaving sticky or oily residue.²⁸

C. Phytochemical Screening : Preliminary phytochemical screening of **Shankhapushpi and Bael leaf extracts** revealed the presence of various bioactive phytoconstituents, including flavonoids, phenolic compounds, alkaloids, triterpenoids, saponins, glycosides, and phytosterols. The presence of flavonoids and phenolic compounds is particularly important due to their reported antioxidant potential. These phytoconstituents may contribute to the biological activity of the herbal extracts. The findings support the selection of Shankhapushpi and Bael leaves as herbal ingredients for cosmetic application. Thus, the phytochemical screening results support their

incorporation into the herbal peel-off face mask gel.²⁰

D. Antioxidant Assay : The antioxidant activity was evaluated using the DPPH radical scavenging assay. The extracts demonstrated free-radical scavenging activity, indicating their potential antioxidant properties. This activity may be mainly associated with the presence of phenolic compounds and flavonoids identified during phytochemical screening. Antioxidant activity may help protect the skin from oxidative stress and support its rejuvenating properties. Therefore, the results support the potential use of the formulated herbal peel-off face mask gel for skin rejuvenation and anti-aging cosmetic applications.²¹

RESULTS

A. Organoleptic Parameters

The Physical properties of the formulated Herbal Peel off mask were evaluated by Colour, Odour, Appearance, Consistency and texture.

Table 02: Result of Organoleptic Properties.

Sl.No.	Properties	F ₁	F ₂	F ₃	F ₄
1	Colour	Dark Purple	Purple	Bluish-Green	Bluish-Green
2	Odour	Pleasant	Pleasant	Pleasant	Pleasant
3	Appearance	Semi-solid	Semi-solid	Semi-solid	Semi-solid
4	Texture	Good	Good	Good	Good
5	Consistency	Good	Good	Good	Good

B. Physicochemical Parameters

The physicochemical properties of the formulated herbal peel-off mask were evaluated based on the following parameters:

- pH,
- Spreadability,
- Drying time,
- Folding endurance,



- Peelability,
- Washability test

- Phytochemical Screening
- Antioxidant Assay

Table 03: pH of Formulation F1 to F4.

Sl.No.	Formulation	pH
1	F1	6.4
2	F2	6.8
3	F3	7.0
4	F4	6.7

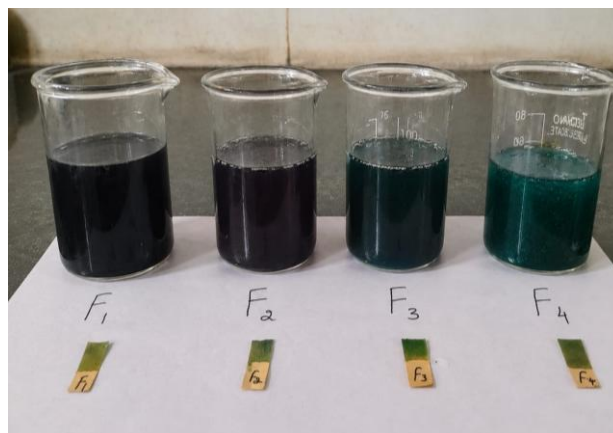


Figure 02:pH test

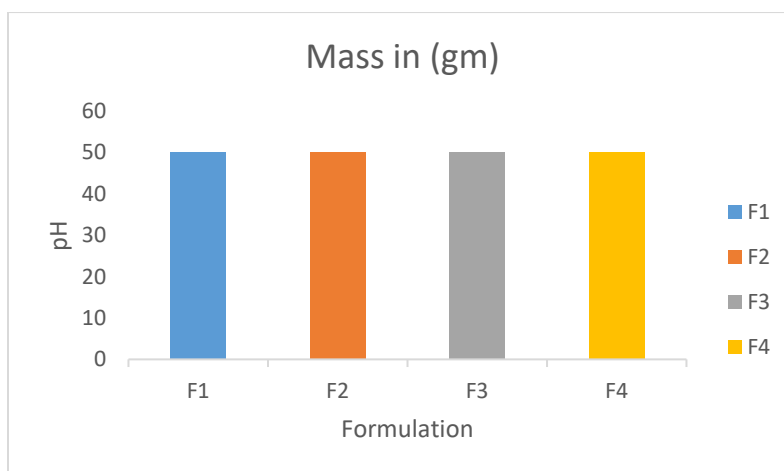


Figure 03:pH of Formulation F1 to F4

Table 04: Spreadability of Formulation F1 to F4

Formulation	Mass in (gm)	Diameter Of spread (cm)	Spreadability (Cm ²)
F1	50	5.5	23.74
F2	50	5.1	20.41
F3	50	4.8	18.34
F4	50	4.4	15.19

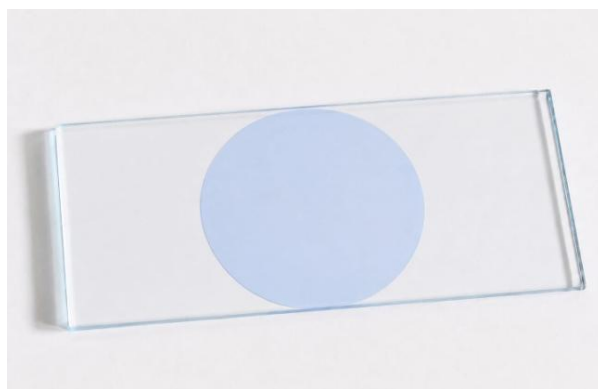


Figure 04: Spreadability Test.

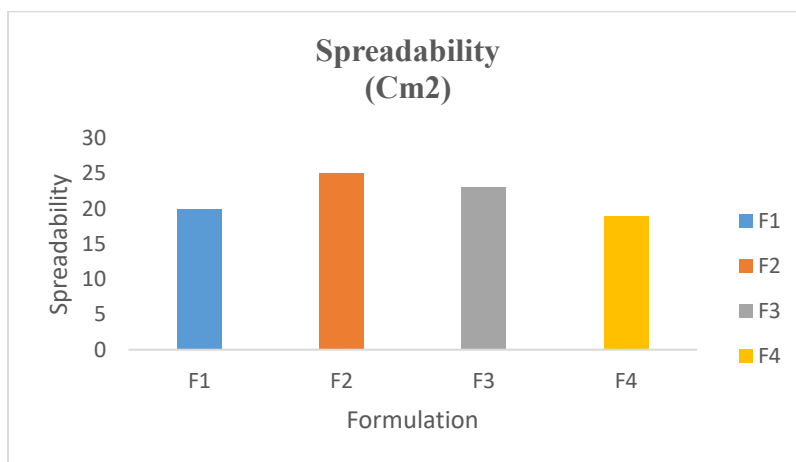


Figure 05: Spreadability of Formulation F1 to F4.



Figure 06: Peelability Test.

Table 06 :Preliminary phytochemical screening of the extracts

SL.No.	Chemical test	Shankhapusphi Extract	Beal Extract
1.	ALKALOIDS		
	Dragendorff's	+	+
	Wagner's	+	+
	Mayer's	+	+
	Hager's	+	+
2.	GLYCOSIDES		
	Legal's	+	+
	Modified Borntrager's	-	-
3.	PHYTOSTEROLS AND TRITERPENOIDS		
	Salkowski	+	+
	Liebermannburchard	+	+
4.	SAPONINS		
	Froth test	+	+
5.	PHENOLIC COMPOUNDS		
	Ferric chloride	+	+
6.	FLAVONOIDS		
	Ferric chloride	+	+
	Lead acetate	+	+
	Shinoda test	+	+
7.	CARBOHYDRATES		
	Molisch's test	+	+
	Barfoed's test	+	+
	Fehling's test	+	+
8.	PROTEINS AND AMINO ACIDS		
	Ninhydrin test	+	+
	Millon's test	+	+
9.	FIXED OILS AND FATS		
	Spot test	-	-
	Saponification test	-	-

Table 07 :In-vitro anti-oxidant activity of clitoria ternatea flower extract by DPPH radical scavenging assay.

SL No.	Concentration (g/ml)	Absorbance	Percentage Inhibition %
1	5	0.620	12.0
2	10	0.510	27.6
3	15	0.400	43.2
4	20	0.320	54.5
5	25	0.250	64.6
6	30	0.180	74.4



2² Factorial Design with PVA and HPMC by using Design Expert Software:

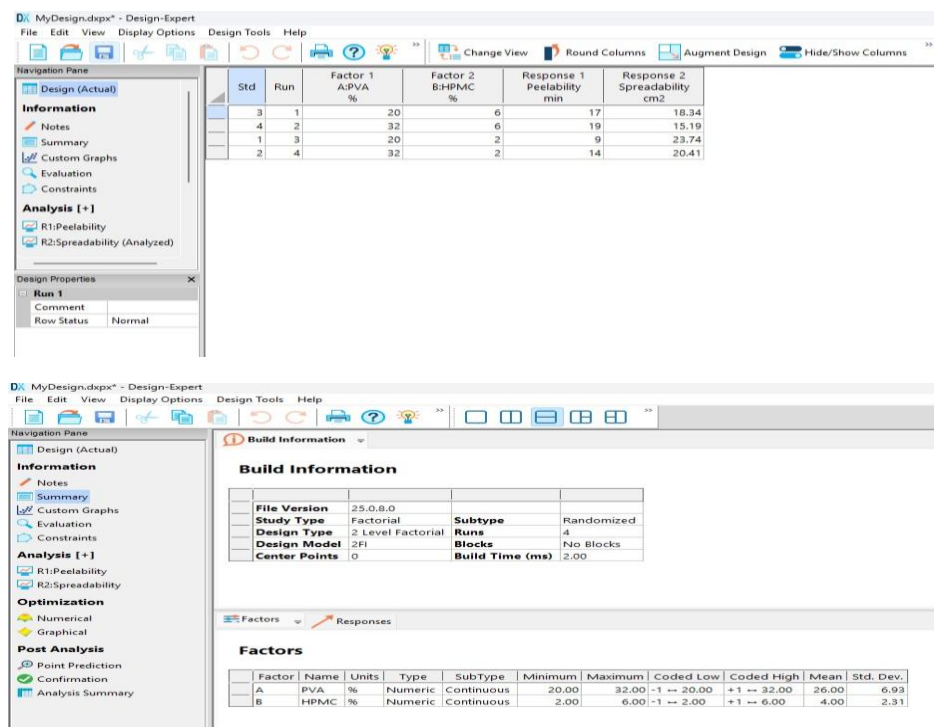


Figure 7 :2² Factorial Design with PVA and HPMC

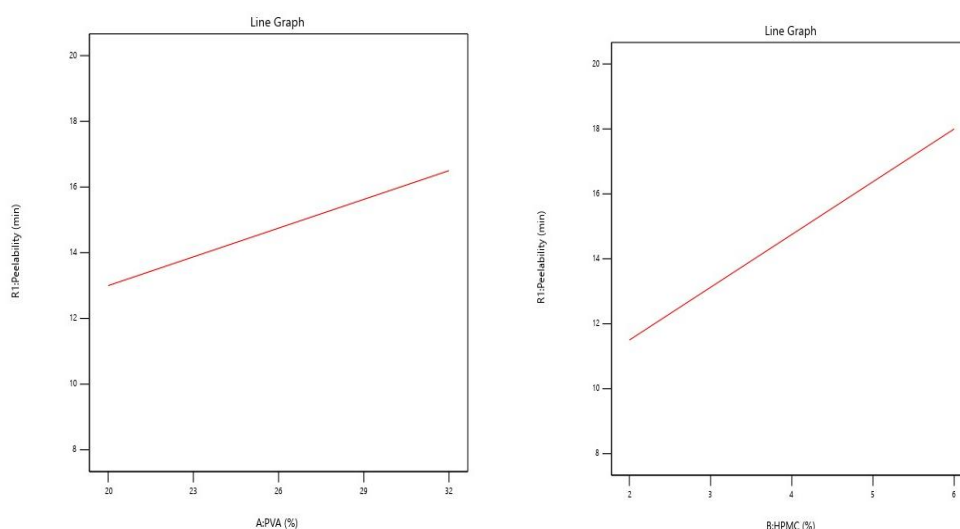


Figure 8: The Line graph showing the effect of PVA and HPMC Concentration on Peelability

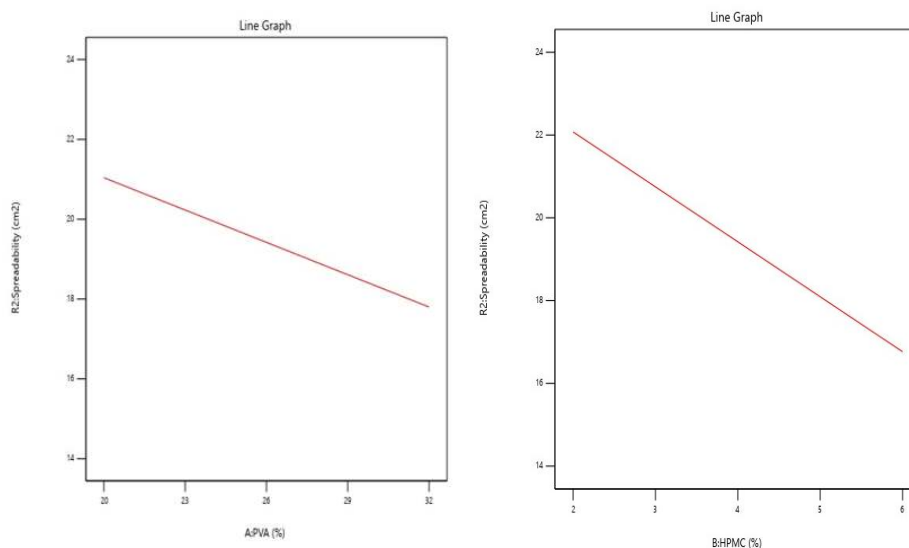


Figure 9: The Line graph showing the effect of PVA and HPMC Concentration on Spreadability

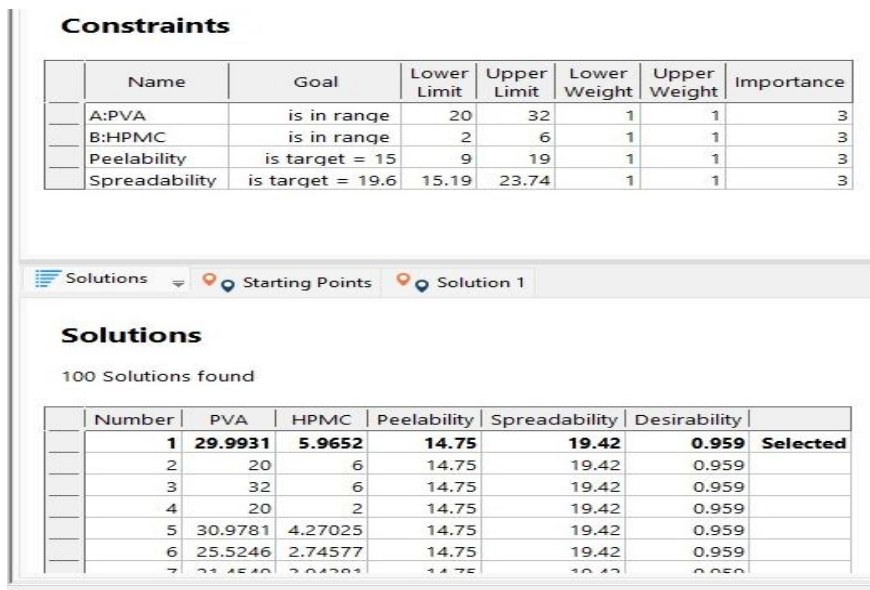


Figure 10 : Numerical Optimization/Desirability analysis

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest associated with this research work. The study was carried out solely for academic and educational purposes.

CONCLUSION

The present study successfully developed and evaluated a herbal peel-off face mask gel



containing Shankhapushpi flower and Beal leaf extracts. The prepared formulations exhibited acceptable appearance, colour, homogeneity, pH, spreadability, peelability, viscosity and washability, indicating good physical properties and skin compatibility. The herbal extracts contributed to the antioxidant potential of the formulation, supporting its possible role in protecting the skin from oxidative stress and promoting skin rejuvenation. Among the prepared formulations, the optimized formulation showed comparatively better overall evaluation characteristics. Numerical optimization was performed using the desirability function to obtain an optimized formulation. The selected solution consisted of 29.99% PVA and 5.97% HPMC, with predicted peelability and spreadability values of 14.75 min and 19.42 cm², respectively. The overall desirability value was 0.959, indicating a highly desirable optimized formulation that closely satisfied the predefined target responses. Hence, the developed herbal peel-off face mask can be considered a promising natural cosmetic formulation for skin care and anti-ageing applications, with scope for further stability and clinical studies.

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