CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
SJIF Impact Factor: 7.187
https://doi.org/10.5281/zenodo.21890862

Available online at: http://www.iajps.com Review Article

FORMULATION AND OPTIMIZATION OF PEEL - OFF FACE MASK USING *VACCINIUM CORYMBOSUM* AND *CLITORIA TERNATEA* LINN

Gokul Krishna M[1*], Shemeena B. R[1], Sreenath B. S[1], Ufran Fathima N[1], Jerin Faith J. L[1], Dr. Aparna P[2], Archana L.R[3], Dr. Prasobh G. R[4]

[1]B. Pharm Students, Sree Krishna College of Pharmacy and Research Centre, Parassala, Thiruvananthapuram, Kerala, India – 695502.

[2]Associate Professor, Sree Krishna College of Pharmacy and Research Centre, Parassala, Thiruvananthapuram, Kerala, India – 695502.

[3]Assistant Professor, Sree Krishna College of Pharmacy and Research Centre, Parassala, Thiruvananthapuram, Kerala, India – 695502.

[4]Principal, Sree Krishna College of Pharmacy and Research Centre, Parassala, Thiruvananthapuram, Kerala, India – 695502.

Abstract:

Herbal cosmetics have gained significant attention in recent years owing to the increasing consumer preference for safe, eco-friendly, and plant-based skincare products. Peel-off face masks are among the most popular topical cosmetic formulations because of their ability to cleanse the skin, remove excess sebum, exfoliate dead skin cells, and deliver active ingredients effectively. This review highlights the formulation aspects, composition, and evaluation parameters of peel-off face masks with special emphasis on the incorporation of Vaccinium corymbosum (blueberry) and Clitoria ternatea Linn. (butterfly pea flower). Both plants are rich sources of anthocyanins, flavonoids, and other phenolic compounds that exhibit potent antioxidant, anti-inflammatory, anti-ageing, and skin-protective properties. The review discusses the anatomy and physiology of the skin and face, classification of cosmetics, ideal characteristics of peel-off masks, selection of polymers and excipients, extraction procedures of herbal ingredients, formulation methodology, and physicochemical evaluation techniques including pH, viscosity, spreadability, drying time, peelability, film-forming ability, washability, and stability studies. The available literature indicates that herbal peel-off masks formulated with blueberry and butterfly pea flower extracts possess promising potential for improving skin hydration, elasticity, brightness, and protection against oxidative stress while minimizing the adverse effects associated with synthetic cosmetic ingredients. This review provides a comprehensive scientific basis for the future development and optimization of safe, effective, and natural peel-off facial mask formulations.

Keywords: *Peel off face mask, Vaccinium corymbosum, Clitoria ternatea Linn, Antioxidant skincare, Cosmeceuticals*

Corresponding author:

Gokul Krishna M,

B. Pharm Students, Sree Krishna College of Pharmacy and Research Centre, Parassala, Thiruvananthapuram, Kerala, India.

Mobile:

Email: *gkfurious5678@gmail.com*

QR CODE

Please cite this article in press Gokul Krishna M et al., Formulation and Optimization of Peel - off face mask using Vaccinium Corymbosum and Clitoria Ternatea Linn.,, Indo Am. J. P. Sci, 2026; 13(08).

INTRODUCTION:

Cosmetics are products applied to the external parts of the human body, such as the skin, hair, nails, lips, and teeth, to cleanse, protect, beautify, perfume, or enhance appearance. Besides improving physical appearance, cosmetics play an important role in maintaining skin health, personal hygiene, and self-confidence. The increasing awareness of skincare and advancements in cosmetic science have significantly expanded the use of cosmetic products worldwide.

According to the Drugs and Cosmetics Act, 1940 (India), a cosmetic is any article intended to be rubbed, poured, sprinkled, sprayed on, introduced into, or otherwise applied to the human body for cleansing, beautifying, promoting attractiveness, or altering appearance. Similarly, the United States Food and Drug Administration (USFDA) define cosmetics as products intended to cleanse, beautify, promote attractiveness, or alter appearance without affecting the body's structure or functions.

Fig 1: Cosmetics

Today, the cosmetic industry offers a wide variety of products, including creams, lotions, gels, serums, face washes, sunscreens, facial masks, shampoos, conditioners, lip care products, and decorative cosmetics. These formulations are designed to cleanse the skin, improve hydration, reduce pigmentation, prevent acne, protect against ultraviolet (UV) radiation, and delay premature skin ageing.

In recent years, consumer preference has shifted towards herbal and natural cosmetics because of growing concerns about the long-term use of synthetic chemicals. Plant-derived ingredients are rich in bioactive compounds such as flavonoids, polyphenols, anthocyanins, vitamins, and phenolic acids, which exhibit antioxidant, anti-inflammatory, antimicrobial, moisturizing, and anti-ageing properties. These natural compounds help neutralize free radicals, reduce oxidative stress, and protect the skin from environmental damage caused by pollution and UV exposure.

The skin is constantly exposed to external factors such as sunlight, dust, microorganisms, and environmental pollutants that can cause dryness, wrinkles, pigmentation, and acne. Cosmetic products help maintain the skin's natural barrier by cleansing impurities, restoring moisture, improving texture, and protecting the skin from harmful environmental factors. Modern cosmetic formulations often include ingredients that promote collagen synthesis, improve skin elasticity, and strengthen the skin barrier.

A growing area of cosmetic science is cosmeceuticals, which combine cosmetic and therapeutic benefits. Cosmeceuticals contain biologically active ingredients such as vitamins, peptides, hyaluronic acid, ceramides, retinol, and

botanical extracts that improve skin health while enhancing appearance. These products bridge the gap between cosmetics and pharmaceuticals by providing functional benefits beyond traditional cosmetic effects. [1]

CATEGORIES OF COSMETICS:

Cosmetics are classified based on their intended use and the part of the body on which they are applied. They are designed to cleanse, protect, beautify, and improve the appearance of the skin, hair, nails, lips, teeth, and other external body parts. The major categories of cosmetics are described below.

- Skin care cosmetics
- Hair care cosmetics
- Decorative cosmetics
- Oral care cosmetics
- Personal hygiene products
- Cosmetics for nails

SKIN CARE COSMETICS

Skin care cosmetics are products used to maintain healthy skin by cleansing, moisturizing, protecting, and improving its appearance. They help prevent dryness, acne, pigmentation, wrinkles, and premature ageing. Common skin care products include cleansers, face washes, moisturizers, toners, sunscreens, serums, face masks, exfoliants, and night creams. These products often contain active ingredients such as vitamins, antioxidants, hyaluronic acid, plant extracts, and natural oils.

HAIR CARE COSMETICS

Hair care cosmetics are formulated to cleanse, nourish, protect, and style the hair and scalp. They help maintain hair strength, reduce dandruff, prevent hair damage, and improve hair texture. Examples include shampoos, conditioners, hair oils, hair serums, hair masks, hair sprays, hair gels, hair dyes, and styling creams. Herbal ingredients such as aloe vera, hibiscus, amla, bhringraj, and coconut oil are commonly incorporated into hair care formulations.

DECORATIVE COSMETICS

Decorative cosmetics are used to enhance facial features and improve physical appearance. They provide colour, definition, and coverage to different parts of the face. Common products include foundation, compact powder, concealer, blush, lipstick, lip gloss, eye shadow, eyeliner, mascara, eyebrow products, and nail polish. These cosmetics are available in various shades and formulations to suit different skin tones and preferences.

ORAL CARE COSMETICS

Oral care cosmetics are intended to maintain oral hygiene and improve the appearance of the teeth and mouth. They help prevent bad breath, dental plaque, and tooth stains while promoting healthy gums and teeth. Examples include toothpaste, mouthwash, dental gels, tooth powders, and breath fresheners. Some products also contain fluoride and herbal extracts for additional oral health benefits.

PERSONAL HYGIENE COSMETICS

Personal hygiene cosmetics are products used for cleansing the body and maintaining freshness. They help remove dirt, sweat, excess oil, and microorganisms while preventing body odour. This category includes soaps, body washes, hand washes, deodorants, antiperspirants, talcum powders, intimate hygiene products, and wet wipes. These formulations often contain mild surfactants, moisturizers, fragrances, and antimicrobial agents.

NAIL CARE COSMETICS

Nail care cosmetics help maintain healthy, attractive nails by protecting and beautifying them. Products in this category include nail polish, nail polish remover, cuticle creams, nail hardeners, nail strengtheners, and nail conditioners. They improve nail appearance and help prevent brittleness and damage. [2]

ANATOMY AND PHYSIOLOGY OF SKIN

The skin is the largest organ of the human body, covering an average surface area of 1.5–2.0 m^2 and accounting for approximately 15–16% of total body weight. It serves as the first line of defence against physical, chemical, microbial, and environmental hazards while maintaining internal homeostasis. The skin also regulates body temperature, prevents excessive water loss, synthesizes vitamin D, and provides sensory perception. Owing to its protective and physiological functions, the skin is the primary target for cosmetic and dermatological formulations.

ANATOMY OF SKIN

The skin consists of three main layers:

- Epidermis
- Dermis
- Hypodermis (subcutaneous tissue)

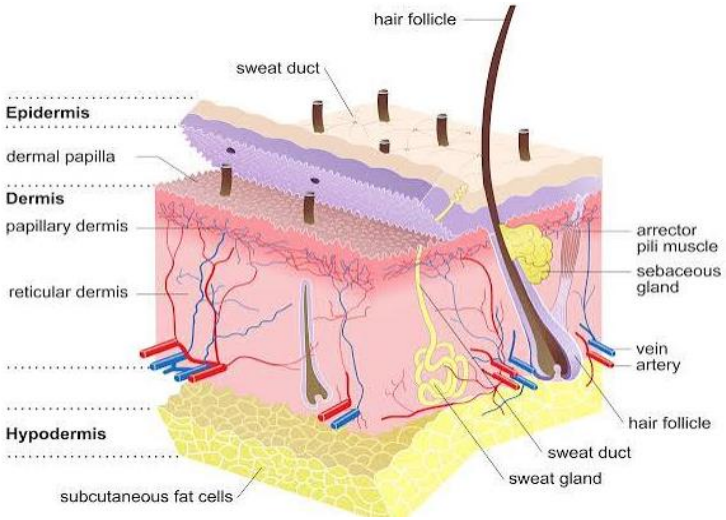


Fig 2: Anatomy of skin

1. EPIDERMIS

The epidermis is the outermost layer of the skin and is composed of keratinized stratified squamous epithelium. It is avascular and receives nutrients by diffusion from the dermis. The epidermis consists of five layers:

- **Stratum corneum** – Outermost layer composed of dead, keratin-filled cells that form the skin's protective barrier.
- **Stratum lucidum** – Present only in thick skin such as the palms and soles.
- **Stratum granulosum** – Contains keratohyalin granules involved in keratin formation.
- **Stratum spinosum** – Provides structural strength and flexibility.
- **Stratum basale (germinativum)** – Deepest layer where continuous cell division occurs. It contains melanocytes, which produce melanin responsible for skin pigmentation.

2. DERMIS

The dermis lies beneath the epidermis and consists of dense connective tissue rich in collagen and elastin fibres, which provide strength and elasticity. It contains blood vessels, lymphatic vessels, nerve endings, hair follicles, sebaceous glands, and sweat glands. The dermis is divided into the papillary layer and the reticular layer.

3. HYPODERMIS (SUBCUTANEOUS TISSUE)

The hypodermis is the deepest layer of the skin and is composed mainly of adipose and connective tissue. It provides insulation, cushions internal organs, stores energy, and attaches the skin to underlying muscles and bones.

PHYSIOLOGY OF SKIN

The skin performs several essential physiological functions that are important for maintaining overall health.

- **Protection:** Acts as a barrier against microorganisms, chemicals, ultraviolet (UV) radiation, and mechanical injury.
- **Thermoregulation:** Maintains body temperature through sweating and regulation of blood flow in the dermal blood vessels.
- **Sensation:** Contains receptors that detect touch, pressure, pain, heat, and cold.
- **Excretion:** Sweat glands helps to eliminate water, salts, and small amounts of metabolic wastes.
- **Vitamin D Synthesis:** Exposure to sunlight converts 7-dehydrocholesterol in the skin into vitamin D_3, which is essential for calcium metabolism.
- **Immune Function:** Langerhans cells and other immune cells protect the body against invading pathogens.
- **Water Balance:** The stratum corneum prevents excessive trans epidermal water loss, maintaining skin hydration.
- **Wound Healing:** The skin can repair damaged tissues through inflammation, cell proliferation, and tissue remodelling. [3]

ANATOMY AND PHYSIOLOGY OF THE FACE

The face is the most visible part of the human body and plays a vital role in facial expression, communication, protection of sensory organs, and overall appearance. It consists of skin, muscles, bones, blood vessels, nerves, sebaceous glands, sweat glands, and hair follicles. Facial skin is thinner and more delicate than the skin of many other body parts, making it more susceptible to environmental damage, dehydration, acne, pigmentation, and

premature ageing. Therefore, understanding the anatomy and physiology of the face is essential for the development of effective cosmetic formulations, particularly facial masks and other skincare products.

ANATOMY OF THE FACE

The face is composed of several structural components that work together to provide support, movement, and protection.

1. FACIAL SKIN

The facial skin consists of three layers: the epidermis, dermis, and hypodermis (subcutaneous tissue). The epidermis acts as a protective barrier, while the dermis contains collagen and elastin fibres that provide strength and elasticity. The hypodermis contains adipose tissue, which cushions the face and provides insulation.

2. FACIAL MUSCLES

The muscles of facial expression are attached to the skin rather than bones, allowing movements such as smiling, frowning, blinking, and speaking. Important facial muscles include the frontalis, orbicularis oculi, orbicularis oris, zygomaticus, and buccinator muscles. These muscles are supplied by the facial nerve.

3. SEBACEOUS GLANDS

Sebaceous glands are abundant on the face, particularly in the forehead, nose, and chin (T-zone). They secrete sebum, an oily substance that lubricates and protects the skin and hair. Excessive sebum production may clog pores and contribute to acne formation.

4. SWEAT GLANDS

The face contains numerous eccrine sweat glands that help regulate body temperature through sweat production. Sweat also helps maintain skin hydration and eliminates small amounts of metabolic waste.

5. HAIR FOLLICLES

Hair follicles are present throughout the facial skin except on the lips. They are associated with sebaceous glands and contribute to the skin's protective function.

PHYSIOLOGY OF THE FACE

The facial skin performs several important physiological functions that maintain skin health and appearance.

- **Protection:** The facial skin acts as a barrier against microorganisms, ultraviolet (UV) radiation, dust, and environmental pollutants.
- **Sebum Production:** Sebaceous glands produce sebum, which prevents excessive water loss, lubricates the skin, and maintains its softness.
- **Sweat Secretion:** Sweat glands regulate body temperature and help remove small amounts of waste products.
- **Sensory Function:** Numerous sensory receptors present in the facial skin detect touch, pain, pressure, heat, and cold.
- **Facial Expression:** Facial muscles enable expressions that are essential for communication and emotional interaction.
- **Wound Healing:** Facial skin has a rich blood supply, allowing rapid healing and tissue repair following injury. [4]

PEEL - OFF MASKS

Peel-off masks are topical cosmetic formulations designed to improve skin appearance and health by forming a thin, flexible film on the skin surface. After application, the mask dries within a specified time and can be removed easily as a single layer without the need for washing. Peel-off masks have gained significant popularity due to their ease of use, deep cleansing action, and ability to deliver active ingredients directly to the skin.

Peel-off masks are widely used in the cosmetic industry for cleansing, exfoliation, hydration, oil control, skin brightening, anti-ageing, and acne management. These formulations effectively remove dead skin cells, excess sebum, dirt, pollutants, and impurities from the skin surface, leaving the skin clean, smooth, soft, and refreshed. Regular use of peel-off masks also improves skin texture, minimizes the appearance of pores, and enhances skin radiance.

The effectiveness of peel-off masks mainly depends on the presence of film-forming polymers, which produce a continuous elastic film after drying. Commonly used film-forming agents include polyvinyl alcohol (PVA), polyvinylpyrrolidone (PVP), hydroxypropyl methylcellulose (HPMC), and Carbopol. These polymers provide good adhesion to the skin while allowing the dried film to be peeled off easily without causing significant irritation.

Fig 3: Peel Off Face Mask

IDEAL PROPERTIES

• Should form a smooth, uniform, and flexible film after application.
• Should dry within 15–30 minutes for convenient use.
• Should peel off easily in one piece without causing pain or skin irritation.
• Should have good spreadability and uniform consistency.
• The pH should be compatible with the skin (around 4.5–6.5).
• Should be non-irritant, non-toxic, and dermatologically safe.
• Should possess good adhesion to remove dirt, excess sebum, and dead skin cells effectively.
• Should provide adequate moisturizing effect and prevent excessive water loss.
• Should have pleasant colour, odour, and overall cosmetic appearance.
• Should be compatible with herbal extracts and other active ingredients without affecting their stability.
• Should leave the skin feeling clean, soft, smooth, refreshed, and non-greasy after removal.
• Should remain physically, chemically, and microbiologically stable during storage.

ADVANTAGES

• Removes dead skin cells and promotes gentle exfoliation.
• Cleanses the skin by removing dirt, dust, excess sebum, and impurities.
• Helps unclog pores and reduces the appearance of blackheads.
• Leaves the skin smooth, soft, refreshed, and radiant.
• Improves skin texture and enhances overall complexion.
• Delivers active ingredients effectively to the skin surface.
• Helps maintain skin hydration when formulated with suitable humectants.
• Easy to apply and remove without the need for washing.
• Suitable for regular skincare and most skin types.

DISADVANTAGES

• May cause irritation or redness in individuals with sensitive skin.
• Can cause discomfort if peeled off before complete drying.
• Excessive or frequent use may lead to skin dryness or irritation.
• Not suitable for damaged, inflamed, or sunburned skin.
• May pull out fine facial hair during removal, causing temporary discomfort.
• Some formulations may contain synthetic ingredients that can trigger allergic reactions.
• Does not effectively remove deep-seated blackheads or severe acne.
• Requires sufficient drying time before removal.
• Improper peeling may cause temporary skin irritation or discomfort.
• Results are temporary and require regular use to maintain healthy skin. [5]

RAW MATERIALS AND EXCIPIENT PROFILE

The materials used for the formulation of the peel-off face mask include *Vaccinium corymbosum* (Blueberry) extract, *Clitoria ternatea* Linn. (Butterfly pea flower) extract, Polyvinyl Alcohol (PVA), Sodium Carboxymethyl Cellulose (NaCMC), Glycerine, Polyethylene Glycol 400, Methyl Paraben, Propyl Paraben, Citric Acid, Ethanol, Purified Water, and Orange Oil as

fragrance. The details of the materials are given below. [6]

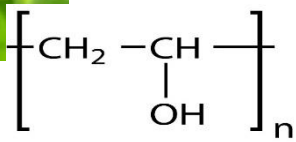
1. BLUEBERRY
Botanical source: *Vaccinium corymbosum*
Family: Ericaceae
Chemical constituents: Anthocyanins, Flavonoids, Vitamin C, Phenolic compounds, Tannins, Organic acids.

Therapeutic/Cosmetic uses:
- Powerful antioxidant.
- Protects skin against free radical damage.
- Delays premature skin ageing.
- Improves collagen synthesis.
- Enhances skin hydration and elasticity.
- Brightens the skin complexion. [7]

Fig 4: Blueberry

2. BUTTERFLY PEA FLOWER
Botanical source: *Clitoria ternatea* Linn.
Family: Fabaceae
Chemical constituents: Anthocyanins, Flavonoids, Kaempferol, Quercetin, Phenolic compounds.
Therapeutic/Cosmetic uses:
- Strong antioxidant activity.
- Anti-inflammatory effect.
- Protects skin from oxidative stress.
- Promotes skin hydration.
- Improves skin elasticity.
- Helps reduce signs of ageing. [8]

Fig 5: Butterfly Pea Flower



POLYVINYL ALCOHOL

3. POLYVINYL ALCOHOL (PVA)
Category: Film-forming polymer
IUPAC name: Poly(ethanol)
Therapeutic Uses:
- Forms a flexible peelable film.
- Improves peelability.

- Provides good adhesion to the skin.
- Enhances mechanical strength of the mask. [9]

Fig 6: Polyvinyl Alcohol

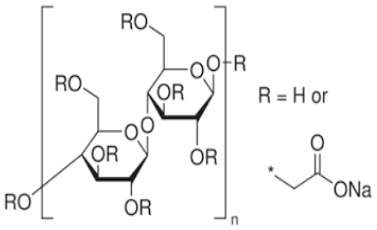
4. SODIUM CARBOXYMETHYL CELLULOSE (NaCMC)
Category: Thickening agent, viscosity enhancer, suspending agent.
IUPAC name: Sodium 2-hydroxypropyl carboxymethyl cellulose
Therapeutic Uses:

- Increases viscosity.
- Improves spreadability.
- Enhances film flexibility.
- Stabilizes the formulation. [10]

NNNNNNN

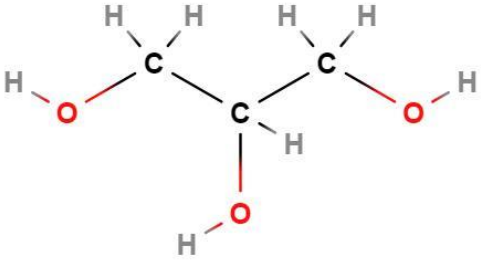
NaCMC

Fig 7: NaCMC



5. GLYCERINE
Category: Humectant
IUPAC name: Propane-1,2,3-triol
Therapeutic Uses:

- Retains skin moisture.
- Prevents drying of the mask.
- Softens and smoothens the skin.
- Improves elasticity of the dried film. [11]



GLYCERINE

Fig 8: Glycerine

6. POLYETHYLENE GLYCOL
Category: Humectant and solvent
IUPAC name: Poly(oxy-1,2-ethanediyl)
Therapeutic Uses:

- Improves penetration of active ingredients.
- Maintains moisture.
- Enhances skin feel.
- Prevents drying of the formulation. [12]

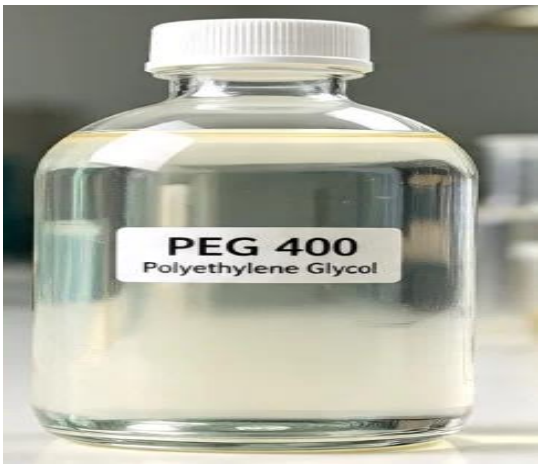
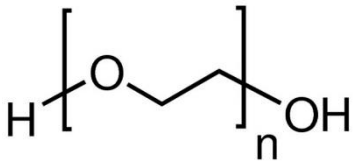


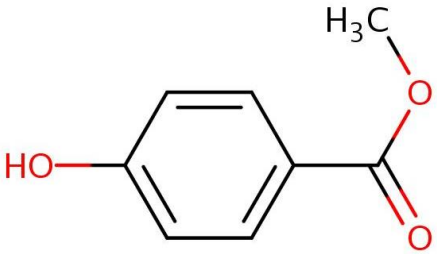
Fig 9: Polyethylene Glycol

POLYETHYLENE GLYCOL



7. METHYL PARABEN
Category: Preservative
IUPAC name: Methyl 4-hydroxybenzoate
Therapeutic Uses:

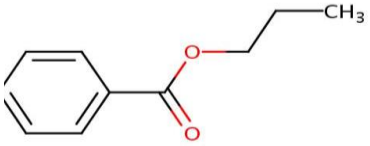
- Prevents microbial contamination.
- Increases shelf life.



METHYL PARABEN

- Maintains product stability. [13]

Fig 10: Methyl Paraben



PROPYL PARABEN

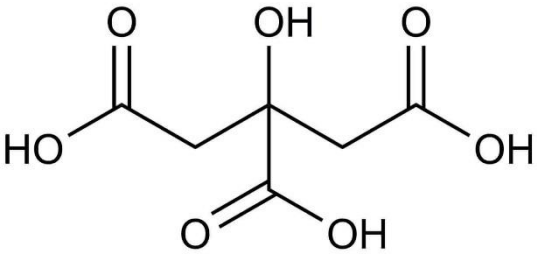
8. PROPYL PARABEN
Category: Preservative
IUPAC name: Propyl 4-hydroxybenzoate
Therapeutic Uses:

- Prevents fungal growth.
- Enhances preservation.
- Improves storage stability. [14]

Fig 11: Propyl Paraben

9. CITRIC ACID
Category: Solvent
IUPAC name: 2-hydroxypropane-1,2,3-tricarboxylic acid
Therapeutic Uses:

- Dissolves herbal extracts.
- Provides a cooling effect.
- Aids quick drying of the mask. [15]

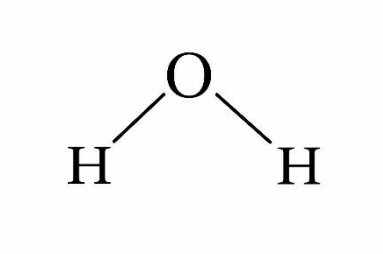


CITRIC ACID

Fig 12: Citric acid

10. PURIFIED WATER
Category: Vehicle
IUPAC name: Oxidane
Uses:

- Solvent for water-soluble ingredients.
- Maintains uniform consistency.
- Provides the required volume. [16]



WATER

Fig 13: Purified Water

11. ORANGE OIL
Category: Essential oil, fragrance agent.
Therapeutic Uses:

- Acts as a natural fragrance.
- Provides antioxidant and antimicrobial benefits.
- Contributes to skin freshness and cleansing. [17]

Fig 14: Orange Oil

ROLE OF INGREDIENTS

SL. NO	INGREDIENTS	ROLES
1.	*Vaccinium corymbosum*(Blueberry)Extract	Antioxidant, anti-ageing agent, skin brightening agent, collagen boosting agent
2.	*Clitoria ternatea Linn,* Extract	Antioxidant, anti-inflammatory agent, skin conditioning agent, natural colouring agent
3.	Polyvinyl Alcohol (PVA)	Film-forming polymer, peel-forming agent

4.	Sodium Carboxymethyl Cellulose (NaCMC)	Thickening agent, viscosity enhancer, stabilizer
5.	Glycerine	Humectant, moisturizing agent, plasticizer
6.	Polyethylene Glycol 400	Humectant, co-solvent, penetration enhancer
7.	Methyl Paraben	Preservative (antimicrobial agent)
8.	Propyl Paraben	Preservative (antifungal agent)
9.	Citric Acid	pH adjusting agent, chelating agent, stabilizer, enhances preservative efficacy, maintains formulation stability.
10.	Purified Water (Distilled Water)	Vehicle, solvent
11.	Orange Oil	Fragrance, skin-soothing agent

Table 1: Role of ingredients

METHOD OF EXTRACTION

Extraction of *Vaccinium corymbosum* (Blueberry)

Materials

Fresh blueberries – 100 g, 70% Ethanol – 500 mL, Whatman filter paper, Beaker, Conical flask, Glass rod, Water bath

Procedure

Fresh blueberries were thoroughly washed with distilled water to remove dirt and impurities, then crushed into a fine pulp using a blender or mortar and pestle. The pulp was transferred into a clean conical flask, and 500 mL of 70% ethanol was added and mixed thoroughly. The flask was sealed with aluminium foil or a stopper and kept at room temperature for 48 hours to allow extraction. After the extraction period, the mixture was filtered through Whatman filter paper. The filtrate was then concentrated using a water bath maintained at 40–45°C until a concentrated liquid extract was obtained. Finally, the extract was stored in an amber-coloured bottle at 4°C until further use. [18]

METHOD OF PREPARATION

The peel-off face mask was formulated using *Vaccinium corymbosum* (Blueberry) extract and *Clitoria ternatea* Linn. (Butterfly pea flower) extract along with suitable film-forming polymers and excipients. Polyvinyl alcohol (PVA) and Sodium Carboxymethyl Cellulose (NaCMC) were used as film-forming agents, while glycerine and PEG-400 acted as humectants and plasticizers. The formulation was prepared by incorporating all the ingredients under continuous stirring to obtain a smooth and homogeneous gel. The prepared peel-off face mask was then transferred into suitable containers and subjected to various physicochemical and performance evaluation tests.

FORMULATION OF PEEL - OFF FACE MASK

Step 1: Preparation of PVA Solution

- Take the required quantity of purified water in a beaker.
- Heat the water to 70–80°C.
- Slowly add Polyvinyl Alcohol (PVA) with continuous stirring.
- Continue stirring until PVA is completely dissolved and a clear solution is obtained.

Step 2: Preparation of NaCMC Gel

- In a separate beaker, disperse NaCMC in a small quantity of purified water.
- Allow it to hydrate for 20–30 minutes until a smooth gel is formed.

Step 3: Preparation of the Base

- Add the hydrated NaCMC gel slowly into the PVA solution with continuous stirring.
- Add Glycerine and PEG-400 to the mixture and stir until homogeneous.

Step 4: Addition of Preservatives

- Dissolve Methyl paraben and Propyl paraben in a small amount of warm water or PEG-400.
- Add the preservative solution to the base and mix thoroughly.

Step 5: Cooling

- Allow the formulation to cool to approximately 40°C.
- This prevents degradation of the plant extracts.

Step 6: Addition of Herbal Extracts

- Add the required amount of Blueberry extract.
- Add the required amount of Butterfly Pea Flower extract.

- Stir continuously until both extracts are uniformly dispersed.

Step 7: pH Adjustment

- Adjust the pH of the formulation to 5.5–6.5 using citric acid.

Step 8: Addition of Fragrance

- Add 2–3 drops of essential orange oil and mix well.

Step 9: Final Volume Adjustment

- Add purified water q.s. (quantity sufficient) to make the final weight 100 g.
- Stir gently to obtain a smooth, homogeneous gel.
- Remove any entrapped air bubbles by allowing the formulation to stand for a few minutes.

Step 10: Filling and Storage

- Transfer the prepared peel-off face mask into a clean laminated cosmetic tube or airtight container.
- Store at room temperature, protected from direct sunlight. [19]

EVALUATION OF PEEL - OFF FACE MASK

1. Organoleptic Evaluation

The prepared peel-off face mask was evaluated for its colour, odour, appearance, texture and consistency by visual inspection and sensory observation. A small quantity of the formulation was taken in a clean glass container and examined under normal daylight. The colour and appearance were observed visually, while the odour was assessed by smelling the formulation. The texture and consistency were determined by gently rubbing the formulation between the fingers.

2. pH Evaluation

The pH of the formulated peel-off face mask was determined using a digital pH meter. Approximately 1 g of the peel-off mask was dispersed in 10 mL of distilled water and stirred until a uniform dispersion was obtained. The pH meter was calibrated using standard buffer solutions of pH 4.0 and pH 7.0 before measurement. The electrode was immersed in the sample, and the pH was recorded after obtaining a stable reading. All measurements were performed in triplicate, and the average value was reported.

3. Homogeneity Evaluation

The homogeneity of the prepared peel-off face mask was evaluated by visual inspection. A small quantity of the formulation was spread uniformly on a clean glass slide and examined under normal daylight for the presence of lumps, coarse particles, aggregates, or phase separation. The formulation was also gently rubbed between the fingers to assess its smoothness and uniformity. A homogeneous formulation was smooth, uniform, free from lumps, grittiness, and phase separation.

4. Viscosity Evaluation

The viscosity of the prepared peel-off face mask was determined using a Brookfield Digital Viscometer. Approximately 50 g of the formulation was transferred into a clean beaker. The appropriate spindle (Spindle No. 64, or as recommended by the instrument) was immersed completely in the formulation without trapping air bubbles. The viscosity was measured at 25 ± 2°C using a rotational speed of 10 rpm. The reading was allowed to stabilize before recording the viscosity in centipoise (cP). All measurements were carried out in triplicate, and the average value was reported.

5. Spreadability

The spreadability of the prepared peel-off face mask was determined using the glass slide method. Approximately 0.5 g of the formulation was placed between two clean glass slides. A 100 g weight was placed on the upper slide for 1 minute to obtain a uniform film of the formulation. Then, an additional 20 g weight was attached to the upper slide using a pulley arrangement, and the time required for the upper slide to move 7.5 cm was recorded.

The spreadability was calculated using the following formula:

$$S = \frac{M \times L}{T}$$

Where:

- S = Spreadability (g·cm/s)
- M = Weight tied to the upper slide (g)
- L = Length moved by the glass slide (cm)
- T = Time taken to separate the slides (seconds)

6. Extrudability

The extrudability of the prepared peel-off face mask was determined by filling the formulation into a collapsible aluminium or laminated tube. The tube was pressed manually by applying a constant force, and the ease with which the formulation was extruded through the nozzle was observed. The amount of formulation extruded, and the force required were noted. The extrudability was graded based on the ease of extrusion.

7. Drying Time

The drying time of the formulated peel-off face mask was determined by applying approximately 1 g of the formulation uniformly on a clean glass slide to form a thin layer. A stopwatch was started immediately after application. The time required for the mask to dry completely and form a non-sticky, continuous film was recorded. The test was

performed in triplicate at room temperature (25 ± 2°C), and the average drying time was calculated.

8. Film Forming Ability and Peelability

The film-forming ability of the prepared peel-off face mask was evaluated by applying approximately 1 g of the formulation as a uniform thin layer on a clean glass slide (or on the inner surface of Petri dish). The formulation was allowed to dry completely at room temperature (25 ± 2°C). After drying, the former film was visually examined for uniformity, continuity, smoothness, flexibility, transparency, cracks, and ease of peeling. A good peel-off mask should form a smooth, continuous, flexible, and non-sticky film that can be removed easily in one piece without breaking.

The peelability of the prepared peel-off face mask was evaluated by applying approximately 1 g of the formulation as a uniform thin layer on a clean glass slide (or on the inner surface of Petri dish). The formulation was allowed to dry completely at room temperature (25 ± 2°C) until a continuous film was formed. The dried film was then peeled off carefully, and the ease of peeling, continuity of the film, flexibility, and presence of any residue on the surface were observed. The test was performed in triplicate, and the average observation was recorded.

9. Washability Evaluation

The washability of the prepared peel-off face mask was evaluated by applying approximately 1 g of the formulation uniformly on a clean glass slide and allowing it to dry completely. After the film was peeled off, any remaining residue was washed with running tap water. The ease of washing and the presence of any residual formulation on the surface were observed visually.

10. Stability Study

The stability of the formulated peel-off face mask was evaluated by storing the formulations in well-closed containers under different storage conditions. The formulations were stored at room temperature (25 ± 2°C) and accelerated conditions (40 ± 2°C ± 75 ± 5% RH) for 30 days. The samples were examined at 0, 15, and 30 days for any changes in colour, odour, appearance, homogeneity, pH, viscosity, drying time, and phase separation. [20]

CONCLUSION

The increasing consumer demand for safe, effective, and naturally derived skincare products has led to significant interest in herbal cosmetics and cosmeceuticals.The present review highlights the potential of herbal peel-off face masks prepared using *Vaccinium corymbosum* (blueberry) and *Clitoria ternatea* Linn. (butterfly pea flower) as natural skincare products. Both herbal extracts are rich in antioxidants, flavonoids, and anthocyanins, which help protect the skin from free radical damage, improve skin hydration, enhance elasticity, and reduce signs of ageing. Peel-off face masks provide effective cleansing, remove excess oil and dead skin cells, and leave the skin smooth, fresh, and radiant. The review also emphasizes the importance of selecting suitable polymers, excipients, and evaluation parameters to obtain a stable, safe, and effective formulation. Based on the available literature, herbal peel-off masks containing blueberry and butterfly pea flower extracts show promising potential as natural cosmetic products. However, further formulation optimization, stability studies, and clinical evaluations are required to confirm their safety and effectiveness for long-term use. Overall, these herbal ingredients offer a promising and eco-friendly approach for developing effective peel-off face masks with enhanced skincare benefits.

REFERENCES:

1. Harry RG. *Harry's Cosmeticology*. 9th ed. New York: Chemical Publishing Co.; 2015.
2. Barel AO, Paye M, Maibach HI, editors. *Handbook of Cosmetic Science and Technology*. 5th ed. Boca Raton: CRC Press; 2022.
3. Remington JP. *Remington: The Science and Practice of Pharmacy*. 23rd ed. Philadelphia: Pharmaceutical Press; 2020.
4. Aulton ME, Taylor KMG. *Aulton's Pharmaceutics: The Design and Manufacture of Medicines*. 6th ed. London: Elsevier; 2022.
5. Rowe RC, Sheskey PJ, Quinn ME. *Handbook of Pharmaceutical Excipients*. 9th ed. London: Pharmaceutical Press; 2020.
6. Tortora GJ, Derrickson B. *Principles of Anatomy and Physiology*. 16th ed. Hoboken: Wiley; 2021.
7. Ross MH, Pawlina W. *Histology: A Text and Atlas*. 8th ed. Philadelphia: Wolters Kluwer; 2020.
8. Indian Pharmacopoeia Commission. *Indian Pharmacopoeia*. 2022 ed. Ghaziabad: IPC; 2022.
9. Wanegaonkar A, et al. Development and evaluation of herbal peel-off face mask containing *Clitoria ternatea* flower extract. *International Journal of Pharmaceutical Research*. 2025.
10. Setiyaningsih W, et al. Formulation and optimization of peel-off gel mask containing *Clitoria ternatea* extract. *Journal of Pharmaceutical Sciences*. 2024.
11. Wijaya DP, et al. Optimization of butterfly pea peel-off mask using factorial design. *International Journal of Applied Pharmaceutics*. 2025.

12. Nursal FK, et al. Effect of sorbitol concentration on peel-off gel mask containing butterfly pea extract. *Journal of Cosmetic Science*. 2023.
13. Putri SA, et al. Formulation and evaluation of peel-off gel mask containing butterfly pea and white turmeric extracts. *Pharmaciana*. 2024.
14. Kalt W, Cassidy A, Howard LR, et al. Recent research on the health benefits of blueberries and their anthocyanins. *Advances in Nutrition*. 2020;11(2):224–236.
15. Vidana Gamage GC, Lim YY, Choo WS. Anthocyanins from *Clitoria ternatea* flower: Biosynthesis, extraction, stability, antioxidant activity and applications. *Frontiers in Plant Science*. 2021;12:792303. DOI:10.3389/fpls.2021.792303
16. Liu Y, et al. Blueberry anthocyanins: Chemistry, bioactivities and applications. *Food Chemistry*. 2022.
17. Kim JH, et al. Characterization of anthocyanins in highbush blueberry using UPLC-QToF/MS. *Food Research International*. 2025.
18. Yang L, et al. Blueberry anthocyanins: Stability, biological activities and industrial applications. *Critical Reviews in Food Science and Nutrition*. 2024.
19. Draelos ZD. Cosmeceuticals: Current trends and future perspectives. *Dermatologic Clinics*. 2019;37(4):419–430.
20. Mukherjee PK. *Quality Control and Evaluation of Herbal Drugs*. 2nd ed. New Delhi: Elsevier; 2019.