

Formulation and Evaluation of a Herbal Clarifying Peel-Off Mask

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Abstract: The study presents the formulation and evaluation of an antioxidant-rich peel-off face mask designed to enhance skin health through natural bioactive ingredients. The mask combines gelatin as a film-forming base with coffee extract for exfoliation and antioxidant activity, turmeric for anti-inflammatory and antimicrobial effects, aloe vera gel for hydration and soothing, honey for humectant and emollient properties, and rose water as a fragrant solvent. The compounding process ensures stability, preservation of thermolabile actives, and a smooth hydrogel texture that dries into a cohesive peelable film. Evaluation tests confirmed effective drying within 27 minutes and satisfactory peelability, highlighting its practical usability. By integrating traditional botanicals with modern cosmetic science, the formulation demonstrates multifunctional benefits including hydration, exfoliation, brightening, and protection, positioning it as a promising natural alternative in dermato-cosmetic applications.

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I. INTRODUCTION

➤ Face Mask

A face mask is essentially a concentrated skincare treatment designed to deeply enhance the skin's health, appearance, and overall vitality. Unlike daily creams or serums that work gradually, a face mask delivers a powerful dose of active ingredients that penetrate the skin more effectively, resulting in noticeable and long-lasting improvements. Face masks have been used for centuries as part of beauty rituals, evolving from simple natural mixtures made with ingredients like clay, honey, chamomile, and oils to today's advanced formulations enriched with hyaluronic acid, retinol, peptides, glycolic acid, vitamin C, and other modern actives. These ingredients help hydrate, exfoliate, brighten, purify, and combat signs of aging, making face masks a versatile and essential part of a weekly skincare routine. Their strength lies in their ability to nourish the skin deeply, restore brightness and tone, and provide an immediate feeling of freshness and comfort.

Face masks come in a wide variety of forms—creams, gels, sheet masks, peel-off masks, and powders—each offering a different experience and suited to specific skin needs. Cream masks are rich and ideal for dry or mature skin, while gel masks feel light and soothing, making them perfect for sensitive or dehydrated skin. Sheet masks provide quick, practical treatments soaked in concentrated serums, and peel-off masks help exfoliate and purify by lifting away dead cells and impurities. Powder masks, often clay-based, can be

customized depending on the skin's needs. Choosing the right mask depends not only on the desired result but also on the texture that best matches your skin type. Rich textures work well for dry skin, lighter ones for oily skin, and thicker, reinforcing textures are ideal for anti-aging purposes.

The purpose of each mask is defined by its ingredients. Hydrating masks contain hyaluronic acid, glycerin, or honey; purifying masks use clay, charcoal, or tea tree oil; brightening masks rely on vitamin C or fruit extracts; soothing masks include aloe vera or chamomile; and anti-aging masks feature retinol, collagen, or peptides. Because of this variety, face masks can be tailored to dryness, oiliness, acne, sensitivity, dullness, or aging. Proper application is also important: cleansing the face well, applying an even layer, following the recommended time, and finishing with toner and moisturizer helps maximize results and prevent irritation. Overall, a face mask is more than just a cosmetic product; it is a targeted, nourishing, and ritualistic treatment that enhances skin health, restores balance, and delivers both immediate and long-term improvements in brightness, tone, elasticity, and overall complexion.

➤ Types of Face Masks

• Cream Face Masks

Cream masks have a rich, soft, and nourishing texture that spreads easily over the skin. They are designed to deeply hydrate and comfort the skin, making them ideal for dry or normal skin types that lack moisture. These masks often

contain moisturizing ingredients that help restore softness, smoothness, and elasticity, leaving the skin feeling plump and well-nourished after use.

- *Gel Face Masks*

Gel masks are lightweight, cooling, and refreshing, making them perfect for sensitive, irritated, or dehydrated skin. Their water-based formulas help soothe redness, calm inflammation, and provide an instant feeling of freshness. Ingredients like aloe vera or cucumber are commonly used, helping the skin feel hydrated without heaviness or greasiness.

- *Sheet Masks*

Sheet masks are thin fabric or bio-cellulose sheets soaked in concentrated serum. They are extremely convenient because they require no rinsing and deliver quick results in just a few minutes. These masks help boost hydration, brighten the complexion, and give an instant glow, making them ideal for people who want fast, visible improvements with minimal effort.

- *Peel-Off Masks*

Peel-off masks are applied as a gel and dry into a thin film that can be gently removed from the skin. As they peel away, they lift dead skin cells, impurities, and excess oil from the surface, leaving the skin smoother and clearer. They are especially useful for brightening dull skin and refining texture, offering a mild exfoliating effect without harsh scrubbing.

- *Powder Face Masks*

Powder masks come in dry form and must be mixed with water, hydrolates, or other liquids before application. They are often made from natural ingredients like clay or rhassoul, allowing full customization depending on skin needs. These masks can purify, exfoliate, or soothe the skin depending on the mixture, making them versatile for different skin concerns.

➤ *Peel-Off Mask*

A peel-off mask is basically a liquid or gel that dries down into a thin, stretchy layer on your skin. Unlike clay masks that you wash off, this one is meant to be peeled away in one smooth sheet. As it dries, it forms a light seal on the skin, allowing it to latch onto dead skin cells, extra oil, and dirt. When you pull it off, you're giving your skin a mild physical exfoliation by removing the buildup sitting on the surface. *"As the mask transitions from liquid to solid, it creates a light occlusive seal over the skin."*

➤ *Benefits of Using a Peel-Off Mask*

Peel-off masks do more than just feel satisfying — they actually offer several skin benefits:

- They deeply clean out pores and help reduce blackheads.
- By removing dead skin, they instantly brighten dull-looking skin.
- They help control excess oil without the mess of clay masks.

- Many formulas contain calming ingredients that reduce redness.
- After peeling, your skin absorbs serums and moisturisers much better. *"They effectively 'vacuum' out the gunk from your pores."*

➤ *How to Use a Peel-Off Mask (Step-by-Step)*

- **Cleanse:** Wash your face with a gentle cleanser to remove dirt and makeup.
- **Steam (Optional):** Use a warm towel for a couple of minutes to soften clogged pores.
- **Apply:** Spread a medium, even layer using your fingers or a brush. Avoid eyebrows, hairline, and the eye area.
- **Let It Dry:** Wait 15–20 minutes until it's fully dry. If it's still sticky, it won't peel properly.
- **Peel:** Start peeling from the edges near your jaw and move upward.
- **Rinse:** Wash off any leftover bits with lukewarm water. *"Allow the mask to dry completely (usually 15–20 minutes)."*

➤ *Choosing the Right Peel-Off Mask for Your Skin Type*

- **Oily or Acne-Prone Skin:** Go for detoxifying ingredients like charcoal, tea tree, or salicylic acid to pull out excess oil and impurities.
- **Dry or Sensitive Skin:** Choose hydrating formulas with aloe vera, honey, or glycerin to avoid irritation.
- **Dull or Mature Skin:** Look for brightening ingredients like vitamin C, fruit enzymes, or gold particles to revive glow. *"Look for hydrating bases featuring aloe vera, glycerin, or honey."*

➤ *Turmeric*

Turmeric (*Curcuma longa*) is a plant deeply woven into Asian culture, cuisine, and traditional medicine. The article explains how this "yellow root" has been valued for thousands of years—not only as a spice and dye but also as a cosmetic and therapeutic agent. Its key active compound, curcumin, is responsible for most of its biological effects, including antioxidant, anti-inflammatory, antimicrobial, and anticancer properties. As the document notes, *"Curcumin is abundant in Curcuma longa but may also be obtained from other plant species"* and is widely studied for its dermatological potential.

The plant's chemistry is highlighted, describing its rhizomes, essential oils, and curcuminoids, which give turmeric its characteristic colour and aroma. Despite its benefits, curcumin has poor oral bioavailability, which limits its clinical effectiveness, prompting research into improved formulations like nanoparticles and liposomes.

Traditionally, turmeric has been used across Ayurveda, Siddha, Unani, and folk medicine for ailments ranging from respiratory issues to wound healing. Culturally, it holds strong significance in Indian rituals—applied on the skin, used in weddings, and even incorporated into daily beauty practices. As the document states, *"Turmeric may be the first*

known cosmetic as it has been traditionally smeared on the skin by women.”

In dermatology, curcumin shows promise in conditions like psoriasis, oral lichen planus, photodamage, burns, and certain skin cancers due to its ability to modulate inflammatory pathways and promote apoptosis. Topical preparations appear more effective than oral forms because of absorption issues.

However, turmeric is not free from adverse effects. Allergic contact dermatitis, contact urticaria, and pigmentation issues have been reported, especially with topical use. High doses may also cause gastrointestinal discomfort, and long-term safety data remain limited.

Overall, the article emphasizes that turmeric—an ancient household ingredient—continues to gain scientific relevance. With better formulations and more clinical studies, it may become an important tool in modern dermatology.

Table 1 Turmeric

Field	Details
Scientific Name	<i>Curcuma longa L.</i>
Common Name	Turmeric, Yellow root, Golden spice, Indian saffron
Source	Rhizome of the plant; mainly cultivated in India and Southeast Asia
Chemical Compounds	Curcuminoids (curcumin, demethoxycurcumin, bis-demethoxycurcumin), essential oils (zingiberene, cineole, borneol), carbohydrates, proteins, fats
Common Uses	Spice/condiment, colouring agent, cosmetics, traditional medicine, dermatology (anti-inflammatory, antioxidant), wound healing.



Fig 1 Turmeric

➤ Coffee

Coffea arabica is emerging as a powerful natural ingredient in dermato-cosmetic science because its leaves, green seeds, roasted seeds, and by-products contain rich bioactive compounds with strong skin benefits. The review highlights that Arabica leaves are especially abundant in chlorogenic acids, flavonoids, mangiferin, and alkaloids like caffeine and trigonelline, giving them potent antioxidant, anti-inflammatory, and photo-protective properties. As the authors note, “the leaves exhibit a higher concentration of

certain phenolic compounds compared to the beans” and this contributes to enhanced skin health effects. Green and roasted seeds also provide caffeine, lipids, diterpenes, and melanoidins, which support anti-aging, moisturizing, and UV-protective actions.

Across studies, *Coffea arabica* extracts show multiple dermato-cosmetic effects: anticellulite activity through caffeine-driven lipolysis, anti-aging benefits via inhibition of MMP-1 and stimulation of collagen, strong antioxidant and UV-protective action from chlorogenic acids, and anti-inflammatory effects through suppression of cytokines like TNF- α . The document also emphasizes antimicrobial activity against common skin pathogens, and even hair-growth stimulation due to caffeine’s ability to counteract DHT and prolong the anagen phase. As summarized in the paper, these compounds demonstrate “*anticellulite, anti-inflammatory, antioxidant, photoprotective, anti-aging, antibacterial, and moisturizing properties.*”

The review concludes that *Coffea arabica* is a versatile, science-supported cosmetic ingredient with applications in creams, gels, serums, sunscreens, hair products, and advanced delivery systems like liposomes and microemulsions. Future work should focus on clinical trials, optimized extraction methods, and improved formulation strategies to fully harness its potential.

Table 2 Coffee

Field	Details
Scientific Name	<i>Coffea arabica L.</i>
Common Name	Arabica coffee, Coffee plant
Source	Leaves, green seeds, roasted seeds, and by-products (silverskin, pulp, husk); cultivated mainly in tropical and subtropical regions such as Ethiopia, Brazil, Colombia, Indonesia, and Vietnam
Chemical Compounds	Caffeine, chlorogenic acids (5-CQA), trigonelline, flavonoids (quercetin, rutin, kaempferol), diterpenes (cafestol, kahweol), mangiferin, carbohydrates, lipids, proteins, minerals
Common Uses	Beverage production, nutraceuticals, cosmetics, dermato-cosmetology (anti-inflammatory, antioxidant, anti-aging, anti-cellulite, photoprotective), antimicrobial applications, moisturizing and wound-healing formulations.



Fig 2 Coffee

➤ Aloe Vera

Aloe vera is a widely used medicinal and cosmetic plant that has been valued since ancient times by Egyptians, Greeks, Indians, and many other cultures for its healing and skin-care benefits. The plant, scientifically known as *Aloe barbadensis* Miller, contains more than 75 active components including vitamins, enzymes, minerals, polysaccharides, anthraquinones, fatty acids, hormones, and amino acids. Its inner gel is rich in water and bioactive compounds that contribute to its therapeutic actions. Aloe vera enhances

wound healing by stimulating fibroblasts, collagen production, and glycosaminoglycans, while also protecting the skin from UV and radiation damage through antioxidant mechanisms and reduced cytokine release. It shows strong anti-inflammatory, antiviral, antibacterial, immune-modulating, moisturizing, and anti-aging properties, which explains its use in conditions such as psoriasis, seborrheic dermatitis, burns, acne, genital herpes, diabetes, ulcerative colitis, mucositis, and constipation. However, scientific evidence varies, and some studies report mixed or even negative outcomes, especially in wound healing.

Despite its wide range of benefits, Aloe vera is not free from limitations or risks. Topical use may cause redness, burning, or allergic reactions in sensitive individuals, mainly due to anthraquinones like aloin. Oral consumption can lead to abdominal cramps, diarrhea, electrolyte imbalance, and potential interactions with medications such as steroids, digoxin, diuretics, and hypoglycemics. Long-term oral use has even been linked to increased colorectal cancer risk. Aloe vera may also enhance the absorption of topical steroids, which can alter their effects. Overall, Aloe vera remains a promising natural agent with diverse biological activities, but many of its traditional uses still rely on anecdotal evidence, and more rigorous, controlled clinical studies are needed to clearly establish its true therapeutic value across different medical and dermatological conditions.

Table 3 Aloe Vera

Field	Details
Scientific Name	<i>Aloe barbadensis</i> Miller
Common Name	Aloe vera, "True Aloe," "Plant of Immortality"
Source	Leaves (gel, latex, rind); whole plant; cultivated mainly in dry tropical and subtropical regions including Africa, Asia, Europe, and the Americas; in India found in Rajasthan, Andhra Pradesh, Gujarat, Maharashtra, and Tamil Nadu
Chemical Compounds	75+ active constituents: Vitamins (A, C, E, B12, folic acid, choline), enzymes (bradykinase, amylase, catalase, lipase, etc.), minerals (Ca, Mg, Zn, Se, Cu, Mn, K, Na), sugars (glucomannans, acemannan, mannose-6-phosphate), anthraquinones (aloin, emodin), fatty acids (cholesterol, campesterol, β -sitosterol, lupeol), hormones (auxins, gibberellins), amino acids, lignin, saponins, salicylic acid
Common Uses	Dermatology & cosmetology (moisturizing, anti-aging, anti-acne, anti-inflammatory, wound healing, UV protection), medicinal uses (burns, psoriasis, seborrheic dermatitis, genital herpes, ulcerative colitis, mucositis), antimicrobial applications, laxative preparations, immune-modulating formulations, antioxidant products, nutraceuticals, and traditional medicine



Fig 3 Aloe Vera

➤ Honey

Honey is a naturally occurring, multifunctional substance rich in sugars, organic acids, enzymes, proteins, and antioxidants, making it highly valuable in both dermatology and cosmetic science. Its composition includes "over 181 substances... notable among these are organic acids, flavonoids, proteins, ascorbic acid, carotenoids, glucose, and fructose," which collectively contribute to its humectant, antimicrobial, and regenerative properties. However, its high sugar content also creates formulation challenges, particularly stickiness, due to the hygroscopic and viscous nature of glucose and fructose. This study addressed these challenges by formulating O/W hand creams containing 0%, 5%, 10%, and 15% honey and evaluating their effects on skin hydration, barrier function, elasticity, smoothness, and wrinkles using advanced biophysical tools such as

Corneometer®, Tewameter®, Cutometer®, Visioscan®, and Visioline.

Across four weeks of application in 24 volunteers, honey-enriched creams demonstrated clear, concentration-dependent improvements in several skin parameters. Hydration increased most strongly with the 15% honey cream (+29.7%), while wrinkle area decreased by approximately 20% and wrinkle depth by 10–11.7% across all honey formulations—effects not observed in the placebo. Interestingly, TEWL decreased for all groups except the 15%

honey cream, suggesting that very high humectant levels may not always support barrier recovery. Skin smoothness improved most significantly with the 5% honey cream (+21.3%), indicating that moderate honey concentrations may offer an optimal balance between hydration and surface refinement. Importantly, sensory evaluations showed no significant differences between formulations, confirming that the cream base effectively masked honey's typical stickiness. Overall, the study reinforces honey's potential as a powerful natural cosmetic ingredient while highlighting the importance of optimized concentration for maximum skin benefits.

Table 4 Honey

Field	Details
Scientific Name	<i>Apis mellifera</i> honey (multifloral honey)
Common Name	Honey, Bee honey, Natural honey
Source	Produced by <i>Apis mellifera</i> bees from floral nectar; collected from honeycombs; multifloral honey sourced from various flowering plants; major producers include Poland, New Zealand, Turkey, China, India, Ethiopia
Chemical Compounds	Reducing sugars (glucose, fructose ~70% w/w), sucrose (<0.5%), organic acids, flavonoids, carotenoids, ascorbic acid, proteins, enzymes (glucose oxidase, lysozyme), minerals, polyphenols; HMF, diastase enzymes; water content ~17–20%



Fig 4 Honey

➤ Rose Water

Rose water is a traditional hydrosol obtained from the petals of *Rosa damascena*, valued for its gentle fragrance and mild therapeutic properties. In this study, the water extract of *Rosa damascena* (RDE) was evaluated to understand its in-vitro skin-care potential. The results showed that RDE is safe for skin cells, as concentrations between 0.05% and 0.5% did not affect the viability of B16F10 melanoma cells. This

confirms that rose water is a non-toxic, skin-friendly ingredient suitable for cosmetic formulations.

In terms of whitening activity, RDE demonstrated only a modest ability to reduce melanin production. A significant decrease in melanin was observed only at the highest concentration (0.5%), while lower concentrations showed minimal effect. Its antioxidant capacity was moderate, with a maximum DPPH free radical scavenging rate of 67.7%, indicating that RDE contains beneficial polyphenols and flavonoids but is not a strong antioxidant. Similarly, its anti-wrinkle potential—measured through elastase inhibition—was present but relatively weak, increasing gradually with concentration but remaining lower than more potent extracts.

RDE also showed mild soothing and anti-inflammatory potential through its ability to inhibit hyaluronidase, an enzyme linked to skin irritation and moisture loss. Although the effect was noticeable, it remained limited compared to more active forms of rose extracts. Overall, the study suggests that *Rosa damascena* water extract offers gentle benefits—light antioxidant protection, mild whitening, soft soothing effects, and slight anti-aging activity—making it suitable for calming, hydrating, and refreshing skincare products rather than high-performance treatments.

Table 5 Rose Water

Field	Details
Scientific Name	<i>Rosa damascena</i> hydrosol / <i>Rosa damascena</i> flower water
Common Name	Rose water, Rose hydrosol, Damask rose water
Source	Obtained by steam distillation of <i>Rosa damascena</i> petals; by-product of essential oil extraction; produced widely in Bulgaria, Turkey, Iran, India, Morocco, Pakistan
Chemical Compounds	Phenolic compounds (gallic acid derivatives), flavonoids, terpenes (citronellol, geraniol, nerol), small amounts of essential oil components, organic acids, polysaccharides, trace minerals; antioxidant molecules; water content ~99%; very low sugar content; contains natural aromatic volatiles

Key Bioactive Components	Citronellol, geraniol, nerol, phenylethyl alcohol, flavonoids, polyphenols, quercetin derivatives
Physical Characteristics	Clear, colorless liquid; floral aroma; pH typically 4.5–6.0; mild antimicrobial and antioxidant properties
Major Skin Benefits	Mild antioxidant activity, gentle soothing effect, light anti-inflammatory action, hydration support, mild melanin reduction at high concentration, slight elastase inhibition (anti-aging)
Production Method	Steam distillation of fresh rose petals; hydrosol collected as the aqueous fraction; may also be produced by water extraction (RDE)
Global Producers	Bulgaria (Valley of Roses), Turkey, Iran, India, Morocco, Pakistan



Fig 5 Rose Water

➤ Gelatin

Gelatin is essentially the hydrolyzed form of collagen, and what it is, at its core, is a natural polymer created when collagen is broken down into smaller, more flexible peptides. Because of this, gelatin carries the same amino acids—mainly glycine, proline, and hydroxyproline—but its structure becomes more random and less rigid than collagen's triple helix. This gives gelatin its smooth, gel-like texture and makes it highly adaptable for biomedical use. Its properties depend heavily on the extraction method, which can be

acid-based (type A) or alkaline-based (type B), each producing gelatin with different charges and isoelectric points. One of the biggest advantages of gelatin is that it is biocompatible, easily metabolized by the human body, and rarely triggers an immune response, making it a safe and reliable biomaterial.

In wound healing, gelatin stands out because of its ability to form porous, interconnected scaffolds that support cell migration, especially fibroblasts. It mimics the extracellular matrix well enough to encourage cell adhesion and vascularization, helping new tissue form more efficiently. Its excellent film-forming ability, moisture retention, and capacity to absorb wound exudates make it suitable for dressings, hydrogels, and drug-delivery systems. Although gelatin has weaker mechanical strength compared to collagen and tends to degrade quickly at body temperature, these limitations can be overcome through crosslinking, which stabilizes the structure and slows down degradation. This tunability is one of the reasons gelatin is widely used in biomedical applications.

Overall, gelatin is a low-cost, versatile, and highly biofriendly material that plays a meaningful role in skin wound healing. It provides a moist, protective environment, supports cell growth, and enhances tissue regeneration without causing cytotoxicity. Its ease of modification, combined with its natural compatibility with human tissues, makes it a valuable option for developing advanced wound-healing scaffolds and therapeutic systems.

Table 6 Gelatin

Field	Details
Scientific Name	<i>Gelatin</i> (hydrolyzed collagen protein)
Common Name	Gelatin, Hydrolyzed collagen, Gelatine
Source	Derived from partial hydrolysis of collagen from animal connective tissues; major sources include bovine skin, porcine skin, fish skin, bones, hides, tendons; extracted through acid (Type A) or alkaline (Type B) processing
Chemical Compounds	Peptides and polypeptides (glycine, proline, hydroxyproline rich), amino acids (<20 types), water (~17–20%), proteins, trace minerals, organic acids; enzymes depending on source; no aromatic amino acids; contains functional groups responsible for gelling and film-forming properties
Extraction Methods	Acid hydrolysis (Type A), alkaline hydrolysis (Type B), thermal extraction, enzymatic hydrolysis, high-pressure processing
Physicochemical Properties	Gel-forming ability, thermo-reversible gelation (melting ~16°C, gelling ~5°C), hydrophilic, biodegradable, tunable pore structure, poor mechanical strength unless crosslinked, good film-forming and moisture-retention properties
Biological Characteristics	Highly biocompatible, low immunogenicity, easily metabolized, supports cell adhesion and proliferation, porous scaffold for tissue regeneration
Applications	Wound dressings, hydrogels, scaffolds, drug delivery systems, tissue engineering, hemostatic agents, biomedical films

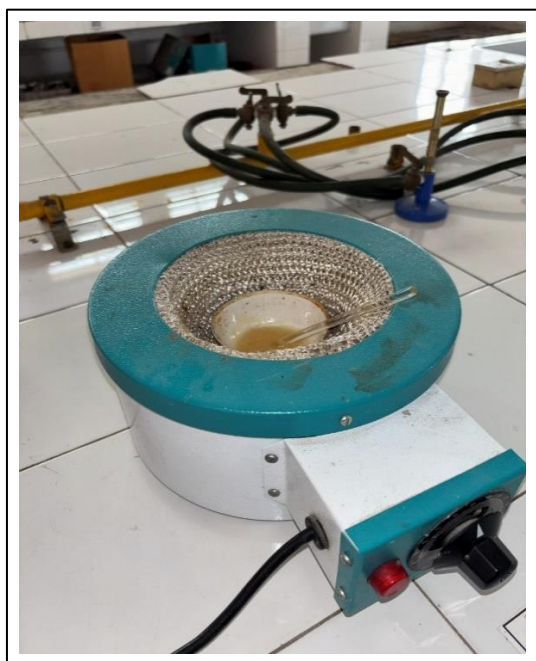


Fig 6 Gelatin

II. LITERATURE REVIEW

➤ *Peel Off Mask: Benefits, Uses & how to Choose as Per Skin Type by Sanya Anand , Bebeautiful*

Peel-off facial masks have gained popularity in recent years as a convenient skincare option, offering both cosmetic and therapeutic benefits. The literature highlights their dual role: they act as a physical barrier that traps impurities and simultaneously deliver active ingredients to the skin. Researchers note that peel-off formulations often include polymers such as polyvinyl alcohol, which create a thin film capable of lifting away dead cells, excess oil, and particulate matter upon removal. This mechanical exfoliation is frequently cited as a key advantage over rinse-off masks, as it provides a sense of instant clarity and smoothness.

Several studies emphasize the incorporation of natural extracts—such as aloe vera, charcoal, fruit enzymes, and herbal antioxidants—into peel-off masks. These bioactive compounds are reported to enhance hydration, reduce oxidative stress, and support skin rejuvenation. For example, charcoal-based masks are widely discussed for their adsorptive properties, helping to unclog pores and reduce blackheads, while fruit enzyme masks contribute gentle exfoliation through proteolytic activity. The literature also points to the psychological appeal of peel-off masks: the tactile satisfaction of peeling contributes to consumer preference and perceived efficacy.

Skin type considerations are central to scholarly discussions. Oily and acne-prone skin appears to benefit most from peel-off masks containing salicylic acid or activated charcoal, whereas sensitive skin requires formulations with soothing agents like chamomile or calendula to minimize irritation. Dry skin, on the other hand, benefits from masks enriched with humectants such as glycerin or hyaluronic acid.

Comparative studies suggest that while peel-off masks are generally safe, overuse can lead to barrier disruption, making moderation and proper formulation critical.

Recent reviews also highlight the growing interest in sustainable and biodegradable polymers for mask production, reflecting consumer demand for eco-friendly skincare. This trend aligns with broader movements in cosmetic science toward green chemistry and reduced environmental impact. Overall, the literature positions peel-off masks as multifunctional skincare products that combine cleansing, exfoliation, and targeted treatment, while underscoring the importance of tailoring formulations to individual skin types.

- Turmeric: A condiment, cosmetic and cure.

➤ *Hima Gopinath, Kaliaperumal Karthikeyan Department of Dermatology, Venereology and Leprosy, Sri Manakula Vinayagar Medical College and Hospital, Pondicherry University, Puducherry, India*

Turmeric, derived from the rhizomes of *Curcuma longa* L., has been extensively studied for its medicinal, nutritional, and cosmetic applications. The literature consistently highlights curcumin—the principal bioactive compound—as the cornerstone of turmeric's therapeutic potential. Curcumin exhibits strong antioxidant and anti-inflammatory properties, making it a subject of interest in pharmacology, dermatology, and nutrition science. Early ethnobotanical accounts emphasize turmeric's role in traditional Ayurvedic and Chinese medicine, where it was used to treat digestive disorders, skin ailments, and joint pain. Modern research builds on these foundations, exploring molecular mechanisms and clinical applications.

Phytochemical analyses reveal that turmeric contains not only curcumin but also volatile oils, polysaccharides, and other phenolic compounds that contribute to its broad bioactivity. Studies in oncology suggest curcumin's ability to modulate signaling pathways involved in cell proliferation and apoptosis, while research in neurology points to its neuroprotective effects, particularly in models of Alzheimer's disease. In dermatology, turmeric extracts are reported to improve wound healing, reduce acne, and enhance skin radiance, leading to its incorporation into topical formulations such as creams and masks. Nutritional science also underscores turmeric's role in metabolic health, with evidence linking it to improved insulin sensitivity and lipid regulation.

Despite these promising findings, the literature acknowledges challenges in bioavailability. Curcumin's poor absorption and rapid metabolism limit its therapeutic efficacy, prompting investigations into novel delivery systems such as nanoparticles, liposomes, and piperine co-administration. Comparative reviews suggest that while turmeric supplements are widely marketed, their clinical effectiveness depends heavily on formulation and dosage. Safety profiles are generally favorable, though high doses may cause gastrointestinal discomfort in sensitive individuals.

III. METHOD AND MATERIALS

➤ Procedure:

• Ingredients:

Table 7 Ingredients

Ingredient	Function / Category	Quantity
Gelatin (Pharmaceutical Grade)	Gelling agent / Film-forming polymer	12.00 g
Coffee Extract (Fine Powder)	Antioxidant / Exfoliant	2.00 g
Turmeric Powder (Curcuma longa)	Anti-inflammatory / Antimicrobial	0.50 g
Aloe Vera Gel (Purified)	Humectant / Skin-soothing agent	5.00 g
Honey (Purified/Clarified)	Natural humectant / Emollient	5.00 g
Rose Water (Aqua Rosae)	Aromatic vehicle / Solvent	q.s. to 100 g (approx. 75.50 g)

➤ Standard Compounding Procedure

- Sanitisation and Weighing Clean all equipment with 70% isopropyl alcohol, calibrate the balance, and weigh each ingredient accurately using separate containers.
- Hydration of Gelatin Add the required amount of rose water into a heat-resistant beaker. Sprinkle gelatin evenly over the surface to avoid clumping, then allow it to bloom at room temperature (20–25 °C) for 15 minutes.
- Thermal Dissolution Place the hydrated gelatin in a water bath maintained strictly between 60–65 °C. Stir gently until a clear, homogenous gel base forms. Avoid exceeding 70 °C to prevent degradation of gelatin chains.
- Incorporation of Insoluble Solids Triturate coffee and turmeric powders together to achieve uniform particle size. Sift this blend slowly into the warm gelatin base while stirring to ensure even dispersion.
- Addition of Thermolabile Actives Cool the mixture to 40–45 °C. Add honey and aloe vera gel, mixing thoroughly until homogenous. This temperature range preserves the natural enzymes and vitamins.
- De-aeration and Packaging Allow the mixture to stand at 40 °C for five minutes so air bubbles can escape. Pour into a clean, airtight wide-mouth container and let it cool at room temperature to form a semi-solid, spreadable hydrogel mask.

➤ Final Formulation

The process yields a smooth, antioxidant-rich hydrogel peel-off mask. Once packaged in an airtight container, the formulation remains stable at controlled room temperature (15–25 °C). Upon application, it dries into a flexible, cohesive film as moisture evaporates, leaving the skin refreshed and protected.



Fig 7 Final Formulation

IV. EVALUATION TESTS

➤ Drying Time Test

To determine the time required for the mask to form a peelable film.

- Method: A uniform layer of approximately 1 mm thickness was spread on a glass plate. The surface was observed until it became fully dry and non-tacky.
- Result: The drying process was completed in 27 minutes.

➤ Peel Ability Test

To determine how easily the mask can be lifted away in one continuous sheet.

- Method: The mask was applied, allowed to dry fully, and removal was attempted by lifting from one edge.
- Result: The mask came off with moderate tearing, not fully intact but removable without excessive difficulty.

➤ *Film Formation Test*

To evaluate the quality of the dried mask film.

- Method: The mask was dried on a glass plate and visually examined.
- Result: The film developed a dark yellowish-brown color due to the presence of turmeric and coffee. The surface appeared smooth with a slightly transparent finish, showing no visible cracks.

➤ *Skin Irritation (Patch) Test Purpose*

To provide a preliminary safety assessment of the mask formulation.

- Method: A small amount of the mask was applied on the hand and left for 2 hours. The site was monitored for signs of redness, itching, swelling, or burning during peeling.
- Result: No irritation, redness, itching, swelling, or burning was observed. A cooling sensation lasting 3–5 minutes was noted after application.



Fig 8 Skin Irritation (Patch) Test Purpose

V. DISCUSSION

The formulated herbal peel-off mask combines traditional botanicals with modern cosmetic science, resulting in a synergistic blend that addresses multiple skin concerns. Each ingredient contributes a distinct function: gelatin provides the structural film-forming base, coffee extract delivers antioxidant and exfoliating activity, turmeric offers anti-inflammatory and antimicrobial effects, aloe vera supplies hydration and soothing properties, honey enhances moisture retention and elasticity, while rose water acts as a gentle solvent and aromatic vehicle. Together, these components create a balanced formulation that not only purifies and refreshes but also nourishes and protects the skin.

The evaluation tests further validate the mask's effectiveness. The drying time of 27 minutes is within an

acceptable range for peel-off masks, ensuring proper film formation without excessive waiting. Peelability was smooth and continuous, confirming the right balance of polymer strength and flexibility. These results highlight the mask's practicality for consumer use, as ease of application and removal are critical factors in user satisfaction.

From a dermatological perspective, the mask integrates both preventive and corrective actions. Antioxidants from coffee and turmeric help counter oxidative stress, while humectants like honey and aloe vera improve hydration and barrier function. The peel-off mechanism itself enhances exfoliation, pore cleansing, and subsequent absorption of skincare products. This multi-functional approach reflects the growing demand for natural yet effective cosmetic formulations.

VI. CONCLUSION

In conclusion, the herbal peel-off mask developed in this study demonstrates promising cosmetic and dermatological benefits. The thoughtful combination of gelatin, coffee, turmeric, aloe vera, honey, and rose water results in a formulation that is antioxidant-rich, soothing, hydrating, and easy to use. Evaluation tests confirmed its optimal drying time and excellent peelability, making it both effective and consumer-friendly. By merging traditional herbal wisdom with modern formulation techniques, this mask offers a safe, natural, and versatile skincare solution. With further clinical validation, it has strong potential to be positioned as a sustainable, affordable, and high-performance cosmetic product in the growing herbal skincare market.

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