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Herbal Peel-Off Mask: A Natural Approach for Acne Prevention and Blackhead Removal

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ABSTRACT

In light of increasing consumer demand for natural and dermatologically safe cosmetic products, this study involves the formulation and evaluation of herbal peel-off mask targeted at managing acne and blackheads. The mask incorporates botanical extracts including Willow Bark, Grapefruit Seed, and Blueberry, 2 % w/w each selected for their exfoliating, revitalizing, and antioxidant properties. Polyvinyl Alcohol (15% w/w) served as the primary film-forming agent, supported by Glycerine, Propylene Glycol, and Xanthan Gum to enhance hydration, consistency, and spreadability. The formulation was subjected to physicochemical and dermatological assessments, including pH testing, spreadability, peelability, folding endurance, drying time, and irritancy testing. Results indicated a skin-compatible pH of 7.1, smooth application, good film integrity with a folding endurance of 15, and effective peeling without irritation. The final product demonstrated excellent stability under ambient conditions. The herbal peel-off mask was found to be effective in removing blackheads, dead skin cells, and excess oil while improving overall skin texture. Its natural composition, ease of application, and favourable user experience suggest its potential as a safe and effective skincare solution, particularly for oily and acne-prone skin types.

Keywords: Peel-off mask, acne, blackheads, herbal extracts, Film-forming agent

Abbreviations: PVA: Polyvinyl Alcohol, g: Gram, ml: Millilitre, C: Celsius

INTRODUCTION

In recent years, the consumer shift has changed to natural and herbal skincare products, driven by concerns about the adverse effects of synthetic ingredients often found in traditional cosmetics[1]. In the most common skin issues, acne and blackheads affect a significant portion of the world's population. These conditions are often associated with excessive sebum production, pore clogging, and bacterial proliferation factors requiring gentle yet effective solutions for long-term skin health[2].

A peel-off mask is a topical preparation applied as a thin, even layer over the face using fingers or a spatula. After application, the mask will dry out a consistent film that sticks to the skin. As soon as this film is completely dry, it can be gently removed in one piece. This effectively removes impurities such as dead skin cells, excess oil and dirt. This procedure leaves a clean and refreshing skin surface free of stickiness and, making peel-off masks a popular choice for deep cleansing and skin rejuvenation.

Peel-off masks have gained popularity as a convenient and non-invasive method to detoxify the skin and remove dead cells. Their mechanical peeling effects helps eliminate impurities and unclog pores, making them especially advantageous for oily and acne-prone skin[3]. When formulated with herbal extracts, these masks offer the additional benefits that provide therapeutic advantages without the risks of irritating or allergic reactions associated with synthetic chemicals [4].

Botanical ingredients like Willow Bark Extract, a natural source of salicylic acid, exhibit keratolytic and anti-inflammatory properties, aiding in the exfoliation of dead skin and prevention of acne lesions[5]. Grapefruit Seed Extract is known for its antimicrobial and astringent effects, helping to reduce bacterial load and tighten pores[6]. Blueberry Extract, rich in antioxidants such as anthocyanin and vitamin C, supports skin repair and provides protection against oxidative stress[7].

This study focuses on the formulation and evaluation of herbal peel-off mask incorporating Willow Bark, Grapefruit Seed, and Blueberry extracts. The aim is to develop a natural, skin-friendly solution capable of preventing acne and effectively removing blackheads while enhancing overall skin texture and clarity.

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Materials and Methods

Table 1: Materials

Sr.No.	Ingredients	Name and address of commercial suppliers
1.	Willow Bark Extract	PURENSO SELECT, Kamal Vihar, Dewas Naka, Indore – 452 010, Madhya Pradesh, INDIA
2.	Grapefruit Seed Extract	PURENSO SELECT, Kamal Vihar, Dewas Naka, Indore – 452 010, Madhya Pradesh, INDIA
3.	Blueberry Extract	PURENSO SELECT, Kamal Vihar, Dewas Naka, Indore – 452 010, Madhya Pradesh, INDIA
4.	PVA (Polyvinyl Alcohol)	PURE CHEM LABORATORIES, Pune-411 030
5.	Xanthan Gum	RESEARCH LAB FINE CHEM INDUSTRIES, Mumbai 400 002, India
6.	Glycerine	SISCO RESEARCH LABORATORIES PVT LTD, Plant Site 2, H-4,MIDC, Taloja-410 208,Maharashtra, India
7.	Propylene Glycol	ANALAB FINE CHEMICAL, Mumbai-400 053
8.	Propyl Paraben	NEW NEETA CHEMICALS, Pune, Maharashtra, 411 033

Table 2: Equipment

Sr.No.	Equipment Name	Make
1.	Weighing Balance	SUN, Vishwas Company, Pune-411 002, MODEL: VIV, Sr :2310051
2.	pH Meter	TOSHNIWAL INSTRUMENTS MFG PVT LTD, Ajmer

Method

Table 3: Formula for Preparing Multi-Herb Peel Off Mask

Sr.No.	Ingredients	Role	Quantity in grams
1.	Willow Bark Extract	Exfoliating, Anti-Acne	1 g
2.	Grapefruit Seed Extract	Revitalizing, Brightening	1 g
3.	Blueberry Extract	Antioxidant, Nourishing	1 g
4.	PVA	Primary Film-Forming Agent	7.5 g
5.	Xanthan Gum	Thickener, Stabilizer	0.1 g
6.	Glycerine	Moisturizer, Prevents Cracking	1.5 g
7.	Propylene Glycol	Humectant, Improves Peeling	1 g
8.	Propyl Paraben	Preservative	0.1 g
9.	Strawberry Flavour	Fragrance	0.25 g
10.	Distilled Water	Solvent	36.55 g

Step 1: Preparing the Film - Forming Base

1. In a clean beaker, mix 0.1 g Xanthan Gum with 1.5 g Glycerine, make sure to prevent clumping.
2. Stir continuously with a spatula until a smooth dispersion is obtained.
3. Add this mixture to 5 g warm deionized water. Stir gently to avoid foaming.
4. In a separate beaker, heat 15 g distilled water to 80-90°C (Do not boil).
5. Slowly sprinkle 7.5 g PVA into the heated water while stirring continuously.
6. Maintain the temperature at ~85°C and stir until PVA is fully dissolved.
7. Allow the solution to cool down to 40°C before proceeding.

Step 2: Preparing the Active Phase

8. In another beaker, mix 1 g Willow Bark Extract, 1 g Grapefruit Seed Extract, and 1 g Blueberry Extract into 5 g distilled water.

9. Stir the solution thoroughly to ensure the extracts are evenly dispersed.

Step 3: Combining Functional Ingredients

10. Slowly pour the Xanthan Gum solution into the PVA solution while stirring manually.

11. Add 1 g Propylene Glycol and mix well to improve texture and film flexibility.

12. Add 0.1 g Propyl paraben and continue mixing to ensure preservation efficacy.

13. Introduce 0.25 g Strawberry Fragrance to the mixture and stir for another 5 minutes.

Step 4: Finalization

14. Add the active phase (Step 3) to the main formulation under continuous stirring.

15. Slowly add the remaining quantity of distilled water while maintaining gentle agitation.

16. Continue manual stirring until a uniform, smooth gel-like consistency is achieved.

Step 5: Quality Check & Storage

17. Check the viscosity and ensure the solution is smooth with no undissolved particles.

18. Transfer the final formulation into air-tight, opaque containers to prevent microbial contamination.

19. Store at room temperature (~25°C) away from direct sunlight[8-14].

Evaluation Parameters

Organoleptic Properties: After visual inspection of the formulation with respect to colour, odour, state, consistency was performed.

pH: The pH value of this herbal peel off mask was determined by using digital pH meter.

Peel Off Test: The formulation film was spread on backside of the hand's skin. Leave it for 15-20 minutes to dry properly. After 15-20 minutes, peel off the dry film from the skin surface.

Folding Endurance Test: a folding endurance test assesses the durability of the mask film. A small strip of the dried mask film is repeatedly folded at the same spot until it breaks, and the number of folds it withstands before breaking is recorded. This test helps determine the film's robustness and ability to withstand stress during use[15].

Drying Time Test: The mask in paste form was applied to the back of the hand. The duration required for the mask to dry and form a peelable film layer on the skin was precisely measured.

Wash ability: After applying the formulations to the skin, the ease and extent of washing with water were manually assessed[16].

Spreadability Test: A total of 1gm of peel off preparation was placed between the two glass slides, and a weight of 100 grams was placed on the glass slide for 2 minutes to compress the sample to a uniform thickness and measure its diameter.

Stability: Stability Testing was done at room temperatures. The visual testing was done.

Irritancy Test: The irritation test was done by applying a formulation on hand's back skin and leave it for 15 minutes to check irritation reaction such as swelling, itching and redness effect on the skin[17].

Results

Organoleptic Properties: After visual inspection of the formulation, following observations were made:

Colour: The colour of formulation was confirmed with visual inspection and it's clear in colour.

Odour: Pleasant & fruity

State: Semi-solid

Consistency: Smooth and Thick

pH: The pH of the peel off mask formulation was found to 7.1 at room temperature using a pH meter (Fig. No 1).

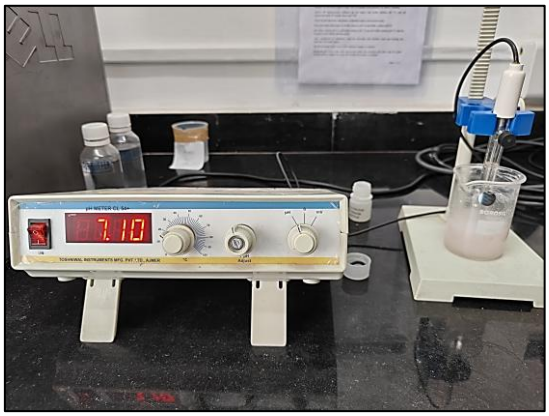

Fig. No 1: pH Test

Peel Off Test: After 15-20 minutes, peel off the dry film from the skin surface. Easy removal of peel without any complications and breaking was observed (peeling property Fig. No 2).

Fig. No 2: Peel–off Test

Folding Endurance Test: After drying, a portion of film was cut and folded it at the same place until it was broken. The folding endurance was found to be 15 (Fig. No 3).

Fig. No 3: Folding Endurance Test

Drying Time Test: The duration required for the mask to dry and form a peelable film layer on the skin was determined to be 15-20 minutes.

Wash ability: After applying, the formulation was found to be easily washable.

Spreadability Test: A total of 1gm of peel off preparation was placed between the two glass slides, and a weight of 100 grams was placed on the glass slide for 2 minutes to compress the sample to a uniform thickness and measure its diameter (Fig. No 4).

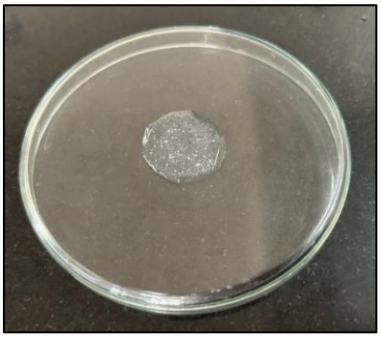

Fig. No 4: Spreadability Test

Stability: The product maintained its texture and appearance, with no significant separation or sedimentation observed after keeping it at room temperature typically 25°C for specified formulation.

Irritancy Test: The skin irritation study of formulated product did not exhibit irritant effects, swelling, itching and redness on the skin.

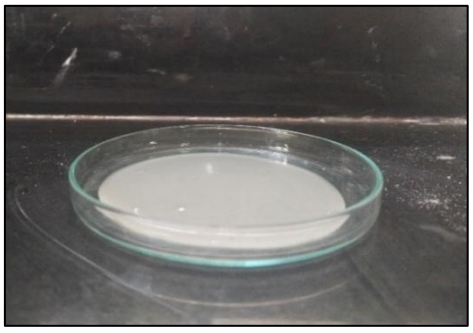

Fig. No 5: Final Product

Discussion

The present study focused on the formulation and evaluation of a blackhead and acne clarifying peel-off mask using herbal extracts with known skin benefits. Natural ingredients such as Willow Bark, Grapefruit Seed, and Blueberry Extracts were incorporated into the formulation to offer a safer and more skin-friendly alternative to conventional synthetic products. The mask demonstrated excellent peelability, spreadability, and stability at room temperature, ensuring ease of application and user comfort.

The combination of 15% w/w Polyvinyl Alcohol as a film-forming agent, along with Glycerine, Propylene Glycol, and Xanthan Gum, contributed to improved hydration, texture, and consistency. Willow Bark (2%) provided effective keratolytic action for exfoliation and acne reduction, while Grapefruit Seed and Blueberry Extracts (2% each) contributed antioxidant, anti-inflammatory, and astringent properties.

The formulation demonstrated an optimal drying time of 15–20 minutes, enabling sufficient interaction of the herbal constituents with the skin. Good washability ensured easy removal of residues without leaving an oily or sticky feel, which is especially suitable for acne-prone skin. The formulation exhibited uniform spreadability, ensuring even application and effective contact with the skin. Stability studies confirmed no significant changes in appearance or texture at room temperature, indicating good physical stability. The irritancy test showed no signs of redness, itching, or swelling, confirming the safety and skin compatibility of the herbal peel-off mask.

Overall, the formulated herbal peel-off mask proved to be a stable, gentle, and effective skincare product specifically targeted for oily and acne-prone skin. Its natural composition, combined with user-friendly attributes and therapeutic effects, positions it as a promising candidate for further development in the cosmetic and dermatological skincare segment.

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