



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Research Paper

A Multi Component Herbal Peel-Off Mask: Integrating Pomegranate Extract, Green Tea and Charcoal for Enhance Skin Health

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ARTICLE INFO

Published: 22 Aug 2026

Keywords:

Peel-off masks, cosmetic formulations, deep cleansing, exfoliation

DOI:

10.5281/zenodo.22055614

ABSTRACT

Peel-off masks are widely used cosmetic formulations for deep cleansing, exfoliation, and improving skin appearance. This study aims to formulate and evaluate a herbal peel-off mask using pomegranate extract, activated charcoal, and green tea powder as active ingredients. Activated charcoal provides adsorption and detoxifying effects, while green tea and pomegranate contribute antioxidant and antimicrobial properties. The formulation was evaluated for physical appearance, pH, drying time, spreadability, viscosity, and stability. The results indicated that the developed formulation is stable, effective, and suitable for cosmetic use. Activated charcoal is known for its adsorbing properties that remove dirt and toxins from skin pores. Green tea peel-off masks show strong antioxidant activity and stability in gel formulation. Pomegranate peel extract exhibits antibacterial activity against acne-causing bacteria.

INTRODUCTION

Skin is the outer protective layer of the body and continuously exposed to pollutants, UV radiation, and microorganisms, leading to acne, dullness, and aging. Peel-off masks are cosmetic preparations that form a film on the skin and are removed after drying. They help in removal of dead cells and impurities. Improve blood circulation and skin texture. Provide instant glow and tightening effect. Tighten skin and unclog pores. Herbal peel-

off masks are preferred because they are safe, natural, and have fewer side effects. Natural ingredients such as green tea powder, charcoal and pomegranate extract are used due to their safety and effectiveness.

OBJECTIVES

1. To formulate herbal peel-off mask.
2. To evaluate parameters.
3. To study stability.

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



MATERIALS AND METHODS

Materials

Pomegranate extract (*Punica granatum*)

Activated charcoal

Green tea powder (*Camellia sinensis*)

Other Ingredients:

Polyvinyl alcohol (PVA) – film forming agent

Glycerin – moisturizer

Xanthum gum– thickening agent

Distilled water

Preservatives (propyl paraben)

1.Aqueous Phase: PVA was hydrated in hot distilled water (80°C) until a clear gel was formed.

2.Stabilization: Xanthan gum was slurried in glycerin and added to the PVA solution to enhance rheological stability.

3.Active Incorporation: After cooling to 40°C , activated charcoal was dispersed via high-shear mixing, followed by the addition of botanical extracts and preservatives.

4.Completion: Isopropyl alcohol was added as a drying accelerator, and the pH was adjusted to 5.8 using Triethanolamine.

Methods of preparations

FORMULATION TABLE

Ingredients	Quantity	Category
Polyvinyl chloride	14g	Film former
Isopropyl Alcohol	6.4ml	Solvent/ Drying agent
Glycerin	4ml	Humectant
Propylene Glycol	2.9ml	Plasticizers
Pomegranate extract	3ml	Antioxidant and Anti-aging
Activated charcoal	2.50g	Adsorbent
Green tea powder	2g	Active / Smoothing
Xanthan Gum	1g	Thickner
Triethanolamine	1.8g	PH adjuster
Paraben (methyl/propyl paraben)	0.50g	Preservative
Distilled water	62 ml	Vehicle

ROLE OF INGREDIENTS

4.1 Activated Charcoal

Adsorbs dirt, oil, toxins

Cleans pores deeply

Used widely due to strong adsorption capacity .

4.2 Green Tea Powder

Rich in antioxidants (catechins)

Anti-aging and anti-inflammatory

Proven antioxidant activity in peel-off masks .

4.3 Pomegranate Extract



Antioxidant and anti-acne
Contains flavonoids and phenolics
Effective against Staphylococcus species.

PROCEDURE

Step 1: Preparation of the Polymer Base (Phase A)

1. Heat Distilled Water: Take the distilled water (62g) in a heat-resistant glass beaker and heat it to approximately 80°C.
2. Dissolve PVA: Slowly add the Polyvinyl Alcohol (PVA) to the hot water while stirring continuously with a glass rod or mechanical stirrer. Maintain the temperature until the PVA is completely dissolved and the solution is clear and lump-free.
3. Hydrate Xanthan Gum: In a small separate container, pre-mix the Xanthan Gum with a little Glycerin (to prevent clumping) and add it to the PVA solution. Stir until a uniform, thickened base is formed.

Step 2: Addition of Plasticizers & Humectants (Phase B)

1. Cooling: Allow the mixture to cool down to about 40°C-45°C.
2. Add Humectants: Stir in the remaining Glycerin and Propylene Glycol. These ensure the mask doesn't become too brittle and is easy to peel off.
3. Preservation: Dissolve the Methyl and Propyl Parabens into the Isopropyl Alcohol and add this mixture to the base. (The alcohol also helps the mask dry faster on the face).

Step 3: Incorporation of Actives (Phase C)

1. Add Adsorbent: Slowly add the Activated Charcoal. Stir vigorously to ensure even dispersion so there are no black streaks or lumps.
2. Add Extracts: Incorporate the Pomegranate liquid extract and the Green Tea powder (or

Honey). Ensure the powder is finely sifted before adding to prevent grittiness.

Step 4: Neutralization and Final Mixing

1. pH Adjustment: Use Triethanolamine dropwise while stirring. Check the pH using a digital pH meter or indicator strips. Aim for a pH of 5.5 to 6.5 (skin-compatible).
2. Homogenization: Continue stirring for another 10-15 minutes to ensure the **mask is completely homogeneous and smooth.**

Step 5: Packaging

1. Let the mixture stand for a few hours to allow any trapped air bubbles to escape.
2. Transfer the finished 100g product into a clean, air-tight **plastic tube or jar.**

EVALUATION TEST

1. Organoleptic Evaluation

This is the initial sensory assessment of the physical characteristics.

Color: The mask should be a uniform, deep jet-black. Streaks indicate poor dispersion of the 2.50g of Activated Charcoal.

Odor: Check for any "chemical" smell from the Isopropyl Alcohol. It should be neutral or characteristic of the Pomegranate/Green Tea extracts.

Consistency: It should be a smooth, semi-solid gel. It must be thick enough to stay on the face but fluid enough to spread easily.

2. Physicochemical Analysis

PH Determination: Use a digital pH meter. The ideal range for a facial mask is pH 5.5 to 6.5. If the pH is too low, it may irritate the skin; if too high, it may feel "slimy" and won't dry correctly.

Viscosity: This measures the "flow." If the mask is too runny, the 1.00g of Xanthan Gum may need to



be increased. If it's too thick to squeeze out of a tube, the water content is likely too low.

3. Functional (Performance) Testing

This is the most critical stage for a peel-off formulation.

Spreadability: Apply a small amount (approx. 1g) to a 5cm diameter circle on the forearm. It should spread uniformly without "rolling" or clumping.

Drying Time: Monitor how long it takes for the film to become non-tacky.

Standard: 15-20 minutes.

Issue: if it takes > 30 mins, increase the Isopropyl Alcohol or decrease the Glycerin.

Peel-ability: Once dry, the mask is peeled from the edges.

Ideal: It should come off in a single, continuous sheet.

Failure: If it breaks into small flakes, you need more Propylene Glycol (Plasticizer). If it is too sticky hurts to remove, you may need more..A or less Honey.

The formulation was subjected to several physicochemical tests:

- **Organoleptic Properties:** The mask exhibited a smooth, uniform black texture with a glossy finish and a pleasant botanical odor.
- **pH Determination:** The digital pH meter recorded a value of 5.8, ensuring compatibility with the acid mantle of human skin (pH range 4.5–6.5).
- **Drying Time:** A thin film applied to a glass slide dried completely within 18 minutes, meeting the commercial standard of 15–20 minutes.
- **Peelability:** The mask demonstrated high tensile strength, peeling away in a single, non-fragmented sheet.

4. Stability Testing

Accelerated Stability: Place a sample in a glass jar at 40°C with 75% relative humidity for 1-3 months.

Check for: Phase separation (water leaking out), mold growth (preservative failure), or "skinning" (the top layer drying out in the jar).

Centrifugation: Spin the mask at 3000 RPM for 30 minutes. If the charcoal settles at the bottom, the Xanthan Gum network isn't strong enough to suspend the particles.

RESULTS AND DISCUSSION

The formulation showed good film formation and easy peelability

No irritation observed on skin

Provided deep cleansing and smooth texture

Antioxidant and antibacterial properties improved skin condition

CONCLUSION

The developed herbal peel-off mask containing pomegranate extract, activated charcoal, and green tea powder is effective, safe, and stable. It provides multiple benefits such as deep cleansing, anti-acne activity, and skin rejuvenation. This formulation can be used as a natural cosmetic product.

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HOW TO CITE: Anjali Prasad, Mohd Khalid Qureshi, Jayesh Rathod, Komal Rathod, Krishna Sable, Saket Gabhale. A Multi Component Herbal Peel-Off Mask: Integrating Pomegranate Extract, Green Tea and Charcoal for Enhance Skin Health, *Int. J. of Pharm. Sci.*, 2026, Vol 4, Issue 8, 3637-3641, <https://doi.org/10.5281/zenodo.22055614>

