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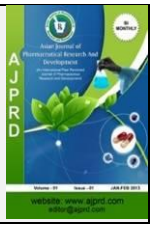

Open Access Research Article

Formulation and Evaluation of Spirulina and Charcoal Peel off Mask

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ABSTRACT

The increasing preference for natural and eco-friendly cosmetic products has led to the exploration of bioactive ingredients for skincare applications. the present study aims to formulate and evaluate a peel-off face mask incorporating spirulina and activated charcoal as key functional components. spirulina, a blue-green microalga, is rich in proteins, vitamins, and antioxidants, which contribute to skin nourishment, hydration, and protection against oxidative stress. activated charcoal is well known for its excellent adsorptive properties, enabling effective removal of dirt, toxins, and excess oil from the skin. The peel-off mask was formulated using polyvinyl alcohol as a film-forming agent, along with suitable excipients such as glycerin as a plasticizer, humectants, and preservatives to enhance stability and usability. the prepared formulation was evaluated for various physicochemical parameters including ph, viscosity, spreadability, drying time, and film-forming characteristics. stability studies and skin irritation tests were also conducted to ensure product safety and effectiveness. Herbal spirulina peel-off mask showed satisfactory evaluation tests, spreadability was 9.7, peelability 18 min, goodstability, and no skin irritation. The formulation with skin-friendly pH 5.6 provided effective cleansing, hydration, and nourishment for healthy skin.

KEY WORDS: Spirulina, Charcoal, Cosmeceuticals, Skin Cleansing, Peel off Mask

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INTRODUCTION

The skin is the largest organ of the human body and acts as a protective barrier against environmental pollutants, microorganisms, and harmful ultraviolet radiation. Continuous exposure to dust, toxins, and changing environmental conditions can lead to various skin problems such as acne, dryness, premature aging, and loss of skin vitality. as a result, maintaining healthy skin has become an important aspect of personal care. in recent years, there has been a significant shift toward the use of natural and herbal cosmetic products due to their safety, effectiveness, and minimal side effects compared to synthetic formulations.

Face masks are widely used in skincare routines for deep cleansing, detoxification, and rejuvenation of the skin. among various types, peel-off face masks have gained popularity due to their ease of application and ability to form a thin film on the skin, which can be easily removed after drying. These masks help in removing dirt, excess oil, and dead skin cells, thereby improving skin texture and appearance. they also promote blood circulation and provide a refreshing effect. [1,2]

Types of facial mask divided in to four groups:

1. Peel-Off Masks

Peel-off masks form a thin film on the skin and are removed by peeling after drying.

Composition

- Film-forming agents (Polyvinyl alcohol, gelatin)
- Humectants (glycerin)
- Active ingredients (charcoal, spirulina, aloe vera, vitamins)

Mechanism of Action

A peel-off mask works by forming a thin film over the skin after application. The film-forming agents such as polyvinyl alcohol (PVA) dry on the skin surface and trap

dirt, excess oil, dead skin cells, bacteria, and impurities. When the mask is peeled off, these unwanted particles are removed along with the dried film, resulting in deep cleansing, smoother texture, and refreshed skin. Spirulina provides antioxidant, anti-inflammatory, moisturizing, and skin-nourishing effects, while activated charcoal adsorbs toxins and excess sebum from pores. The mask also improves blood circulation, tightens pores, hydrates the skin, enhances skin elasticity, and promotes healthy, glowing, and rejuvenated skin appearance.

Advantages

- Removes dirt, dead skin cells, and excess oil.
- Helps in reducing blackheads and acne.
- Improves skin smoothness and brightness.
- Tightens pores and refreshes the skin.

Disadvantages

- May cause dryness in sensitive skin.
- Excessive use can irritate the skin.
- Painful removal in people with facial hair.
- Can cause redness or itching in allergic individuals.

Uses

- Skin brightening and cleansing
- Removes dead skin cells and impurities.
- Tightens skin pores and improves texture.
- Provides hydration and skin refreshment.

Examples

- Charcoal peel-off mask
- Spirulina peel-off mask[4]

Formulation Table and Procedure:

MATERIAL AND METHOD

Spirulina was obtained from Global Healthfit, UP; The charcoal, honey, Sandal wood oil, PVA, Glycerin & methyl Paraben were obtained from Vishal Chem ltd Mumbai

Table 1: Formulation table and procedure

Sr No.	Ingredients	Function	F1	F2	F3
1.	Spirulina	Antioxidant	2gm	2gm	1ml
2.	Charcoal	Detoxifying	3gm	2gm	2ml
3.	Honey	Soothing effect	3ml	3ml	3ml
4.	SandalwoodOil	Fragrance	0.5ml	0.3ml	0.3ml
5.	Glycerin	Hydration	4-5Drop	4-5Drop	4-5Drop
6.	PolyvinylAlcohol	Film forming	0.5gm	3gm	1gm
7.	MethylParaben	Preservative	0.2gm	0.2gm	0.5ml
8.	water	Vehicle	7ml	7ml	7ml

METHOD OF PREPARATION:

Methyl paraben and propyl paraben were dissolved in a sufficient quantity of water to prepare a preservative solution.

The film-forming agents, HPMC and PVA, were separately dissolved in water and stirred until a clear and homogeneous solution was obtained.

Spirulina powder, activated charcoal, honey, and the prepared film-forming agent solution were added gradually and mixed thoroughly to form a uniform base.

The preservative solution was then incorporated into the formulation, followed by the addition of a few drops of glycerin and sandalwood oil. The mixture was stirred continuously using an electric stirrer for 20 minutes to ensure proper mixing and uniform distribution of all ingredients.

Finally, the prepared peel-off mask formulation was transferred into a clean, airtight, and properly labeled container and stored for further evaluation studies[16].

EVALUATION TEST:

1. **Determination of pH:** The Ph of the formulation was determined usinga digital pH meter. Before usage, the pH meter was calibrated using. Standard buffer solutions at pH 4,7 and 9.[17]

2. Physicalevaluation:

Physical characteristics such as:

color, appearance,c onsistency,and texture were checked for the prepared formulation, [18]

- **Colour:**The formulation's colour was checked against a white back ground.
- **Consistency:** The consistency was determined by applying the formulation onto the skin.
- **Greasiness:** Greasiness of formulatione valuated by applying the formulation on to the skin
- **Odor:** The odour of the gel was examined by mixing the gel in water and observing the Odor.[19,20]

3. **Peel off Test:** After application, the peel off gel was uniformly spread over the hands and allowed to dry. Research wassuggest that the ideal drying period for the peel-off mask typically spans between 15 to 30 minutes [21]. Subsequently, once fully dried, the mask was effortlessly peeled off from the skin's surface without any fragmentation.

4. **Washability:** The formulations were administered onto such as checked the skin, and subsequently, washing with water were meticulously examined.Washability of prepared peel off mask was good.

5. **Irritation test:**

   This parameter was evaluated using a patch test. Any signs of skin irritation at the patch site could suggest an allergic reaction.[22,23]

6. **Spreadability:** To Evaluate spreadability, gel sample was sandwiched between two glass slides and pressed to a consistent thickness by applying a weight of - grams on the glass slide. The duration for which the upper glass slide took to separate from the lower slide, indicating spread ability.[24,25]

S= mX1/t

S-Spreadability

m-Weighttiedtoupperslide.

I-Lengthmovedonglass slide.

t-time taken.

MEAN: it is refers to the average value of observations or measurements.

Mean = Sum of all values / Number of values

7. **Stability:** The formulation was stored under different room temperature conditions for 30 days and evaluated periodically.

RESULT AND DISSCUSION:

1. Determination of pH

Table 2: pH of peel off mask

Sr. No.	F1	F2	F3
1	7.4	6	5.6

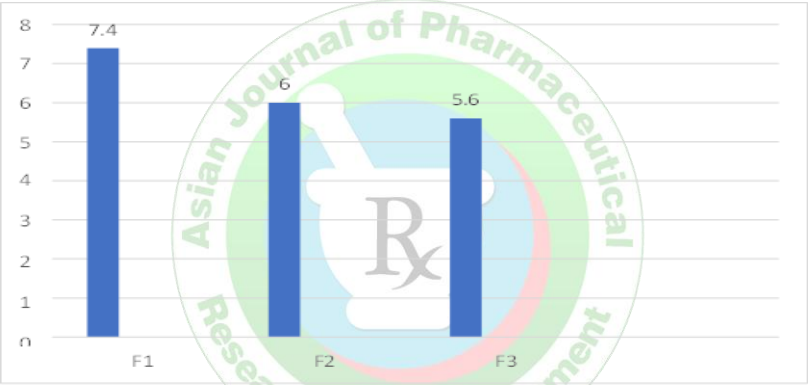

Figure 1: Graphical representation of pHVs Batches

F3 showed a pH of 5.6, indicating good compatibility with the skin and suitability for use as a peel-off mask.

2. Peel of test:

Table 5: Irritancy Test

Sr. No	F1	F2	F3
1	23 min	21 min	18 min

Employing a stopwatch, the drying duration of the peel of mask F3was found to be 18 min.

3. Physicalb evaluation:

Table 3: Physical Evaluation

Sr No.	Colour	Odour	Consistency	Washability
F1	Blackish-green	pleasant	Semi-Solid	Good
F2	Blackish-green	Pleasant	Semi-Solid	Good
F3	Blackish-green	pleasant	Semi-Solid	Good

F3 formulation showed a blackish-green color, pleasant odor, semi-solid consistency, and good washability, indicating acceptable physical characteristics of the peel-off mask.

4. Washability:

Table.4: Washability test

Sr. No.	Parameter	F1	F2	F3
1.	washability	washable	washable	Easilywashable

F3 formulation was easily washable with water, indicating good user convenience and easy removal.

5. Irritation test:

Table.5: Irritation test

Sr. No.	Parameter	F1	F2	F3
1.	Irritation	irritation	No irritation	No irritation
2.	Redness	Redness	No Redness	No Redness
3.	Swelling	swelling	swelling	No swelling

F3 showed no irritation, redness, or swelling, indicating excellent skin compatibility.

6. Spreadability test:

Table 6: Spreadability test

Sr. No.	Parameter	F1	F2
1.	Spread ability	8.1	7.6

Mean = 8.1+7.6+9.7/ 3 = 8.4

F3 exhibited the highest spreadability value (9.7 cm), indicating easy and uniform application on the skin.

7. Stability Test:

Table 7: Stability test

Sr.No.	F1	F2	F3
1	Slight change in colour	Stable	Highly Stable

No significant changes in F3 colour, odour, pH or consistency were observed during the stability study period.

CONCLUSION:

Using herbal ingredients, it is possible to create cosmetics that are safer and less harmful than synthetic formulations. The study on peel off masks includes natural ingredients such as Spirulina, Charcoal, Honey, Turmeric, Sandalwood oil.

On human skin, the peel-off masks demonstrated good peel-off qualities without causing any irritation or itching. The combination of these natural ingredients exhibits Anti-Acne, Anti- inflammatory, and Anti -Bacterial properties, which may contribute to clearer, healthier skin.

On the effectiveness of a peel-off mask containing Spirulina, Charcoal, Turmeric, would depend on numerous factors such as individual skin type, sensitivity, and specific skincare concerns. However, thes eingredientsare known for their potential benefits in skin care.A peel-offmask combining these ingredients could potentially offer reduce acne, brightening effects.

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