



## Formulation and evaluation of polyherbal scrub gel with antioxidant and anti-aging activity

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ARTICLE DETAILS	ABSTRACT
<p><i>Article history:</i> Received on 15 August 2022 Modified on 25 October 2022 Accepted on 28 October 2022</p> <hr/> <p><i>Keywords:</i> Coffee Arabica, Orange peel, Scrub gel, Anti-oxidant, Anti-aging.</p>	<p>Making an herbal scrub gel was the primary goal of the study. Natural compounds with anti-inflammatory, antibacterial, and antioxidant qualities are typically found in herbal cosmeceuticals. Coffee powder, orange peel powder, honey, and gram flour are utilized as active ingredients in this preparation and added to the gel made with various grades of carbapol. Numerous criteria, including physical appearance, viscosity, pH, spreadability, irritation, and washability, were used to assess the manufactured gel. Good spreadability, homogeneity, appearance, pH, and ease of removal were all demonstrated by the formulation. During irritancy tests, the formulation exhibits no signs of redness, edema, inflammation, or irritation. This formulation met all necessary characterisation requirements and was deemed to be safe for cutaneous application. This composition can therefore be used as an effective face scrub to maintain skin that is healthy and glowing.</p>

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### INTRODUCTION

Pharmaceutical products along with bioactive substances are combined to create herbal cosmetics. Numerous botanicals and phytochemicals included in herbal goods serve two purposes: first, they are utilized as body care cosmetics; second, the phytochemicals enhance the body's biological processes, which naturally leads to healthy skin. As the realization stated, chemical medications may have adverse effects and do not always function as panaceas. Herbalism and the usage of natural goods are now popular trends. The most abundant source of herbs used in the cosmetics industry is found in India. In the global market, herbal cosmetics were becoming increasingly popular. To achieve the goal of beautifying, a variety of herbal cosmetic items are utilized as part of a beauty regimen. Scrubber is designed to keep the skin healthy and looking nice. The skin's surface needs to be cleaned frequently to get rid of dead cells, crusts, makeup, and other secretions like smile and sebus [1,2].

A gel is a system of at least two solid or semisolid components made up of a liquid interpenetrated

by a condensed mass. Gels and jellies have more of a solid than a liquid nature, while being made up of a tiny number of solids mixed with a vast volume of liquid. Gel and jelly are distinguished by the existence of dermal structure, which gives them solid-like qualities.

### The Perfect Scrub Properties

- It ought to be nontoxic.
- There should be tiny grits in it.
- It ought to be slightly abrasive.
- It should be non-sticky and non-irritating.
- It must be capable of eliminating dead skin cells.

Additionally, coffee beans and other natural components can be used as cosmetic elements in skincare products because coffee contains a lot of antioxidants. Coffee grinds are perfect for exfoliating dead skin cells because of their strong aroma and rough surface [3].

Compared to alternative formulations for topical application, gel-based facial scrubs have

numerous advantages. The semisolid dosage forms used for topical administration are called gels. Among all the semi-solid dose forms, they are the most common. Gel is a network of a solvent and gelling agent mixture. The solvent equally embeds the medication molecules. Gels can be broadly classified into two varieties based on the solvent type: hydrogels and organogels. Gels are made up of two interpenetrating systems in which the gelator—a colloidal particle—is evenly dispersed throughout a solvent or dispersion media to produce a three-dimensional matrix [4].

The gels are made by mixing an organic, inorganic, or aqueous solvent or solvent systems with a gelling agent (gelator), which can be a natural, synthetic, or semi-synthetic polymer or tiny molecules with a low molecular weight. In gels, the polymer serves as the gel matrix's structural core. Gel's structural strength, enhanced adhesion to the surface where it is applied, and reduced penetration of bigger molecules—all of which enable retention—are attributed to the polymeric meshwork. Solvent penetration causes swelling during gel formation, which entangles the drug particles in the polymer network and causes it to stretch and maintain its shape. Viscosity is a crucial factor in gel preparation [5].

The primary body part that reveals a person's health is their face skin. Three categories of skin exist: dry skin, oily skin, and sensitive skin. Regular use of scrubs makes skin smoother and more radiant by eliminating dead skin cells and revealing new skin cells. One of the main components of face scrub formulation is a mild abrasive agent. Scrubs can be applied to the skin directly or with a little cosmetic pad. It is advised to apply the scrub gel gently since it promotes blood circulation and increases the amount of oxygen reaching the skin's surface [6]. Body scrub also contains preservative and emulgator in addition to the scrubbing agent. Body scrubs frequently employ triethanolamine (TEA) as an emulgator. TEA is a chemical that is frequently used to produce emulsions in topical or cosmetic products [7].

#### Advantages of Skin Scrubbing

- People who scrub their skin get clean skin devoid of perspiration, oil, and filth. All of the dust that has accumulated in the pores of the skin cannot be removed by cleansing milk,

face wash, or facial cleansers. To do this, scrubbing is used.

- Removes flakes from the skin: Irritated skin leads to dry patches. Over time, it permits dead cells to accumulate. Scrubbing the face might help you effectively manage inflamed skin.
- Eliminating dead cells is crucial since they provide the appearance of pale, aged skin. Take them off with a gentle scrape.
- A healthy glow can be achieved by exfoliating the skin.
- Eliminates dark areas: For optimal effects, use the scrub twice a week. It is especially effective on knees, elbows, and knuckles.
- Eliminate acne scars: Exfoliation can help remove scars from acne [8,9].

## MATERIALS AND METHODS

### Materials

Coffee Powder and honey were procured from local market. Orange peel powder was prepared by grinding the air dried orange peel. Gram flour was made by grinding Gram seeds (chana daal). Carbapol 934, triethanolamine, methyl paraben and sodium lauryl sulphate were obtained from Loba Chemicals, Mumbai. All other solvents used were of analytical grade.

### Preparation of scrub gel

Weigh carbapol and let it soak in water for at least four hours. All of the herbal ingredients, including coffee powder, orange peel powder, and Gram flour, were precisely weighed. These powders were sieved through sieve number 120 and added to the carbapol gel. Accurately weighed honey, sodium lauryl sulfate and methyl paraben were also added. To neutralize the pH, dropwise triethanolamine was added to the gel (Table 1).

**Table 1:** Formulation of polyherbal scrub gel

Sr. No.	Ingredients	Quantity
1	Coffee powder	1gm
2	Orange peel powder	3gm
3	Honey	3gm
4	Gram flour (Besan)	3gm
5	Carbapol 934	2gm
6	Triethanolamine	0.1ml
7	Methyl parabean	0.1ml
8	Sodium lauryl sulphate	4gm
9	Distilled water	qs

## Evaluation of polyherbal scrub gel

### Appearance

The prepared scrub gel was evaluated for its color and clarity [10].

### pH

The pH of the scrub gel was measured using a pH testing strip. Small amount of the gel was applied onto a clean glass surface. pH strip was dipped into the gel for a few seconds and then compare the color of the strip with the provided pH scale [11,12].

### Consistency

The texture was observed by dispensing a small amount of the scrub. Using fingers gently rubbed it between hands or on wrist to check the thickness or fluidity of the gel.

### Spreadability

Two slides are taken and small amount of the gel was placed on the glass slide and another glass slide was placed on the gel. A wooden weight was placed on it. The time required for the gel to spread and the area was measured. The amount and the area of gel on the glass slide represent the efficiency of spreadability.

$$S = \frac{m \times l}{t}$$

Where:

M = Weight attached to higher slide

S = Spreadability in g.cm / sec

l = glass slides length

t = time in seconds

### Extrudability

Standard capped collapsible aluminum tubes were filled with the gel compositions, and the ends were crimped shut. The tubes' weights were noted down. The tubes were clamped after being positioned between two glass slides. After covering the slides with 500 g, the cap was taken off. Weighing was done on the quantity of extruded gel. The extruded gel percentage was computed.

### Viscosity

The gel's consistency was assessed using a viscometer made by Brookfield. At 37°C, spindle number S64 was run for 10 seconds at 12rpm [13-15].

### Irritability

A patch test was performed by applying a small amount of the scrub gel to a discreet area of skin

(inner wrist). After 24 hours, observe for any adverse reactions (redness, itching, stinging, or swelling) [16].

### Washability

After massaging the scrub gel into the skin, rinse with lukewarm water. Check if the gel rinses off easily without leaving any residue behind.

### Foamability

Small amount of the scrub gel was applied to dampened hand or wet skin. Rubbed the gel between hands or directly onto skin and observe if it produces any foam or lather.

## RESULTS AND DISCUSSION

### Appearance

The gel was clear and lightly tinted, with uniform exfoliating particles that are visually pleasing and consistent.

### pH

The pH of the scrub gel was found to be 5.5, which is compatible with the skin's natural acidity. The pH suggests it is well-formulated for most skin types, balancing exfoliation with skin protection. It indicates a product designed to be mild and effective without disrupting the skin's natural pH balance.

### Consistency

The consistency was gel-like—not too thick or viscous but with a smooth and spreadable texture. It feels stable and not run or drips excessively.

### Spreadability

It was discovered that the prepared scrub gel had a spreadability of 17.02 g.cm/sec. This suggests that when the gel is put to skin, it can spread out with ease. It suggests that the scrub gel is moderately spreadable, providing a smooth and even application with minimal effort. This spreadability value indicates a well-balanced formulation in terms of viscosity, allowing the scrub gel to be easily applied to the skin without excess resistance or product wastage.

### Extrudability

During application and patient acceptance, the gel's ejection from the tube is crucial. Extrudability of gel formulation was found to be good. The product extruded easily with moderate pressure, allowing controlling the amount dispensed without over-squeezing or excessive mess.

### **Viscosity**

The viscosity of the gel is used to measure its thickness or flow resistance. The proper viscosity is essential for stability and application ease in a scrub gel. It was found that the scrub gel's viscosity was 4136 cps.

### **Irritability**

The scrub gel does not cause any irritation, redness, or discomfort on the skin. This characteristic is particularly beneficial for individuals with sensitive skin or those prone to skin reactions, as it suggests that the product can be used regularly without causing harm or discomfort. The scrub gel's ability to exfoliate without irritation also points to a well-balanced formulation that uses mild exfoliating agents, non-irritating ingredients, and soothing additives.

### **Washability**

The scrub gel was washing off easily, leaving no gritty particles or residue. The skin feels refreshed, clean, and not stripped or dry. It enhances user convenience by reducing the time and effort needed for removal, ensures the skin is left clean and smooth without irritation, and supports a comfortable post-use experience. Additionally, the scrub's ability to rinse off completely suggests that it is well-formulated with gentle exfoliating agents and effective emulsifiers.

### **Foamability**

The scrub produces mild foam without excess lather, which can help even spreadability. It ensures that the product is gentle, effective, and pleasant to use, providing an even and consistent application without overwhelming the skin with unnecessary foam. This balance between cleaning, exfoliating, and moisturizing makes the scrub more user-friendly, especially for those with sensitive skin, and improves overall performance. Moreover, the mild foam enhances the product's aesthetics and aligns with modern skincare preferences, where consumers seek effective, gentle, and environmentally conscious formulations.

### **CONCLUSION**

The polyherbal scrub gel demonstrates promising potential as a skincare product. By combining multiple herbal ingredients known for their beneficial properties, the scrub gel effectively harnesses the power of natural antioxidants to help combat oxidative stress,

which is a major contributor to skin aging. The anti-aging property is supported by the gel's ability to exfoliate, promote skin renewal, and enhance skin texture through regular use. The polyherbal composition likely contributes to a synergistic effect, where the combined benefits of the herbs work together to improve skin appearance, reduce fine lines, and increase overall skin radiance.

### **REFERENCES**

- [1] Jamdar MJ, Shaikh RH. Preparation and evaluation of herbal gel formulation. *Journal of Pharmaceutical Research and Education*. 2017; 203-204.
- [2] Nemade CT, Baste N. Formulation and Evaluation of a Herbal Facial Scrub" *World Journal of Pharmaceutical Research*. 2014;3:4367-4371.
- [3] Parashar B, Sharma P, Kabra A, Sharma P. Formulation and evaluation of polyherbal face cream. *International Pharmaceutical Scientia*. 2013; 3(3).
- [4] Prathyusha J, Yamani NS, Santhosh G, Aravind A, Naresh B. Formulation and evaluation of polyherbal face scrubber for oily skin in gel form. *International Journal of Pharmaceutical Sciences and Drug Research*. 2019; 11(4): 126-128.
- [5] Londhe SS, Bhosale MG, Joshi AA, Sapkale G. Formulation and evaluation of polyherbal facial scrub. *International Journal for Scientific Research & Development*. 2020; 7(11): 2321-0613.
- [6] Aglawe SB, Gayke AU, Khurde A, Mehta D, Mohare T, Pangavane A, Kandalkar S. Preparation and evaluation of polyherbal facial scrub. *Journal of Drug Delivery & Therapeutics*. 2019; 9 (2):61-63.
- [7] Ervina A, Santoso J, Prasetyo BF, Setyaningsih I, Tarman K. Formulation and characterization of body scrub using marine alga halimeda macroloba, chitosan and konjac flour. *IOP Conference Series: Earth and Environmental Science*. 2020;414: 012004.
- [8] Ghadage PK, Mahamuni SS, Kachare DS, Kachare MD: Formulation and evaluation of herbal scrub using tamarind peel. *Research Journal of Topical and Cosmetic Sciences*. 2021 May 17;12(1):39-42
- [9] Delgado-Arias S, Zapata-Valencia S, Cano-Agudelo Y, Osorio Arias J, Vega-Castro O: Evaluation of the antioxidant and physical properties of an exfoliating cream developed from coffee grounds. *Journal of*

- Food Process Engineering. 2020 May; 43(5):e13067.
- [10] Mulla JAS, Chalke PM, Londhe SP, Patil MA, Nalawade SN, Sawant RR. Design and Optimization of Nanosponges of Poorly Soluble Voriconazole Using Central Composite Design. Indian Journal of Novel Drug Delivery 2023; 15(4): 189-199.
- [11] Mabrouk M, Mulla JA, Kumar P, Chejara DR, Badhe RV, Choonara YE, du Toit LC, Pillay V. Intestinal targeting of ganciclovir release employing a novel HEC-PAA blended lyomatrix. AAPS PharmSciTech. 2016 Oct; 17(5):1120-30.
- [12] Chakorkar SS, Mulla JAS. A novel corticosteroid cubosomes – for ocular drug delivery. Indo American Journal of Pharmaceutical Research, 2020; 10(6): 775-784
- [13] Mulla JAS, Karande BS. Microemulsion Based Hydrogel Formulation for Topical Drug Delivery - A Concise Review. Indian Journal of Novel Drug Delivery. 2021;13(2): 63-69
- [14] Mulla JAS, Shetty NS, Panchamukhi SI, Khazi IAM. Formulation, characterization and in vitro evaluation of novel thienopyrimidines and triazolothienopyrimidines loaded solid lipid nanoparticles. International Journal of Research in Ayurveda & Pharmacy. 2010;1(1):192-200.
- [15] Chejara DR, Mabrouk M, Badhe RV, Mulla JA, Kumar P, Choonara YE, du Toit LC, Pillay V. A bio-injectable algin-aminocaproic acid thixogel with tri-stimuli responsiveness. Carbohydrate polymers. 2016 Jan 1;135:324-33.
- [16] Jadhav VU, Jamakandi VG, Mulla JA, Borkar SN, Karpe P, Suresh R, Dama GY, Sanap GS, Chatap VK. Reservoir Type Nicorandil Transdermal Delivery System By Using Permeation Enhancers. Indian Drugs 2009; 46(9): 23-31.