

RESEARCH ARTICLE

Formulation and Evaluation of Herbal Face Scrub containing *Coffea arabica* Linn, *Myristica fragrans*, and *Lens culinaris* as an Antioxidant and Antiseptic Activity

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Received: 03rd June, 2022; Revised: 23rd August, 2022; Accepted: 08th September, 2022; Available Online: 25th September, 2022

ABSTRACT

The research aimed to produce an herbal facial scrub. The majority of times, the skin on the face is in regular contact with dirt, pollution, and other contaminants. The scrub comprises various natural components that are safe to use, have fewer adverse effects, and have antibacterial, anti-infective, antioxidant, anti-aging, and moisturizing characteristics. The primary ingredient in this scrub is coffee. Coffee contains a lot of antioxidant properties. In addition, coffee grounds have a different aroma and a coarse grain and can be used to remove dirt skin cells that have died. The scrub was made with a simple mixing procedure and a variety of materials, including coffee beans, nutmeg, masoor dal, corn starch, and coconut oil mixed in melted beeswax. Other ingredients such as glycerine, light liquid paraffin, stearic acid, tween 80, and a perfuming agent was added to this formulation with effective results.

Keywords: Coffee Arabica, Exfoliant, Facial scrub, Herbal cosmetic, Red lentil, Skin.

International Journal of Drug Delivery Technology (2022); DOI: 10.25258/ijddt.12.3.43

How to cite this article: Dave P, Patel G, Patel D, Patel B, Patel D, Chakraborty G S, Jani R. Formulation and Evaluation Herbal Face Scrub containing *Coffea arabica* Linn, *Myristica fragrans*, And *Lens culinaris* as an Antioxidant and Antiseptic Activity. International Journal of Drug Delivery Technology. 2022;12(3):1183-1186.

Source of support: Nil.

Conflict of interest: None

INTRODUCTION

By eliminating superficial dead cells and encouraging the development of cells in the sub-epidermal layer, herbal exfoliating scrub reduces age-related changes and neutralizes the environment's damage.¹ Cleaning the surface technically with a scrub or utilizing herbal products containing anti-aging, vitamins, antioxidants and antiseptics characteristics that assist help depth to cleanse the skin and make it shine and appealing remove these dead skin cells.² Facial scrub was simple to use: choose one regular scrub suitable for skin, rub it in for one minute on moisturized skin, and then wash it off.³ The scrub is appropriate for all skin types. Only such essential oil utilized as a scrub ingredient will differ based on the skin type. Sensitive, oily, and dry skin are three different types of skin.⁴ On use of the scrub gel, a gentle massage is indicated to stimulate blood circulation and oxygenation of all skin areas.⁵

Ideal Properties of Scrub

It must be non-toxic, include small rough granules, and be slightly rough, non-irritating, non-sticky, and capable of removing dead skin cells.⁶

Additionally, because coffee has a lot of antioxidants, additional natural components such as coffee beans can be employed as cosmetic ingredients in skincare.⁷ Coffee grounds have a strong scent and a rough surface, making them ideal for exfoliating dead skin cells.⁸

Benefits of Scrubbing Skin

- Scrubbing provides people with clean skin free of grime, oil, and sweat. Cleansing milk, face wash, and facial cleansers are incapable of removing all of the dust accumulated in the skin's pores. This is completed through scrubbing.
- Frees Skin from Flakes: Dry spots are caused by irritated skin. It allows for the accumulation of dead cells over time. Scrubbing the face can assist in dealing with irritated skin efficiently.
- Dead cells make skin look pale and old, so it is essential to get rid of them. Using a mild scrub, remove them.
- Exfoliation can give skin a healthy glow.
- Removes Dark Patches: Use the scrub twice a week for best results. It works particularly well on knuckles, elbows, and knees.
- Get Removal of Acne Scars: Exfoliation can assist get rid of acne scars.^{9,10}

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Table 1: List of ingredients

S. no.	Ingredient name	Use
1.	Coffee	Antioxidants stimulate blood flow, removing dead cells and removing dirt, making skin smoother and brighter.
2.	Nutmeg	Acne and spots should be treated. Smoothens and softens the skin promote fairness and prevent rashes, burns, and infections.
3.	Masoor dal	Antioxidants remove dead cells and remove pollutants from the skin, making it smoother, cleaner, and more effective at treating blackheads and acne.
4.	Corn starch	Helps to remove impurities is also used in skin irritation and inflammation, a benefit for acne skin.
5.	Coconut oil	Reduce inflammation, soother and heal the skin, benefit for irritated skin, and use as antibacterial and antifungal.
6.	Beeswax	Use as a natural exfoliator, anti-inflammatory properties, a rich source of vitamins A and E. also used as Natural skin healing agent.

Table 2: Composition of herbal scrub

S. no.	Ingredient name	Scientific name	Quantity
1.	Coffee	<i>Coffea Arabica</i>	4.5 gm
2.	Nutmeg	<i>Myristica fragrans</i>	1 gm
3.	Corn starch	<i>Foeniculum vulgare</i>	3 gm
4.	Masoor dal	<i>Lens culinaris</i>	2 gm
5.	Beeswax	<i>Cera alba</i>	7 gm
6.	Coconut oil	<i>Cocos nucifera</i>	2.5 mL

Table 3: Organoleptic characteristics

Sr. no.	Parameter	Result
1.	Colour	Brown
2.	Odor	lush
3.	Texture	Good
4.	Smoothness	Good
5.	Consistency	Good

MATERIALS AND METHODS

The following herbal components were used to scrub: coffee, coconut oil, corn starch, nutmeg, and masoor dal.

Coffee

Coffee has relaxing properties as well as anti-aging properties. Additionally, it protects against reducing inflammation and treating acne and dark circles when the sun has gone down.^{11,12}

Nutmeg

Nutmeg is well-known for its anti-inflammatory, antiseptic, and antibacterial properties. In addition, it improves the reduction of wrinkles, dark circles, and other aging indicators. It also improves the reduction and disappearance of acne scars.¹³

Masoor Dal (Red lentil)

Masoor dal exfoliates dead skin cells, giving a healthy glow. After regular usage, the lentil performs as an excellent cleaner, removing blackheads and skin patches. Promotes the skin's tone and moisturizes its scars of lightning and dark patches.¹⁴

Corn Starch

Corn starch is used to lighten dark patches on the face and contains iron and calcium, essential for skin cell renewal.¹⁵

Coconut Oil

Coconut can also help get that natural glow by healing skin from the inside out, keeping it smooth.¹⁶

Stearic acid, beeswax, tween-80, glycerine, light liquid paraffin, and cetyl alcohol are the other compounds utilized.

Method of Preparation for a Facial Scrub

Beeswax was used as the base ingredient, with stearic acid, glycerin, light liquid paraffin, cetyl alcohol, and tween 80 added as additives.

The facial scrub was made by melting beeswax in a water bath at 70°C and mixing it while the other components were homogeneous every mixture was prepared by heating coconut oil and distilled water to 70°C, then mixing until a white cream base was formed. After adding the coffee grounds, nutmeg, and corn starch, a homogenizer was used to combine the mixture for around 5 minutes until a body scrub was formed.¹⁷

Characteristic is of Facial Scrub

pH, physical appearance, color, odor, texture, irritability, viscosity, Spreadability and Washability, were evaluated as evaluation parameters for Facial Scrub- Formulation.¹⁸⁻²²

Organoleptic Characteristics

- Colors: The formulation's colors was carefully assessed and observed.
- Odour: The fragrance of the product was tested when it was spread on the palm and smelling the perfume.
- Consistency: The consistency of the formulation and particles were used to evaluate the texture and homogeneity of the preparation on the skin, such as grittiness, greasiness and stiffness effect. Nature provided a semi-solid preparation.

Texture and Homogeneity

To see the uniform, a less amount of the prepared scrub was rubbed between the thumb and index finger.

Washability

The test was performed on the skin, with the mixture being used on the skin and then washed with pure water.

pH

A pH of a 1% aqueous formulation solution was measured with a pH paper.

Spreadability

The spreadability of the formulations was evaluated by placing 1 g of material between two horizontal glass plates (10 cm, 20 cm) and measuring the spreading diameter. A standard weight of 20 gm was put on the upper glass plate. Visual inspection was used to check the spreading quality.

Skin Irritation

A less amount of the mixture was placed on the dorsal area of the hand and left for a sometimes before being discovered.

ABTS Assay²³

With few changes, the ABTS method 2, 20 -azino-bis-(3-ethyl-benzothiazoline-6-sulfonic acid) was created using the methods described by Contreras-Calderón *et al.* (2016). A hundred microliter of the extract was diluted in 4,900 liters of distilled water. An aliquot of 100 liters was taken from each of the dilutions, to which 1,000 liters of the ABTS radical was added. Then it was placed in a Maria bath (HB 10 CS1, IKA Staufen, Germany) at 30°C for 30 minutes. Finally, a spectrophotometer was used to measure the absorbance within each sample at a wavelength of 730 nm.

Antimicrobial Evaluation^{24,25}

The Pharmaceutical Biotechnology lab examined the formulation for antibacterial activity against test organisms such as *Staphylococcus aureus* and *Propionibacterium acnes*. In this procedure, 100 micro litre standardised bacterial suspension was planted on nutritional agar plates and reinforced clostridial agar (RCA). 200 mg of the formulation was combined with distilled water and placed into the wells once the dosage was optimised. The diameter of Zones of Inhibition (mm), including cupsize, was measured under standard circumstances to assess antibacterial activity. Three times the trials were carried out.

Determination of Microbial Load

The prepared face pack formulation was evaluated for the total viable count of gram-negative pathogens such as *Escherichia coli* and *Pseudomonas* at the Microbiology lab, Parul Institute of Pharmacy and Research.

RESULTS AND DISCUSSION

Organoleptic Characteristics

1 Colour

The color of the formulation was visually tested and found to be brown.

2 Odour

The odour of the mixture was tested by spreading the solution on the hand and smelling it.

Consistency

The consistency of the formulation and particles were used to evaluate the texture and homogeneity of the preparation on the skin, such as grittiness, greasiness and stiffness effect. Nature provided a semi-solid preparation.²⁶

Table 4: Washability

S. no.	Parameter	Result
1.	Washability	Easily washable

Table 5: PH parameterz

S.no.	Parameter	Result
1.	pH	6.5

Table 6: Spreadability parameter

S. no.	Parameter	Result
1.	Spreadability	Easily spread

Table 7: Skin irritation parameter

S. no.	Parameter	Result
1.	Irritation	No
2.	Redness	No
3.	Swelling	No

Homogeneity and Texture

To see the uniform, a less amount of the prepared scrub was rubbed between the thumb and index finger.

Washability

This evaluation was done directly on the skin, with the preparation being applied to the skin and then washed away with plain water and now skin is free from impurities.

pH

A pH paper was used to determine the pH of a 1% aqueous formulation solution, and the result was 6.5.

Spreadability

The spreadability of the formulations was evaluated by placing 1 g of material between two parallel glass plates (10 cm, 20 cm) and measuring the spreading diameter. A standard weight of 20 gm was placed on the upper glass plate. Visual examination was used to check the spreading quality.

Skin Irritation

A less amount of the mixture was applied to the dorsal area of the hand for some times and found to be edema, non-irritating, with no redness or other adverse effects.

ABTS Assay

According to a prior study, the Arabica coffee plant includes flavonoid chemicals that act as antioxidants. Free radicals are neutralized/stabilized by the oxidation-reduction (redox) characteristics of phenolic substances, such as flavonoids and phenolic acids. Green coffee beans are high in polyphenolic antioxidants such chlorogenic, caffeic, ferulic, and n-coumarinic acids, among others. Cream or emulsion Arabica green coffee beans, which have antioxidant activity, could be used to counteract UV-induced and physiological aging.

Table 8: Antimicrobial evaluation

S. no	Bacteria	Observation
1	<i>E. coli</i>	07
2	<i>P. aureginosa</i>	07

Table 9: Determination of microbialload

S. no.	Test	Observation
1	Total viable count (CFU/g)	917
2	Gram negative pathogens (CFU/g); <i>E. coli</i> , <i>Pseudomonas</i>	Absent

Antimicrobial evaluation determination of microbial load are detailed in Tables 8 and 9.

CONCLUSION

The above results suggest that the new scrub formulation is safe to use, and the coffee powder used to get good effects as a scrubbing agent. The majority of the substances are natural, and there are low chances of adverse effects. It is suitable for all skin types, including dry, oily, and normal. It produces better results and leaves the skin looking radiant and bright. A less amount of the mixture was applied to the dorsal area of the hand for some times and found to be edoema, non-irritating, with no redness or other adverse effects.

REFERENCES

- Packianathan N, Kandasamy R: Skin care with herbal exfoliants. *Functional Plant Science and Biotechnology* 2011;5(1):94-7.
- Mahajan S, Gayakwad D, Tiwari A, Darwhekar GN: Formulation and Evaluation of Herbo-Mineral Facial Scrub. *Journal of Drug Delivery and Therapeutics* 2020 May 15;10(3):195-7.
- Shivanand P, Nilam M, Viral D: Herbs play an important role in the field of cosmetics. *International Journal of PharmTech Research* 2010;2(1):632-9.
- Garg A, Aggarwal D, Garg S, Singla AK: Spreading of semisolid formulations: an update. *Pharmaceutical Technology North America*. 2002;26(9):84-105.
- Harish NM, Prabhu P, Charyulu RN, Gulzar MA, Subrahmanyam EV: Formulation and evaluation of in situ gels containing clotrimazole for oral candidiasis. *Indian Journal of Pharmaceutical Sciences*. 2009 Jul;71(4):421-427.
- Upadhyay G, Verma S, Parvez N, Sharma PK: Recent trends in transdermal drug delivery system-a review. *Advances in biological research*. 2014;3:131-380.
- nur Hertina T, Dwiyantri S: Pemanfaatan ampas kedelai putih dan ampas kopi dengan perbandingan berbeda dalam pembuatan lulur tradisional untuk perawatan tubuh. *Jurnal Tata Rias*. 2013 Oct 1;2(3)70-77.
- Dewi D. Sehat dengan secangkir Kopi: Surabaya: Stomata. 2012.
- 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.
- 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.
- de Carvalho Neto DP, Gonot-Schoupinsky XP, Gonot-Schoupinsky FN: Coffee as a Naturally Beneficial and Sustainable Ingredient in Personal Care Products: A Systematic Scoping Review of the Evidence.
- Aldin K. The impact of social media on consumers' health behavior towards choosing herbal cosmetics. *Journal of Critical Reviews*. 2020;7(9).
- Farheen B, Mohammed I: Design and development of unani face pack for skin care. *European J Pharm Med Red*. 2016;3(2):627-632.
- Prathyusha J, Yamani NS, Santhosh G, Aravind A, Naresh B: Formulation and Evaluation of Polyherbal Face Scrubber for Oily Skin in Gel Form.
- Nurlaela L, Romadhoni IF: Pre-course reading activities: efforts to increase interest in reading of students of home economics education.
- Zhang JT, Huang SW, Zhuo RX. Preparation and characterization of novel temperature sensitive poly (N-isopropylacrylamide-co-acryloyl beta-cyclodextrin) hydrogels with fast shrinking kinetics. *Macromolecular Chemistry and Physics*. 2004 Jan;205(1):107-13.
- 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 and Therapeutics*. 2019 Mar 15;9(2):61-3.
- Guy RH: Current status and future prospects of transdermal drug delivery. *Pharmaceutical research*. 1996 Dec;13(12):1765-1769.
- Jain A, Deveda P, Vyas N, Chauhan J, Khambete H, Jain S: Development of antifungal emulsion based gel for topical fungal infection (s). *IJPRD*. 2011;2(12):18-22.
- Bhanu PV, Shanmugam V, Lakshmi PK: Development and optimization of novel diclofenac emulgel for topical drug delivery. *Int J Comp Pharm*. 2011;2(9):1-4.
- Dureja H, Kaushik D, Gupta M, Kumar V, Lather V. Cosmeceuticals: An emerging concept. *Indian Journal of Pharmacology*. 2005 May 1;37(3):155.
- Vatsa E, Aggarwal M, Gautam S. Formulation and Evaluation of Polyherbal Facial Scrub.
- Ghode DS, Chatur VM, Ghode DP, Shaha N, Prajapati S, Thorave A: Formulation And Evaluation Of Facial Scrub Containing Sunflower Seeds And Other Natural Ingredients. *World Journal of Pharmaceutical Research*. 2019 Jun 20;8(9):1772-81.
- 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.
- Himaja N. Ashok kumar A, Bhart kumar B: Preparation and Evaluation of Poly Herbal Fruit Face Mask. *J Res Pharm Sci*. 2015;2(11):07-13.
- Valgas C, Souza SM, Smânia EF, Smânia Jr A: Screening methods to determine antibacterial activity of natural products. *Brazilian journal of microbiology*. 2007 Jun;38(2):369-80.