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Formulation and Evaluation of Herbal Face Scrub that Exfoliates Skin with Coffee

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ABSTRACT
The skin is the outermost organ in the body and is immediately exposed to pro-oxidants such chemicals, UV radiation, and air pollution on a daily basis. Recent years have seen a rise in the popularity of herbal face scrubs because they are inexpensive and can enhance skin health. Exfoliation is the process of eliminating the dead, old skin cells from the skin's outermost layer. It increases the skin's ability to absorb and hold onto moisturizing ingredients while restoring its natural moisture content. The current study's objective is to create and assess a herbal face scrub that uses exfoliating compounds. Natural elements found in these scrubs, like turmeric, neem powder, coffee powder, and sandalwood powder, exfoliate, brighten, and guard against free radical damage. Glycerine and tea tree oil are used to moisturize and nourish the skin. The scrub that has been prepared includes. a number of natural substances with antibacterial, antioxidant, and anti-inflammatory qualities that are safer to use and have fewer negative effects.

KEYWORDS: Exfoliation, Face Scrub, Coffee powder, Herbal skincare, Formulation, Evaluation.

1. INTRODUCTION

Herbal exfoliating scrubs counteract the effects of the environment and lessen age-related changes by removing dead cells from the skin's surface and promoting the growth of cells in the layer beneath the epidermis. In order to thoroughly clean the skin and give it a glossy, appealing appearance, it is recommended to use a scrub or herbal products that include anti-aging, vitamins, antioxidants, and antibacterial properties.[2] Using a facial scrub was easy: just chose a standard scrub that was appropriate for your skin type, massage it in for a minute on hydrated skin, and then rinse it off.[3] Any type of skin can use the scrub. The only essential oil that will vary depending on the skin type is the one used as a scrub ingredient. Three varieties of skin exist: dry, oily, and sensitive.[4] After using the scrub gel, all skin areas should be gently massaged to promote blood circulation and oxygenation.[5]

1.2 Ideal Properties of Scrub:

It needs to have tiny rough granules, be non-toxic and mildly abrasive, and be somewhat rough, non-irritating, non-sticky, and able to remove dead skin cells.[6] There must be tiny, grit-filled particles in it. Dead skin and grime must be eliminated. Furthermore, because coffee is high in antioxidants, other natural elements, like coffee beans, can be used as cosmetic ingredients in skincare products.[7] Coffee grinds are perfect for exfoliating dead skin cells because of their rough surface and potent smell.[8]

1.3 Benefits of Scrubbing Skin

1. To Get Sparkling Clean Skin: Scrubbing leaves your skin clear of debris, oil, and perspiration.
2. Boosts Skin Glow: Exfoliation can genuinely bring out your skin's radiant quality.
3. Restoring the skin's healthy radiance can also be aided by exfoliation.
4. For Silky Complexion: Having smooth skin is the key to looking more appealing.
5. Scrubbing improves the texture, cleanliness, and smoothness of your skin.
6. Eliminate dead skin cells and acne scars.
7. Eliminates Dark Patches: Use the scrub twice for best results; it is especially effective on the elbows and knees.
8. Scrubbing can help relieve dry patches on skin brought on by irritation and can help improve the way that irritated skin is managed. [9,10]

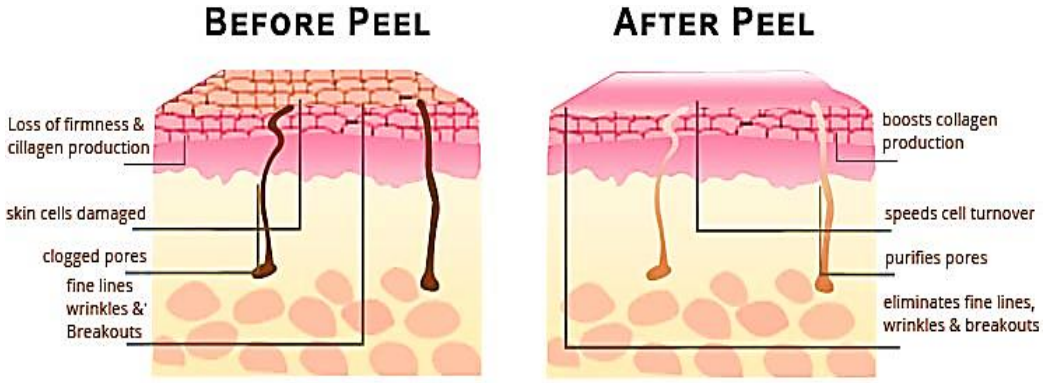

Fig 1: Before & After Exfoliation [11]

2. MATERIAL AND METHODS

2.1 Materials:

1. Coffee powder:

- Synonym: Brew, Cuppa, Caffine.
- Scientific Name: *Coffea arabica*
- Biological Source: Arabica coffee beans are the seeds found inside the fruit of plant.
- Family: It is belonging to family Rubiaceae
- Add coffee beans to a standard blender and process until they resemble a coarse powder.

Fig 2: Coffee beans

Fig 3: Coffee powder

Color	Light to Dark Brown
Odor	Aromatic
Taste	Mild flavor of sweetness

Table 1: Organoleptic Characteristics of coffee powder

Uses:

1. Impurities and dead skin cells can be gently removed using coffee scrubs.
2. Redness and swelling can be less noticeable when using coffee scrubs.
3. Coffee's caffeine dilates blood vessels, which helps lessen cellulite's appearance.
4. Coffee can give your skin a youthful, plump appearance.
5. Scrubs made with coffee might help retain moisture.
6. Coffee scrubs can lessen the visibility of imperfections and fine wrinkles.[12]

2. Neem Powder:

- Synonym: Neem tree, Holy tree, Indian lilac.
- Scientific Name: *Azadirachta indica*
- Biological Source: The various parts of the neem tree, including leaves, bark, seeds and oil extracted from *Azadirachta indica*.
- Family: Meliaceae.
- The neem tree's fresh leaves were gathered, twice cleaned with distilled water to remove any remaining dust and grime, and then allowed to dry completely before being ground into coarse particles and sieved.

Fig 4: Died Neem leaves

Fig 5: Neem Powder

Color	Leaves: Dark Green, Fruits: Yellow Green
Odor	Strong, Pungent
Taste	Extremely Bitter

Table 2: Organoleptic Characteristics of Neem powder

Uses

1. Anti-inflammatory, antibacterial, and antiseptic qualities that have the potential to soothe sensitive skin.
2. It also lessens acne. Due to its antibacterial and anti-inflammatory qualities, it is used as an anti-acne treatment for oily and acne-prone skin.
3. Neem powder contains an antioxidant that both prevents and treats skin blemishes; it also has the ability to purify blood.
4. Skin toner, lightens skin blemishes, Remove blackheads.
5. It also balances the skin's oil production and helps to protect the skin from sun damage.
6. It contains vitamin E, fatty acids that tighten the skin and can help to reduce signs of aging.
7. It also has the benefit of cooling the skin and can be used to treat skin sensitivity.[13]

3. Sandalwood Powder:

- Synonym: Chandan, Santal.
- Scientific Name: *Santalum album*
- Biological Source: Primarily obtained from heartwood of the sandalwood tree. The heartwood is the innermost, darker-coloured part of the trunk, which is in the aromatic compounds that give sandalwood its distinctive scent.
- Family: Santalaceae
- Sandalwood was bought from Osmanabad's local market. Sandalwood is coarsely chopped, ground into a fine powder, and then sieved.

Fig 6: Sandalwood

Fig 7: Sandalwood powder

Color	Golden Yellow to Dark Brown
Odor	Aromatic, Sweet, Slightly Floral,
Taste	Slightly Bitter, Earthy Taste

Table 3: Organoleptic Characteristics of sandalwood powder

Uses:

1. The primary purpose of sandalwood is to hydrate and rejuvenate skin.
2. It possesses medicinal qualities like anti-inflammatory, anti-microbial, anti-oxidant, and anti-proliferative effects.
3. Natural skin-lightening ingredients can be found in sandalwood.
4. Uses calming components to balance out skin tone and leave skin feeling revitalized and refreshed, while tightening skin to minimize the appearance of fine lines and wrinkles.
5. Reduce indications of aging skin, eliminate sun tan, and soothe sunburn
6. Used for fragrance as well.
7. Sandalwood is mostly utilized in many forms, such as wood, oil, powder, etc. The oil is used in formulations for medications, cosmetics, and perfumes.[14]

4. Turmeric Powder:

- Synonym: Haldi, Saffron.
- Scientific Name: *Curcuma longa Linn*
- Biological Source: It obtained from the rhizomes, or underground stems, of the plant *Curcuma longa Linn.*
- Family: Zingiberaceae

Fig 8: Turmeric powder

Color	Bright Yellow Orange
Odor	Slightly Pungent
Taste	Slightly Bitter

Table 4: Organoleptic Characteristic of Turmeric powder

Uses:

1. It guards against accelerated aging.
2. The key to perfect skin.
3. It promotes the skin's natural lightening and brightness.
4. Turmeric is an excellent skincare ingredient for skin that is prone to acne.
5. It brightens your skin and helps to get rid of tan lines.
6. Applied in wound healing, anti-inflammatory, antibacterial, anti-microbial, and antioxidant capacities.[14]

5. Alovera Gel:

- Synonym: Alovera, burn plant
- Scientific Name: *Aloe barbadensis Miller*
- Biological source: It is obtained from thick fleshy leaves of plant *Aloe barbadensis Miller*
- Family: Asphodelaceae
- Using a sharp knife, the outermost leaves of the Alovera plant were harvested from the base of the plant. Clean the leaves that have been collected. Using the knife, trim off the pointed spines and top portion. The aloe vera leaf's top skin should then be gently cut off. Using a spoon, scrape off the gel, chop it into little pieces, and store it in the appropriate container.

Fig 9: Alovera gel

Color	Clear and Transparent
Odor	Mild, Fresh Scent, Slightly Herbal
Taste	Slightly Bitter

Table 5: Organoleptic Characteristics of Alovera gel

Uses:

1. Defense against the sun's UV radiation.
2. Due to its ability to moisturize the skin, it is a common ingredient in high-end sunscreens.
3. To promote the creation of collagen, which lowers the likelihood of wrinkles and fine lines.
4. Rich in antioxidants, anti-inflammatory, antiseptic, and antibacterial qualities.
5. Alovera gel relieves psoriasis, acne, eczema, and other skin disorders.[13]

6. Tea Tree Oil:

- Synonym: Tea tree.
- Scientific Name: *Melaleuca alternifolia*
- Biological Source: It is obtained by the leaves of plant *Melaleuca alternifolia.*
- Family: Myrataceae
- Purchased from local medical store of Osmanabad.

Fig 10: Tea tree oil

Color	Dark Green
Odor	Aromatic
Taste	Extremely Bitter

Table 6: Organoleptic Characteristics of tea tree oil

Uses:

1. Using tea tree oil to lighten and brighten skin can be a natural and efficient method.
2. Tea tree oil as a herbal remedy and antiseptic (germ killer). offering additional advantages including antibacterial and anti-inflammatory qualities.
3. Tea tree oil, also known as Melaleuca oil, has the potential to improve skin health in general.
4. Tea tree oil is an effective remedy for dark spots.[14]

7. Glycerin:

- Chemical Name: Trihydric Alcohol
- Chemical Formula: C3H8O3
- Purchased from local medical store of Osmanabad.

Fig 11: Glycerine

Uses:

1. It hydrates and intensely moisturizes the skin.
2. It can improve the surface hydration, reduce dryness, and rejuvenate the skin.
3. It can also soften skin because it is an emollient.
4. Glycerin also possesses antibacterial qualities, which enable it to shield the skin from dangerous microbes.[13]

3. FORMULATION OF FACE SCRUB

3.1 Formula for Face Scrub:

Ingredients	Role	Formula
Coffee Powder	Exfoliating Agent	13g
Neem Powder	Removes Impurities and dead skin	8g
Sandalwood Powder	Reduce blemishes, Dark Spot	6g
Turmeric	Glowing Skin, Antibacterial, Antimicrobial, Reduce acne	5g
Aloe Vera Gel	Moisturizer, Humectant	6g
Tea Tree Oil	Skin Whitening Agent, Natural deodorant	3ml
Glycerine	Moisturizer, Humectants, Thickening agent, Preservatives	9ml

Table 7: Formula for Face scrub

3.2 Formulation Method:

1 To start, all of the ingredients were washed to get rid of any debris or contaminants.
2 After that, every ingredient was shade-dried in compliance with our specifications.
3 Using a grinder, the ingredients were ground into a fine powder before being sieved.
4 The formulation's formula was followed while weighing the ingredients.
5 To create formulations, the weighed powder was combined with other components.
6 After the face scrub's formulation was assessed, it was labeled and placed into a container.

Fig 12: Formulation of Face Scrub

4. EVALUATION OF FORMULATION

Numerous factors, including physical appearance, color, nature, texture, consistency, odor, pH, irritability, homogeneity, washability, spreadability, patch test, grittiness, and extrudability, were assessed in relation to the prepared face scrub.

4.1 Colour: Visual inspection was used to test the color of the formulated face scrub. They were examined against an off-white backdrop.

4.2 Odour: The odour of formulated scrub was checked by smelling it.

4.3 Nature: Nature of the formulated scrub is determined by appearance.

4.4 Texture: Texture is determined on the basis of Gentle beads, spheres, or particles present in the scrub.

4.5 Consistency: The consistency was checked by applying on skin.

4.6 Homogeneity: The formulated face scrub was tested for homogeneity by visual appearance and touch.

4.7 Irritability: Small amount of the gel was applied on the skin and kept for few minutes and found to be non-irritant.

4.8 pH Determination: A pH Scale paper was used to determine the pH of a 1% aqueous formulation solution.

4.9 Washability: Little quantity of gel was applied over the skin and was washed with water. It was easily washable.

4.10 Spreadability: We had put small amount of the scrub on a glass slide, then another glass slide. was place on top of the gel. We added a 20g wooden weight to the slide and measured how long it took for it to spread. The amount of scrub and the area it spread on the slide show how effectively it spreads. It calculated by using formula:

$$S = m \times L/t$$

Were,
S = spreadability.
m = weight placed on slide.
L = length of glass slide.
t = time taken in seconds.

4.11 Foamability: The first step was to apply a small amount of scrub to the skin and then add a minimal amount of water to determine whether foam was present.

4.12 Grittiness: This test is performed to check the presence of small gritty particles in the formulated scrub.

4.13 Patch test: For the evaluation of hypersensitivity patch test is used and determining the probability of a certain substance causing an allergic reaction on the skin of a patient. A small portion of skin is reacted to dilute form whose specific effect on skin portion is being researched in a patch test. In a patch test, the formulation effect on the skin takes 2-3 days. Because Polyherbal Scrub is a cosmetic product, we put it patch test on a variety of people. Fair, dark, moderately dark, medium fair, and medium skin types.[13]

5. RESULT AND DISCUSSION

A basic technique was used to create the herbal scrub. Based on the spreadability test findings, it was evident that the scrub was gentle, easily applied, and applied to the skin comfortably. The formulation was found to have good spreadability and pH.

By observation & Touch:
1. **Colour**
2. **Odour**
3. **Nature**
4. **Homogeneity**
5. **Consistency**
6. **Grittiness**

7. **Irritability test**
8. **Patch test**
9. **Skin sensitivity test**

10. **Spreadability Test:**

$$S = m \times L/t$$

$$S = \frac{20 \times 7.5}{23}$$

$$S = 6.52 \text{ g.cm/sec}$$

Fig 13: Evaluation Tests

Sr.No.	Parameters	Observation
1.	Color	Brown
2.	Odor	Characteristic
3.	Nature	Semisolid
4.	Texture	Fine

5.	Homogeneity	Good
5.	Consistency	Good
6.	Irritability	Non-Irritant
7.	pH	6.0
8.	Washability	Washable
9.	Spreadability	Easily Spreadable
10.	Grittiness	Small Gritty Particle
12.	Patch Test	No Allergic Reaction
13.	Skin Sensitivity	No rashes

Table 8: Evaluation Test results

6. CONCLUSION

As the body's outermost organ, the skin is immediately and continuously exposed to pro-oxidants such chemicals, UV radiation, and air pollution. This study's objective is to create and assess a herbal face scrub using a natural exfoliant. It can be inferred from the results above that using a designed herbal scrub can be safe. Since only natural components were employed, there were either no negative effects or very small ones. The created sample met all the requirements in terms of appearance, smell, color, texture, homogeneity, consistency, irritability, pH, washability, spreadability, foamability, patch test, extrudability, and grittiness. Since all of the ingredients are natural, there is a lower likelihood of negative effects. It is suitable for all skin types, including dry, combination, oily, and normal. Better outcomes are obtained, and the skin appears brighter and more vibrant. The end product can therefore be used as a multifunctional scrub to encourage attractive skin. The face scrub is cost-effective, useful, and met every evaluation parameter. Thus, we deduce that the Face Scrub works well as a cosmetic on human skin.

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7. FUTURE PERSPECTIVES

Long-term application on various skin types and additional long-term stability tests at various temperatures are needed.

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