

FORMULATION AND EVALUATION OF POLYHERBAL FACIAL SCRUB

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ABSTRACT

The Importance of Cosmetics has increased as many people want to stay young and attractive. There are many products available in market regarding skin care and face care. Scrub is one of the products which is used to cure different types of skin conditions, such as acne, aging, redness and dryness. Peoples having oily skin suffer from acne, whiteheads and blackheads often. So scrubbing is required. The objective behind the study was to formulate and evaluate polyherbal face scrub. By using polyherbal scrub, cleansings, moisturising skin brightening, smoothening of skin is observed. The use of fenugreek, turmeric and aloe vera is to give skin effects like antioxidant, antiseptic, antiaging, antimicrobial. Walnut Shell is natural and biodegradable ingredients which is use as a natural expoliator in facial scrub. The formulation was evaluated with various organoleptic properties and tests. With this, it is concluded that formulation was stable and safe for use. Hence, the problem of pimple and acne can be overcome by this Polyherbal Face scrub.^[1]

KEYWORDS: Facial scrub, Polyherbal, Walnut Shell Powder, Natural Exfoliator.

1. INTRODUCTION

In recent years, there has been a growing interest in the use of herbal formulations for skincare products due to their potential benefits and minimal side effects. Facial scrubs are widely used to exfoliate the skin and remove dead cells, revealing a smoother and healthier complexion. The formulation and evaluation of polyherbal facial scrubs offer a promising approach to enhance the efficacy and safety of these products by harnessing the synergistic effects of multiple herbal ingredients.^[2]

Polyherbal formulations involve the combination of two or more herbs, each possessing distinct therapeutic properties. This combination can lead to a more comprehensive and balanced approach to skin care, targeting various skin concerns such as acne, dullness, and uneven texture. Furthermore, the use of polyherbal facial scrubs can provide a sustainable and eco-friendly alternative to conventional synthetic-based products.

Formulating an effective polyherbal facial scrub requires careful selection and evaluation of herbal ingredients. Each ingredient should be chosen based on its documented pharmacological activities, safety profile, and compatibility with other components. Furthermore, optimizing the extraction and formulation techniques is crucial to preserve the bioactive constituents and ensure their maximum efficacy.

The evaluation of polyherbal facial scrubs involves a comprehensive assessment of various parameters, including physical characteristics, stability, safety, and efficacy. Physicochemical tests, such as pH determination, viscosity measurement, and particle size analysis, help in determining the product's quality and consistency. Stability studies are conducted to assess the shelf life and storage conditions required for maintaining the product's integrity over time.^[3]

Moreover, safety evaluation is of utmost importance to ensure that the polyherbal facial scrub does not cause any adverse effects on the skin. This involves conducting skin irritation and sensitivity tests to assess the product's potential for irritation or allergic reactions. In addition, microbial tests are performed to verify the product's microbiological quality and safety.^[4]

1.1. Benefits of scrubbing your skin

1.1.1 For A Squeaky Clean Skin

Scrubbing gives you clean skin, free from dirt, oil, and sweat. Actually, the bottles of cleansing milk, face wash and facial cleansers cannot pull out all the dust that accumulates in the pores of your skin. Scrubbing does this job successfully.

1.1.2 Frees Your Skin From Flakes

Flaky skin gives rise to dry patches. It allows dead cells accumulate over time. Scrubbing your skin can help you deal with flaky skin effectively.

1.1.3 Say good-bye to useless pores and skin cells

The first and major advantage of the use of a facial scrub is disposing of the useless pore and skin cells out of your face. Dead pores and skin cells make your face appearance dry and dull. These additionally clog your pores and skin pores. Facial scrubs exfoliate your pores and skin very well and cast off the useless pores and skin cells.

1.1.4 Unclogs Skin Pores

Our bodies produce oils that act as herbal moisturizers. However, on occasion the pores and skin can grow to be too oily because of those herbal oils. The greater oil could be saved on your pores and skin pores, inflicting them to clog. It will ultimately result in pimples breakouts. Exfoliation enables to unclog those pores and save you the possibilities of pimples.

1.1.5 Helps In Removing Dead Cells

Dead cells make your skin look dull and tired. Scrub them off with a gentle scrub.

1.1.6 Adds Glow To Skin

Exfoliation can actually make your skin glow.

1.1.7 Removes Dark Patches

Use of scrub twice a week to get results. It is especially effective on knuckles, elbows and knees.

1.1.8 Prevents Ingrown Hair

Ingrown hair may be irritating because it performs a vital function in pimple outbreaks. Facial scrubbing is one of the first-rate methods to save you ingrown hair from ruining your facial

appearance.

1.1.9 Removes Acne Scars

Exfoliation helps in doing away with acne scars.

1.1.10 For Smooth Skin

Smooth skin is the key to a more beautiful you. The scrub will not only make your skin look flawlessly smooth, but will also make it soft and well-nourished.

1.1.11 Promotes Clear Complexion

As soon as the flakes, dead cells, blemishes and accumulated impurities are done away. The scrub has natural skin whitening ingredient, the effect is even better.^[6]

1.2 Advantages of Herbal scrub

- Healthy, glowing skin, minimize pore, reduces breakout and acne, Hides wrinkles
- Allows absorption of the products, improve your tan, Maintain body pH.
- Scrubbing is the removal of dry/ dead skin cells on the surface of the skin and is one of the most important of skincare routine for face.
- Scrubbing not only helps many skin problems, it also increases blood circulation, which in turn helps you to achieve healthy and glowing skin.
- Abrasive scrub cleansers are used for mechanical exfoliation.

1.3 Disadvantages of Herbal scrub

- Hard scrubbing motions and hard scrubbing chemicals may cause skin irritation including redness, inflammation.
- If you have a sensitive skin one can also have allergic reactions to the chemicals present in the synthetic scrubs as well.
- Over scrubbing can result in open pores which are exposed to pollution and UV rays at the same time.
- It also leaves your skin more prone to infections and tanning.^[8]

WALNUT SHELL POWDER: Walnut Shell is natural and biodegradable ingredients which is use as a natural exfoliator in facial scrub. Walnuts are rich in polyunsaturated fatty acids, protein, B-vitamins and minerals like magnesium, manganese and potassium. Walnut shells contain lower amounts of the hygroscopic materials and higher amounts of the hydrophobic materials. The chemical composition of walnut shell fibers includes cellulose (23.9%),

hemicellulose (22.4%), lignin (50.3%), and ash (3.4%).

Effect of Walnut Shell Powder Exfoliator in Face Scrub

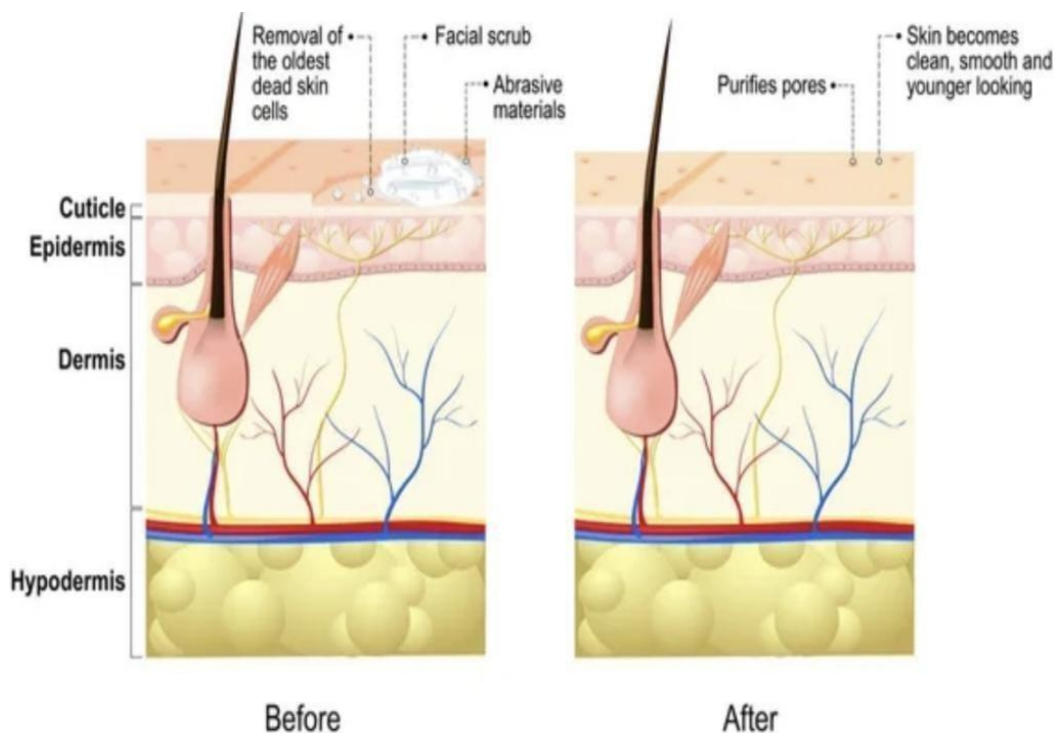


Fig. 1: Effect of Walnut Shell Powder Exfoliator in Face Scrub.

2. INTRODUCTION TO HERBAL INGREDIENTS

2.1 FENUGREEK SEEDS

- **Synonym:** Methi, Genus *trigonella*.
- **Biological Source:** It consists of dried seeds of *Trigonella foenum graecum*.
- **Family:** Fabaceae.
- **Chemical Constituents:** The main chemical constituents are Trigonellin, Diosgenin, Fenugrikin B, Fenugreekine, Rutin.
- **Uses:** Fenugreek seed extract can help improve skin texture, reduce inflammation, and protect against UV radiation damage. Fenugreek seeds also have exfoliating properties that can help remove dead skin cells and unclog pores, making them a useful ingredient in facial scrubs.^[9]



Fig. 2: Fenugreek Seeds.

2.2 BAEL LEAVES

2.2.1 Synonym: Aegle Marmelos, Wood Apple.

2.2.2 Biological Source: It consists of fresh leaves of Aegle Marmelos Linn.

2.2.3 Family: Rutaceae.

2.2.4 Chemical Composition: Bael contains number of chemical constituents such as alkaloid, carotenoids, flavonoids, terpenes which shows various pharmacological action. Aegle marmelos leaves contained γ -sitosterol, aegelin, lupeol, rutin, marmesinin, β -sitosterol, flavones, glycoside, halfordiol, marmeline, marmelosin and phenylethyl cinnamamides.

2.2.5 Uses: Bael is a tropical fruit that is commonly used in Ayurvedic medicine. Bael fruit extract has been shown to have anti-inflammatory and antibacterial properties, making it a potentially useful ingredient in facial scrubs for acne-prone skin.^[10]



Fig. 3: Bael Leaves.

2.3 KASTURI HALAD

2.3.1 Synonym: Kasturi Halad (*Curcuma aromatica*): Synonym: Wild Turmeric, Musk turmeric, Amba halad.

2.3.2 Biological source: It consist of fresh dried rhizomes of curcuma

2.3.3 Family: Zingiberaceae.

2.3.4 Chemical constituent: Wild turmeric has higher concentrations of curcumin, demethoxycurcumin, bisdemethoxycurcumin, phenolic compounds and total flavonoid-curcuminoid. It consists of α -curcumene (8.1–9.1%), zingiberene (11.3–15.8%), β -sesquiphellandrene (9.4–13.7%), β -elemenone (5.1–5.9%), β -turmerone (30.4–33.0%), and α -turmerone (10.9–13.0%).

2.3.5 Uses: Kasturi Halad, also known as wild turmeric or *Curcuma aromatica*, is a plant species closely related to common turmeric. It is known for its antimicrobial, anti-inflammatory, and skin-brightening properties. Kasturi Halad helps in improving the complexion and reducing blemishes.^[11]



Fig. 4: Kasturi Halad.

2.4 ORANGE PEEL (CITRUS SINENSIS)

2.4.1 Synonyms: Orange Cortex, Bitter orange peel.

2.4.2 Biological source: It consist of fresh or dried outer part of the pericarp of citrus aurantium Linn.

2.4.3 Family: Rutaceae

2.4.4 Chemical constituent: Major constituents present in orange peel are Limonene (90%), Citral (4%), Vitamin C, and Pectin. Orange peels are also a rich source of flavonoids and phenolic acids. Flavonoids comprise primarily of flavanone glycosides (hesperidin, narirutin, and eriocitrin), polymethoxylated flavone (sinensetin, nobiletin, and tangeritin) and flavone glycosides (diosmin, isorhoifolin, rutin). Regarding the phenolic acids, OPs are rich in hydroxycinnamic acids, such as ferulic, p-coumaric, sinapic, caffeic, and chlorogenic acids.

2.4.5 Uses: Orange peel, derived from the fruit *Citrus sinensis*, is rich in vitamins and antioxidants. It possesses exfoliating and brightening properties, helping to remove dead skin cells and improve the overall texture and tone of the skin.^[12]



Fig. 5: Orange Peel.

2.5 SANDALWOOD

2.5.1 Synonym: Yellow sandalwood, *Lignum santali*

2.5.2 Biological source: It consists of heart wood of *Santalum album*.

2.5.3 Family: Santalaceae

2.5.4 Chemical constituents: It contains volatile oils, which contain 95% of two isomeric sesquiterpene alcohols namely alpha-santalol and beta-santalol. It also contains santalal, santene, santanone, santalone and santalene.

2.5.5 Uses: Sandal wood is used in perfumery, as skin conditioner, in creams, lotions, soaps and powders. It possesses anti-inflammatory, antimicrobial, and skin-soothing properties. Sandalwood is effective in reducing acne, soothing irritated skin, and improving skin complexion.^[13]



Fig. 6: Sandal Wood.

2.6 WALNUT SHELL

2.6.1 Synonym: Juglans Regia

2.6.2 Biological source: It is a powder of ground shells of Juglans Regia Linn.

2.6.3 Family: Juglandaceae

2.6.4 Chemical constituents: The chemical composition of walnut shell fibers includes ash (3.4%), lignin (50.3%), hemicellulose (22.4%), and Cellulose (23.9%).

2.6.5 Uses: Walnut shell powder is a natural exfoliant, it gently removes dull and dry skin cells to reveal soft, smooth healthy skin.^[14]



Fig. 7: Walnut Shell.

2.7 HONEY

2.7.1 Synonyms: Madhu, Mel, Honey purified, Madh.

2.7.2 Biological source: Honey is sugar like secretion deposited in honey comb by the various species of bees such as *Apis mellifera*, *Apis dorsata*, *Apis florea* and other species of *Apis*.

2.7.3 Family: Apidae

2.7.4 Chemical constituents: Honey is an aqueous solution containing 35% glucose, 45% fructose, 2% sucrose, Maltose, Gum and Acetic acid.

2.7.5 Uses: Honey has moisturizing, anti-bacterial and wound healing properties. Honey help hydrate and soothes the skin, in reducing inflammation and promoting a youthful complexion.^[15]



Fig. 8: Honey.

2.8 POTATO STARCH

2.8.1 Synonym: Amylum

2.8.2 Biological source: Starch consist of polysaccharide granules from the tubers of potato (Solanum tuberosum Linn.)

2.8.3 Family: Solanaceae.

2.8.4 Chemical constituents: Starch contains chemically two different polysaccharides, such as amylose (β -amylose) and amylopectin (α -amylose), in the proportion of 1:2.

2.8.5 Uses: It acts as a natural thickener and binder in skincare products. Potato starch helps in providing a smooth and creamy texture to the facial scrub.^[16]



Fig. 9: Potato Starch.

2.9 GLYCERINE

2.9.1 Synonym: Glycerol

2.9.2 Biological source: It can be obtained either from animal fats or botanical sources such as palm, coconut, or soyabean oil.

2.9.3 Uses: Glycerin is a colorless and odorless liquid derived from plant or animal fats. It is a humectant, which means it attracts and retains moisture in the skin. Glycerin helps in maintaining skin hydration, improving smoothness, and enhancing the overall appearance of the skin.^[18]



Fig. 10: Glycerin.

3. MATERIALS AND METHOD

Table No. 1: List of Ingredients and their Role.

Sr. No.	Ingredients	Role
1	Walnut shell powder	Exfoliator
2	Fenugreek seed powder	Antioxidant, Anti-inflammatory
3	Bael extract	Anti-bacterial
4	Kasturi Halad	Skin brightening property, Antiseptic
5	Orange peel powder	Anti-ageing
6	Sandalwood powder	Skin soothing property
7	Sandalwood oil	Perfume
8	Honey	Moisturizer
9	Glycerine	Skin hydrating
10	Potato starch	Thickening & Binding agent
11	Aloe Vera gel	Smoothing and moisturising property
12	Carbopol	Gelling agent
13	Methyl paraben	Preservative

14	Triethanolamine	Neutraliser
15	Sodium Lauryl Sulphate	Foaming Agent

6.1 Materials and their source

The materials such as Walnut shell powder, Fenugreek seed powder, Kasturi Halad, Orange peel powder, Sandalwood powder, Sandalwood oil, and Honey & Aloe vera gel used in the formulation were collected from Dagadu Telli, a wholesaler of Ayurvedic products. Bael leaves were collected local areas of Nashik.



(a) Bael Powder



(b) Orange Peel Powder



(c) Kasturi Halad



(d) Sandal Wood Powder



(e) Fenugreek Powder



(f) Walnut Shell Powder

Fig. 11: Powders of All Herbal Active Ingredients.



Fig. 12: Honey & Aloe Vera.

6.2 Preparation of Powdered Materials

Powdered materials used were mixed together passed through sieve no.80 except for walnut shell powder & Walnut shell powder was passed through sieve no.60.

6.3 Collection and Extraction of leaves

Bael leaves were collected, washed, cleaned and shade dried. After drying, the powder was grounded mechanically. The extract was prepared by cold maceration process. Weigh 10 gm of powder was soaked in water for 72 hrs. This was stored in desiccator for further use.^[19]



Fig. 13: Extraction Assembly.



Fig. 14: Bael Extract.

6.4 Preparation of Herbal Scrub

1. Methyl paraben was weighed and dissolved in a beaker containing water.
2. To this carbopol was added and stirred continuously for few minutes until it forms a gel.
3. Sodium lauryl sulfate was weighed, dissolved separately with water and was added into the above gel.
4. Followed by this Aloe vera gel was added.
5. Drop wise triethanolamine added into gel to neutralise the pH.
6. The active ingredient mixture was then added into the prepared gel and stirred.^[20]

Table No. 2: Formulation of Herbal Scrub.

Sr. No.	Ingredients	Quantity
1	Walnut shell powder	5 gm
2	Fenugreek seed powder	2 gm
3	Bael extract	2 gm
4	Kasturi Halad	0.1 gm
5	Orange peel powder	2.5 gm
6	Sandalwood powder	2.5 gm
7	Sandalwood oil	0.5 ml
8	Honey	0.5 gm
9	Potato starch	1 gm
10	Aloe Vera gel	5 ml
11	Carbopol	5 gm
12	Methyl paraben	0.5 gm
13	SLS	5 gm
14	Water	q.s

4. METHODS OF EVALUATION

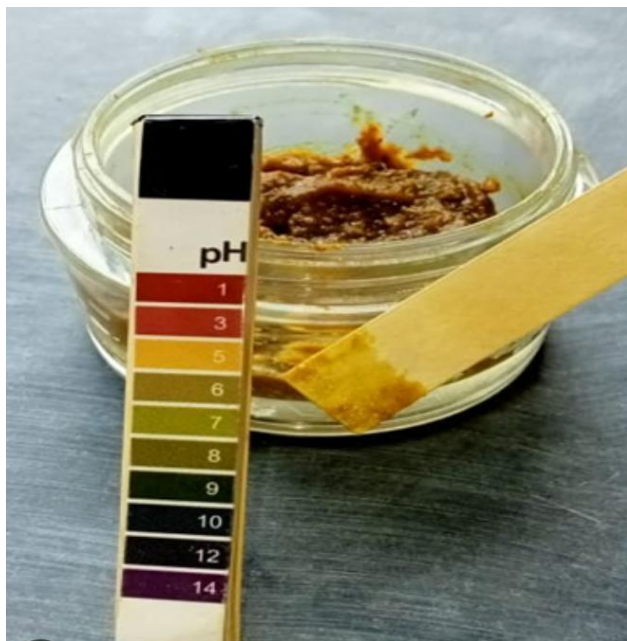
Formulation was tested for Colour, Odour, Consistency, Homogeneity and Texture, pH, Spreadability, Washability, Skin irritation.

Organoleptic Characteristics

- **Colour:** The colour of facial cleansing cream was checked visually.
- **Odour:** The formulation was evaluated for its odour by spreading the gel on 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.

PH

The pH of the gels was determined using a pH paper. The pH value of the Scrub was 6 which are considered acceptable to avoid the risk of irritation on application to the skin.



Spreadability

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 represents the efficiency of spreadability.^[21]



Foamability

Small amount of gel was shaken with water in a graduated measuring cylinder and the foam was measured.

Extrudability

To determine extrudability, a closed collapsible tube containing formulation was pressed firmly at the crimped end. When the cap was removed, formulation extruded until the pressure dissipated. Weight in grams required to extrude a 0.5 cm ribbon of the formulation in 10 s was determined. The average extrusion pressure in g was reported. It was found to be 15.3 g/cm²

Grittiness

Needs to have abrasive property so to satisfy that the Fruit Shell were powdered and passed through sieve no 30 such that the preparation has few gritty particles.^[22]

Sensitivity and Irritability

The preparation of scrub applied on human volunteers and kept for few minutes and observed for side effect. It was observed nonirritant.



5. RESULT AND DISCUSSION

Polyherbal Scrub was prepared and evaluated it contains bael extract which possess anti-bacterial and anti-oxidant property. It also contains walnut shell powder which acting as a natural exfoliating agent the skin surface by releasing dead cell and pore-blocking impurities. They can exfoliate the skin without scratching the skin surface by applying pressure on them. Suitable base materials such as gelling agent, preservative, neutralizer, and foaming agent were selected and incorporated into the extract to design a suitable herbal gel. Evaluation parameters such as color, odor, consistency, and pH were checked.^[23]

Table No. 3: Evaluation Parameter and Observation.

Sr. No.	Parameter	Observation
1	Colour	Brown
2	Odour	Aromatic
3	Consistency	Good
4	pH	6 ± 0.8
5	Spreadability	6.5 ± 0.6 cm
6	Washability	Easily washable
7	Grittiness	Presence of gritty particles
8	Foamability	Foam volume 100ml at 5 min
9	Extrudability	15.3 ± 1.2 g/cm ²
10	Irritability	Non-irritant



Fig. 15: Polyherbal Facial Scrub.

6. CONCLUSION

In conclusion, the formulation and evaluation of a polyherbal facial scrub offers promising benefits for skincare enthusiasts. By combining various herbal ingredients, this type of facial scrub aims to provide a holistic and natural approach to skincare while addressing multiple skin concerns.

The formulation process involves carefully selecting and combining different herbs known for their beneficial properties for the skin, such as exfoliation, cleansing, moisturizing, and antioxidant effects. These herbs are typically chosen based on their traditional use in skincare practices and scientific evidence supporting their efficacy.

During the evaluation phase, the polyherbal facial scrub undergoes rigorous testing to ensure its safety, effectiveness, and overall quality. This evaluation includes various assessments such as stability testing, microbial testing, sensory evaluation, and compatibility testing. These tests help determine the product's shelf life, microbial safety, sensory attributes (e.g., texture, smell), and compatibility with different skin types.^[24]

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