



IJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** VI **Month of publication:** June 2024

DOI: <https://doi.org/10.22214/ijraset.2024.61677>

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Formulation and Evaluation of Face Scrub from Aegle Marvelous Fruit

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Abstract: Scrub is defined as the products used for the purpose of beautifying, cleansing, promoting attractiveness or alternating the appearance. The aim of study is to and revives on application use of Beal fruit in preparation of face scrub as an active ingredient. Scrub is use For the purpose of enhancing skin beauty, several skin conditions are developed, such as skin protection, sunscreen, anti-acne, and anti-wrinkle products. Despite the enormous health benefits of synthetic substances, which once more cause environmental destruction, demand for herbal items and cosmetics is r rising daily. Due to their dual functionality as medications and cosmetics, natural cosmetics are in high demand nowadays. A facial scrub is a cosmetic or a beauty product used to exfoliate and clean the skin on the face and body. Blackheads, whiteheads, sebum, and skin cells can all be removed by using face scrubs. In this face scrub, Cosmetics eagle marvelous is used as an active ingredient. The other ingredients like sugar, honey, carpool, Methyl paraben, distilled water, Propylene glycol, sodium lauryl sulPhate, triethanolamine. The prepared scrub is evaluated for the various parameters such as appearance, PH, viscosity, spread ability, wash ability, irritability and found to be satisfied with all required characterizations. Thus, the developed formulation can be used as an effective scrub for healthy and glowing skin.

Keywords: Aegle Marvelous, anti-acne, antioxidant, exfoliates, face scrub

I. INTRODUCTION

Cosmetics encompass products used for cleansing, beautifying, and enhancing appearance. Historically, herbs have been integral in this realm. Skin, particularly facial skin, reflects overall health. Scrubs, categorized as facial or body, aid in exfoliation. Facial scrubs, richer in oil, are gentler, removing dead cells and promoting skin renewal. Essential oils vary based on skin type: dry, oily, or sensitive. Regular use results in smoother, glowing skin. Mild abrasives are key, applied directly or with pads, accompanied by gentle massage to enhance blood circulation and oxygen supply. [1-5]

Skin, the body's largest organ, acts as a protective barrier against environmental threats. Regular cleansing is crucial to remove impurities and promote healthy skin appearance. Exfoliation, achieved through chemical or mechanical means, removes dead cells, leading to smoother and healthier skin. Facial scrubs, containing natural or synthetic particles, deeply cleanse and exfoliate, enhancing radiance and softness. They aid in clearing pores, improving suppleness, and accelerating cell turnover. Gently massaging the scrub promotes blood circulation and oxygenation. Herbal exfoliants reduce ageing effects and environmental damage. Facial scrubs address various skin issues, including dullness, wrinkles, and dark spots. Suitable for all skin types, they effectively remove excess oil and dirt, leaving skin refreshed and revitalized. Incorporating facial scrubs into skincare routines aids in gentle exfoliation and rejuvenation, promoting a youthful complexion. [6-15]

II. ABOUT SCRUB

Exfoliating scrub lessens aging-related changes and counteracts the effects of the environment by removing dead skin cells from the surface and promoting the growth of cells in the sub-epidermal layer Technically, removing these dead skin cells from the surface involves using a scrub or herbal remedies that have anti-aging, vitamin, antioxidant, and antibacterial properties that help deep clean the skin, make it shine, and make it look attractive.[16] It was easy to apply a facial scrub: just pick one that was right for your skin type, rub it in for a minute on hydrated skin, and then wash it off.[17] There is a scrub for every type of skin. Only the essential oil used as an ingredient in the scrub will change depending on the skin type. Three distinct skin types are sensitive, oily, and dry. [18]

A. *Ideal properties scrub* [19]

1) It should be non-sticky and mild abrasive.

- 2) It should be Non-toxic.
- 3) It must remove dirt and dead skin.
- 4) It should Non-irritant.
- 5) It must contain small gritty particles.

B. Merits of scrub [20]:

- 1) Exfoliation reveals clean skin by scrubbing away dirt and sweat from pores.
- 2) Exfoliation eliminates skin flakes caused by the accumulation of dead cells.
- 3) Exfoliation enhances skin shine, making it appear more radiant.
- 4) Exfoliation helps remove dead cells, preventing skin from looking dull and weary.
- 5) Exfoliation aids in the removal of acne scars.
- 6) Exfoliation promotes smooth skin texture, making it soft and well-nourished.
- 7) A good scrub improves skin's cleanliness, smoothness, and overall texture.

C. Demerits of Scrub: [21]

- 1) Over-scrubbing can leave pores open, exposing skin to UV radiation and pollution, increasing vulnerability to infections and tanning.
- 2) Skin irritation, including redness and inflammation, can be brought on by harsh rubbing movements and chemicals.

III. SELECTION OF SCRUB BASED ON SKIN TYPE

- 1) *Oily Skin:* Use a face scrub with salicylic acid to unclog pores and fight acne.
- 2) *Dry Skin:* Face scrub containing glycolic acid to remove dead skin cells and hydrate dry skin.
- 3) *Sensitive Skin:* Choose a gentle face scrub with antibacterial and anti-inflammatory properties, such as one containing propylene glycol, yogurt, turmeric, or sugar.
- 4) *Combination Skin:* Use a facial scrub that removes excess oil without drying out the skin, recommended by specialists.

A. Steps To Use a Scrub: [23]

Step 1: Rinse your face with water thoroughly. Do not pat it dry. Step 2: Take a nickel - sized amount of facial scrub in your palm.

Step 3: Apply the facial scrub on your wet face.

Step 4: Gently rub the scrub on your face, applying the least amount of pressure. You can rub the scrub in a circular motion using your fingers.

Step 5: Always massage your face upwards and focus on areas like the top and corner of your nose, cheeks and upper lips.

Step 6: Continue the massage for 10 to 15 seconds.

Step 7: Now move to your neck and under the chin and massage for another 10 seconds.

Step 8: Once you finish exfoliating, wash your face with cold or lukewarm water.

Step 9: Gently pat your face dry using a soft towel.

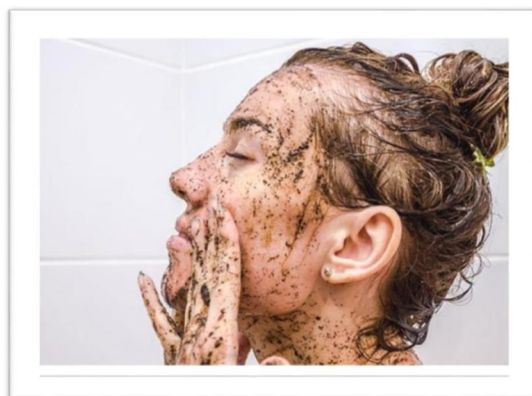


Fig.no.1. Scrubbing ^[24]

IV. MAIN HERBS USED IN PREPARATION OF SCRUB

Aegle marvelous:

Synonyms: Green Apple, Golden Apple, Aegle Marvelous, wood apple, Beal fruit. ^[25]

A. Basic Information about Aegle marvelous

The Indian medicinal plant known as bale has been traditionally used for various ailments. A. marvels, native to Northern India, is also found across the Indian Peninsula and neighboring regions. It's a slow-growing tree with spiky branches, thick bark, and a sweet yet unpleasant-tasting gum-like substance. Biologically active chemicals and essential oils are extracted from bale plants, with selective solvents and standard procedures applied to the most active parts of the plant. Taxonomical classification of A. marvels is provided in Table 1 ^[26-31]

B. Benefits of Beal Fruit extract for Hair:[32]

- 1) Helps in moisturizing the scalp.
- 2) Helps in getting rid of Dandruff, Itchy Scalp, etc.:
- 3) Promotes Hair Growth:



Fig no. 2: Beal Fruit ^[33]

Table no. 1
Taxonomical classification [34]

Kingdom	Plantae
Sub-kingdom	Tracheobionta
Super division	Spermatophyte
Division	Magnoliophyte
Class	Magnoliopsida
Subclass	Residue
Order	Spindale's
Family	Rutaceous
Genus	<i>Aegle</i>
Species	<i>Marvelous</i>
Chemical Composition	Alkaloids , Aegeline , Coumarins , Cineol , CaryoPhyllene

Table 2
Ethno medicinal uses of Aegle marvelous^[35]

Parts	Uses
Leaves	The leaves are most effective in treating fever, nausea, vomiting, swellings, dysentery, dyspepsia, seminal weakness, and intermittent fever.
Root	The roots of bale are thought to be effective in treating urinary problems, preventing heart palpitations, and curing fevers. They are also said to relieve abdominal pain. The medical properties of Dash amula lie in its root to treat fever, diarrhea, and flatulence.
Bark	The villagers use a decoction of the bark to treat fever and cough.
Flower	An anti-dysenteric, ant diabetic, diaPhoretic, and local anesthetic medication can be produced by distilling flowers. It is utilized as a tonic for the stomach and intestine.
Fruit	Beal fruits are edible. The pulp used to make delicious items like murabba, puddings, and juice. Apart from their laxative use and curing respiratory ailments, also used in several traditional medications to treat chronic diarrhea, peptic ulcers, inhibit lipid peroxidation, free radicals scavenging, antioxidants, anti-ulcerative colitis, gastroprotective, hepatoprotective ant diabetic, cardio protective, radio protective, antibacterial, antidiarrheal and antiviral properties.
Seed extract possesses ant diabetic and hypolipidemic effects in	

C. *Benefits of Beal fruit shell:*

The fruit shell is traditionally, various part of Beal tree has been used in Ayurveda medicine for treating digestive issues, respiratory problem and skin condition also used in beautifying products.^[36]

1) *Honey:*^[37]

- Biological Source: Honey is a thick, sugary substance stored in honeycombs by various bee species like *Apis mellifera* and *Apis dorsata*, both belonging to the family *Apidae*.
- Chemical Constitution: Moisture 14_24%, dextrose 23_36%, fructose 30_47%, dextrin and gums 0_7% and ash 0.1_0.8%
- Uses: Mild laxative, bactericidal, antiseptic, sedative alkaline character. Eating Regimen prosperous in honey is encouraged for infant, convalescent, diabetic sufferers and invalid

2) *Rose Water:*

- Biological source: Apart from being used as ornamental flowers, *R. damascena* is primarily cultivated for perfume, medicine, and the food industry^[38]
- Chemical composition: *Rosa damascena* contains terpenes, glycosides, flavonoids, and anthocyanins. It also includes carboxylic acid, vitamin C, kaempferol, and quercetin. Flowers additionally contain bitter principles, tannins, fatty oil, and organic acids.^[39]
- Uses: Rose water has antibacterial properties, which help prevent infections. Applying it to the face and body can prevent burns and cuts from becoming infected. It can also reduce the appearance of scars, especially when used in high concentrations.^[40]

3) *Rice powder:*

- Use: *Oryza Sativa* Powder is a versatile herbal ingredient widely used in cosmetics. It enhances skin texture and appearance in skincare products like masks and scrubs, thanks to its natural exfoliating properties. It absorbs oil, making it ideal for facial powders and makeup. It also strengthens hair and adds shine in hair care products. Lastly, it acts as a chelating agent

D. *Excipients:*^[41]

1) *Tragacanth gum:*

- a) Chemical name: Tragacanth gum
- b) Synonym: Astragals gummier, 9000-65-1, Gum Tragacanth, Gum Tragacanth powder
- c) Molecular Formula: C₁₀H₃₀
- d) Molecular Weight: 150.35 g/mol
- e) functional Category: Bio adhesive material, controlled-release agent, emulsifying agent, emulsion stabilizer, rheology modifier, Stabilizing agent, suspending agent, tablet binder.

- f) Description: Gum tragacanth is a viscous, odorless, tasteless, water- soluble combination of polysaccharides obtained from sap that is drained from the root of the plant and dried. The gum seeps from the plant in twisted ribbons or flakes that can be powdered. It absorbs water to come to be a gel, which can be stirred into a paste
- g) Use: Gum tragacanth has been used as a stabilizer, emulsifier, and thickener in meals products.

2) *Methyl Paraben:*

- a) IUPAC Name: Methyl-4-hydroxybenzoate
- b) Molecular formula: C₈H₈O₃
- c) Molecular weight: 152.15 g/ moll
- d) Functional category: Antimicrobial preservative
- e) Description: Methyl paraben takes place as colorless crystals or a white crystalline powder.
- f) It is odorless or almost odorless and has a slight burning taste
- g) Synonym: Methyl paraben, Methyl p-hydroxybenzoate, Methyl Para hydroxybenzoate, Niacin M, E number E218, Tegosept, Myocyte, mutagen, methyl chemisette, 4-hydroxybenzoic acid methyl ester.
- h) Uses: Inhalation solutions, Nasal solutions, oPhthalmic preparations, Oral options and suspensions, intradermal injections.

3) *Triethanolamine:*

- a) IUPAC name: N, N-diethylethanamine
- b) Molecular formula: C₆H₁₅NO₃
- c) Molecular weight: 149.19 g/moll
- d) Functional category: Alkalizing agent, emulsifying agent.
- e) Description: Triethanolamine is a clear, colorless to light yellow-colored viscous liquid having a slight ammoniac odor
- f) Synonyms: Tealan, trimethylamines, trihydroxy triethylamine, tries (hydroxyethyl) amine, protamine.
- g) Uses: triethanolamine is used as an intermediate in the manufacturing of surfactants, cloth specialties, waxes, polishes, herbicides, petroleum demulsifies, lavatory goods, cement additives, and slicing oils.

4) *Propylene Glycol:*

- a) IUPAC name: Propane-1, 2-diol
- b) Molecular formula: C₃H₈O₂
- c) Molecular weight: 76.09 g/moll
- d) Functional Category: Antimicrobial preservative, disinfectant, humectant, plasticizer, solvent, stabilizing agent, water-miscible co-solvent.
- e) Description: Propylene glycol is a clear, colorless, viscous, virtually odorless liquid, with a sweet, barely acid taste resembling that of glycerin.
- f) Synonyms: 1, 2-Dihydroxypropane, E1520; 2-hydroxypropanol, methyl ethylene glycol, methyl glycol, propane-1, 2-diol, Propyleneglycol.
- g) Uses: Propylene glycol is used in cosmetics and in the meals enterprise as a service for emulsifiers and as a car for flavors in preference to ethanol, due to the fact its lack of volatility provides an extra uniform flavor.

5) *Sodium Lauryl SulPhate:*

- a) IUPAC name: Sodium dodecyl sulPhate
- b) Molecular formula: C₁₂H₂₅NaO₄S
- c) Molecular weight: 288.38 g/moll
- d) Functional category: Anionic surfactant, detergent, emulsifying agent, skin penetrant, pill and tablet lubricant, wetting agent.
- e) Description: Sodium lauryl sulPhate consists of white or cream to faded yellow-colored crystals, flakes, or powder having smooth feel, a soapy, bitter taste, and a faint odor of fatty substances.
- f) Synonyms; sodium sulPhate, lauryl sulPhate, sodium salt, monododecyl sodium sulPhate, natrilaurilsulfas, sodium dodecyl sulPhate.
- g) Uses: Anionic emulsifier, forms self-emulsifying bases with fatty alcohols, as detergent in medicated shampoos, Skin cleanser in topical applications, Solubilize in concentrations higher than indispensable micelle concentration, Tablet lubricant, Wetting agent.

V. MATERIAL AND METHOD

**TABLE 1
FORMULATION FOR FACE SCRUB**

Sr no	Ingredients	category	Formulation 1	Formulation 2
1	Beal fruit powder	Scrubbing agents	3g	2g
2	Tragacanth gum	Gelling agent	0.1g	0.3g
3	Rice powder	preservative	3g	2g
4	Methyl paraben	Neutralizer	0.1g	1g
5	Triethanolamine	Moisturizer	0.3ml	0.4g
6	Propyleneglycol	Foaming agent	1ml	1ml
7	Sodium laurylsulPhate	Vehicle	3g	3g
8	Rose water	Grittiness	qs – 10gm	qs – 10gm

A. Method Of Face Scrub:

1) Preparation of aegle marmalous Powder:

Aegle marmelos fruit is grated and dried in sunlight for seven days. Once dried, it is ground into a powder after all the water has evaporated.



Fig no.3.Beal fruit powder

2) Preparation of Gel:

Methyl paraben was dissolved in rose water, then tragacanth gum was added and stirred until it formed a gel. Sodium lauryl sulPhate was dissolved in rose water separately and added to the gel. Propylene glycol was then added. Triethanolamine was added drop by drop to neutralize Ph. Finally, the active ingredient was added and stirred into the prepared gel.



Fig no.4.Preparation of gel

VI. EVULATION OF FACE SCRUB

The prepared gel was evaluated for organoleptic properties, Ph, irritability, wash ability, grittiness, extrudability, foam ability, spreadability.

A. Organoleptic Properties:

- 1) Color: Visual inspection printed that the face scrub was light brown in color.
- 2) Odor: The smell of components used to be checked by way of software of instruction on hand and feels the scent of perfume.
- 3) Consistency: The consistency of face scrub was found to be semi-solid and easy by using visual examination.
- 4) Homogeneity and Texture: A tiny amount of the prepared scrub was tested by means of urgent it between the thumb and index finger.

B. Ph

PH of the produced gel was once assessed the usage of PH paper. Scrub is gently utilized on PH paper. The PH was once observed to be between 5- 6.

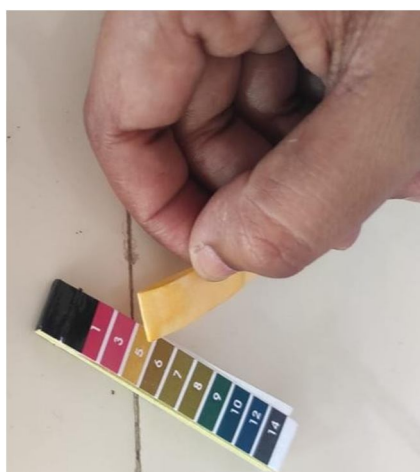


Fig no.5.Ph

C. Irritability:

A small amount of the training used to be utilized to the dorsal region of the hand, left on for a short time, and was observed to be nonirritating. There is no edema or redness occurs.

D. Wash ability:

This take a look at was carried out immediately on the skin. After applying the education and rinsing the pores and skin with regular water, the skin was found to be clear and clean.



Fig no.6. Washability

E. Grittiness:

Few gritty particles have been determined in the face scrub.

F. Foamability

In a graduated measuring cylinder, a small quantity of scrub was once agitated with water to quantify the foam.[42]



Fig no.7. Foamability

VII. RESULT

Sr no.	parameter	Result F1	Result F2
1	Color and homogeneity	Brown & homogeneous	Brown & homogeneous
2	odur	characteristics	characteristics
3	consistency	solid	solid
4	Ph	5	6
5	irritency	No rashes wear seen	No rashes wear seen
6	Wash ability	No traces of scrub was seen	No traces of scrub was seen

VIII. DISCUSSION

Evaluation parameter conducted on the scrub revealed significant findings. For instances, the scrub labelled as F2 exhibited a brown coloration, characteristic odur, and a solid consistency, Heras all formulations F1&F2 demostrstrded good spreadability and Ph level of 6.additionally there waer no signs of irritancy observed for any of the formulation.

IX. CONCLUSION

In this work, we tried to make a scrub. The created scrub gel used to be examined using a range of factors, and it was determined to Be fine for use on the skin to promote fitness and radiance barring causing any side effects. By incorporation of beal fruit powder as Scrubbing agent into the formulation, affectivity of product is increases.

The use of a scrub enhances oxygenation of the skin’s surface. Skin feels softer, cleaner, and extra invigorated after making use of scrub.

It can be used for any kind of pores and skin i.e. normal, oily, and dry. it gives pleasant end result and make the pores and skin top and healthy.

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