



# Formulation And Evaluation Of Herbal Face Scrub From *Oryza Sativa*.

Nilesh Kamble, Vishwjeet Karkhele, Aniket Kawarkhe, Vaishnavi Kendre, Divya Khandagale

Guided by: - Dr. N. G. Patre

## ABSTRACT:-

The present study focus on the formulation and evaluation of a herbal face scrub prepared from *Oryza sativa* (rice). *Oryza sativa* is rich in bioactive compounds such as vitamins, minerals, and antioxidants that help nourish the skin, remove dead cells, and promote a natural glow. The rice powder acts as a gentle exfoliating agent, effectively cleansing the skin without causing irritation. To enhance the scrub's efficacy, natural ingredients like honey, aloe vera gel, and turmeric may be incorporated for their moisturizing, healing, and antimicrobial properties. The herbal formulation is safe, eco-friendly, and free from synthetic chemicals, making it suitable for all skin types. The study aims to develop a cost-effective and natural alternative to synthetic exfoliants, providing a smooth, radiant, and healthy skin appearance.

Keyword:- *Oryza sativa*, herbal face scrub, rice powder, natural exfoliant, antioxidant, skin nourishment, turmeric, honey, aloe vera, eco-friendly formulation, chemical-free, skincare, cost-effective.

## 1) INTRODUCTION:

A herbal face scrub is a natural skincare formulation designed to exfoliate, cleanse, and rejuvenate the skin. It helps in removing dead skin cells, unclogging pores, and improving blood circulation, resulting in smooth and glowing skin. Unlike synthetic scrubs, herbal formulations are free from harsh chemicals and are gentle on the skin.

This scrub contains gram flour (besan) as a natural exfoliating and cleansing agent, while coconut oil provides deep moisturization and prevents dryness. Honey acts as a natural humectant and has antibacterial properties that help in acne control. Tea tree oil is well known for its antimicrobial action, making it effective against pimples and skin infections. Turmeric provides anti-inflammatory and skin-brightening effects, and rose water works as a soothing and refreshing agent that maintains skin pH balance.

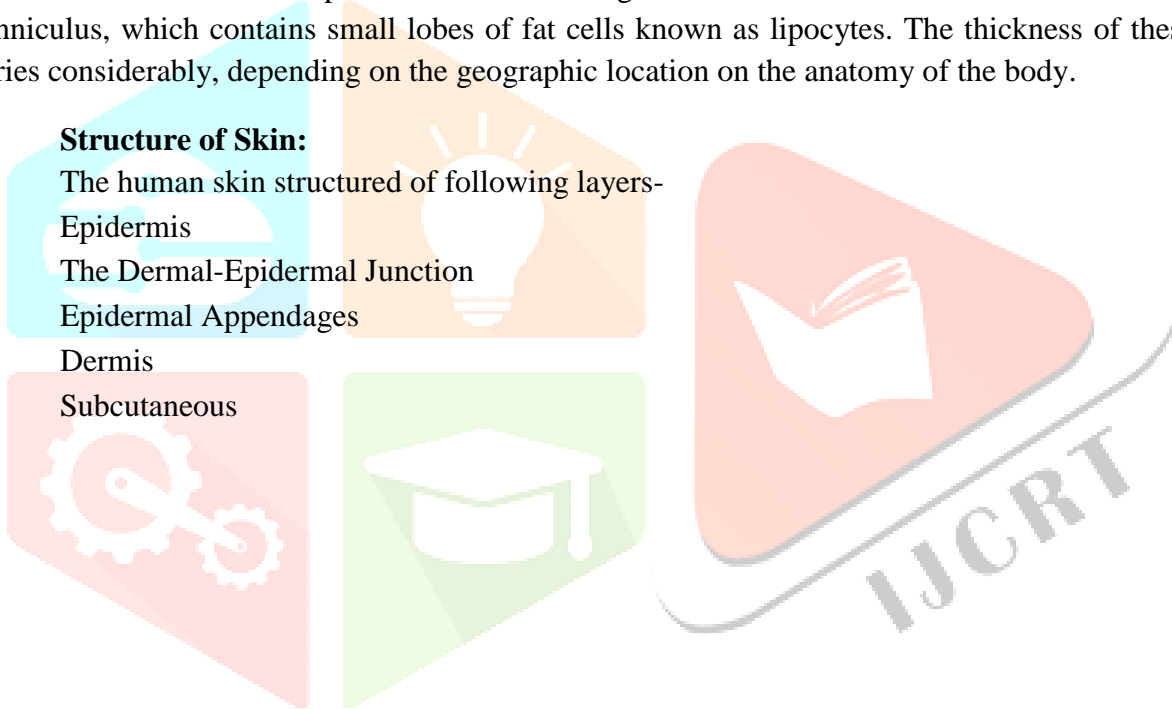
Overall, this herbal face scrub is safe, cost-effective, eco-friendly, and suitable for regular use for maintaining healthy, clear, and radiant skin.

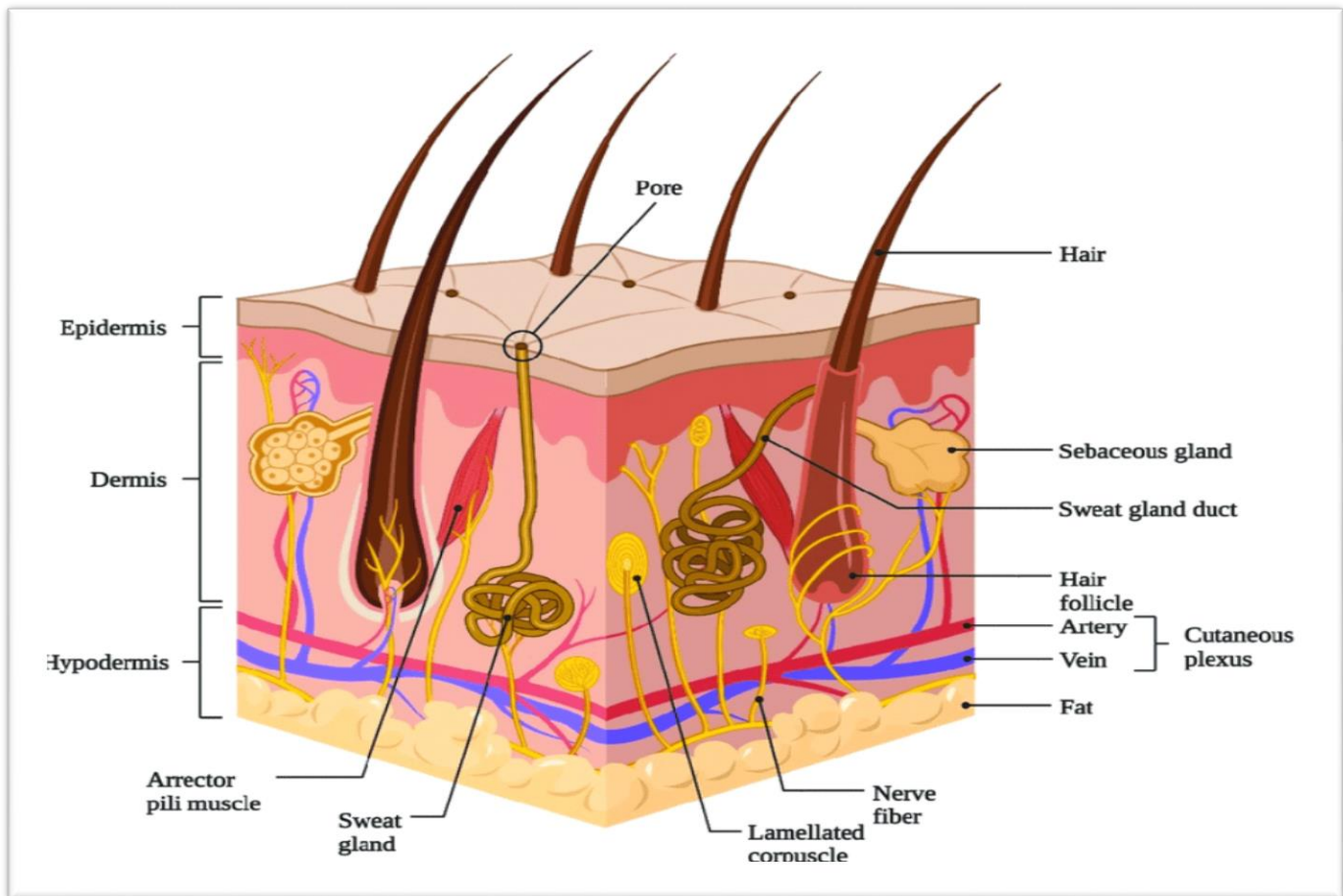
### **Anatomy and Physiology of Skin:**

The skin is the largest organ of the body, accounting for about 15% of the total adult body weight. It has a surface area of about 1.5 to 2 m<sup>2</sup> in adults and it includes glands, hair and nails. It performs many vital functions, including protection against external physical, chemical, and biologic assailants, as well as prevention of excess water loss from the body and a role in thermoregulation. The skin is continuous, with the mucous membranes lining the body's surface.

The integumentary system is formed by the skin and its derivative structures. The skin is composed of three layers: the epidermis, the dermis, and subcutaneous tissue. The outermost level, the epidermis, consists of a specific constellation of cells known as keratinocytes, which function to synthesize keratin, a long, threadlike protein with a protective role. The middle layer, the dermis, is fundamentally made up of the fibrillar structural protein known as collagen. The dermis lies on the subcutaneous tissue, or panniculus, which contains small lobes of fat cells known as lipocytes. The thickness of these layers varies considerably, depending on the geographic location on the anatomy of the body.

- **Structure of Skin:**
- ✓ The human skin structured of following layers-
  - Epidermis
  - The Dermal-Epidermal Junction
  - Epidermal Appendages
  - Dermis
  - Subcutaneous





**Fig no 1: Anatomy of skin**

## 2) REVIEW OF LITERATURE:

1. Harshitha R et al. (2024) — Formulation and Evaluation of Natural Rice Flour Face Scrub  
Uses unpolished rice flour with shea butter, coconut oil, vitamin E for exfoliation and skin texture improvement; evaluated for pH, viscosity, spreadability, washability, etc.
2. Prashant, Rahul & Sreekanth (2022) — Formulation and Evaluation of Herbal Face Scrub (IJPBA)  
A herbal scrub prepared using rice powder as key exfoliant along with sandalwood, orange peel and rose water; evaluated on pH, consistency, spreadability, irritability and found non-irritant and effective.
3. Tanuja Satpute et al. (2025) — A Review on Formulation and Evaluation of a Polyherbal Face Scrub (IJRASET)  
Includes rice flour in the formula alongside beetroot, honey, aloe vera, turmeric, almond oil; evaluated for appearance, pH, comfort, spreadability, washability; positive skin health impact.

4. Baride et al. (2025) — Formulation and Evaluation of Poly Herbal Facial Scrub (EPRA IJRD)  
Rice flour combined with aloe vera, turmeric, carrot powder, orange peel, rose water, coconut oil; evaluated for various physical and sensory parameters—found effective for skin exfoliation and brightening.
5. Aglawe et al. (2019) — Preparation and Evaluation of Polyherbal Facial Scrub (J. Drug Delivery and Therapeutics)  
A poly-herbal scrub including rice bran/powder among other herbal actives; assessed for cleansing efficacy and stability.
6. Mahajan, Gayakwad, Tiwari & Darwhekar (2020) — Formulation and Evaluation of Herbo-Mineral Facial Scrub  
Contains herbal and mineral actives including rice-based exfoliants; evaluated for texture, pH, washability, homogeneity and found favorable.
7. Kumar et al. (2021) [mentioned in review] — Incorporation of Nigella sativa in Poly-Herbal Facial Scrub  
Although focus is Nigella sativa, rice flour is cited as base in multi-herbal scrub designs (2021 formulations)
8. Vishal et al. (2020) — Multi-Purpose Herbal Scrub using Limonia acidissima and rice components  
Includes rice powder in poly-herbal scrub evaluated in J. Drug Delivery and Therapeutics, 2020.
9. Shruti S. Jadhav et al. (2024) — Formulation and Evaluation of Herbal Facial Scrub Using Exfoliating Agent (IJRASET)  
While not rice-only, rice powder is a common exfoliating agent in poly-herbal scrub formulation; evaluated for safety and efficacy of exfoliation action.
10. Sushil Kumar Pal et al. (2024) — Formulation and Evaluation of Herbal Face Scrub (IJSRU)  
Rice powder is among main ingredients alongside orange peel, vitamin E, neem and rosemary; assessed for pH, viscosity, spreadability, foamability etc.

➤ **SCRUB :-**

A rice-based scrub is a natural exfoliant made primarily from ground rice grains or rice powder, often mixed with other ingredients like honey, yogurt, or essential oils. It is used for exfoliating dead skin cells, cleansing pores, and improving skin texture.

### ❖ **Benefits of Scrub :**

- **Gentle Exfoliation-**

Finely ground rice particles gently remove dead skin cells without irritating the skin, suitable even for sensitive skin types.

- **Brightening Effect**

Rice contains compounds like **ferulic acid** and **allantoin**, which can brighten dull skin and reduce pigmentation.

- **Rich in Antioxidants**

Rice contains antioxidants that fight free radicals, helping reduce signs of aging.

- **Oil Control**

Absorbs excess sebum and helps in reducing acne caused by clogged pores.

- **Smooth Skin Texture**

Regular use improves skin smoothness and promotes a healthy glow.

- **Natural and Chemical-Free**

Often free from harsh chemicals, making it eco-friendly and skin-safe.

- Excessive use can damage the skin's barrier and cause dryness or sensitivity.

- **Messy Application-**

Can be messy to use and clean up compared to commercial products.

- **Not Ideal for Severe Skin Conditions-**

Not recommended for those with eczema, psoriasis, or inflamed acne without dermatologist approval.

### ❖ **Applications of scrub:-**

- **Face Scrub**

Used to exfoliate dead skin cells, unclog pores, and brighten the complexion

- **Body Scrub**

Applied to arms, legs, and back to smooth rough patches and improve skin tone.

- **Hand and Foot Exfoliator**

Softens dry or cracked skin, especially on heels and knuckles.

- **Scalp Scrub (Occasionally)**

Removes buildup and promotes circulation (only when finely ground and rinsed well).

- **Pre-Makeup Skin Preparation**

Helps create a smooth base for better makeup application

### 3. **AIM & OBJECTIVES:**

**AIM:** - Formulation Of Herbal Face scrub From *ORIZA SATIVA*

**OBJECTIVES: -**

- To explore the traditional and contemporary uses of herbal scrubs
- To identify the key active ingredients
- To review scientific literature and clinical studies
- To assess the advantages and disadvantages
- To evaluate the potential applications
- To identify gaps in current research

**4. PLANT PROFILE :-**

(Fig.no.2.-Rice)

**Synonyms:** Grain, *Oryza sativa*, white rice

**Biological Source:** - Dried mature grain of *Oryza sativa* plant. Seeds (grains)

**Family:** - *Poaceae*

**Chemical Constituent:-** Rice is primarily composed of carbohydrates(70-80%), mainly starch, followed by protein(6-8%) and fat(1-2%)

**Uses:-**

Rice flour/scrub – exfoliates dead skin, improves brightness.

## 2) Gram Flour: -



(Fig.no.3-Gram flour)

### Biological Source:

Gram flour is obtained by grinding dried seeds of *Cicer arietinum* (Chickpeas)

family:- *legume*.

### Chemical Constituents:

Carbohydrates 50–60% (mostly starch) Energy source

Proteins 20–25% (high-quality plant protein)

Dietary Fiber 10% Aids digestion, controls blood sugar Fats.

### Uses:

Gram flour, also known as besan, is a natural exfoliant that can be used to create gentle scrubs for the face and body.

## 3)Turmeric Powder: -



(Fig.no 4-Turmeric Powder)

#### Biological Source:

Turmeric is obtained from the dried rhizomes of the plant *Curcuma longa*, which is a perennial herb.

**Family:-** *Zingiberaceae*.

#### Chemical Constituents:

Essential Oils ~3–5% (turmerone, zingiberene) Antimicrobial, aromatic, skin healing Starch ~40–50%

Energy source Proteins

~6–8% Nutritional value.

#### Uses of Turmeric: -

Liver protection – supports detoxification. If you are not allergic to turmeric, then you can. safely use.

#### 4)Aloe vera: -



(Fig no.5-Aloe vera)

**Biological Source:**

Aloe vera is a succulent plant, and the gel is extracted from the inner parenchyma (clear part) of the leaves.

**Family:-** *Asphodelaceae*.

**Chemical constituents:**

Vitamins A, C, E, B12    Antioxidant.

Minerals Calcium, zinc, magnesium, potassium

**Uses of aloe vera: -**

Skin moisturizer – light and non-greasy for daily use.

Anti-acne and anti-aging – clear pores, reduces wrinkles.

### 5) Honey: -



(Fig no.6- Honey)

**Biological Source:** Honey is a natural sugar-rich secretion made by honey bees (*Apis* species), especially *Apis mellifera*, from the nectar of flowers.

**Family :-** *Apidae*.

**Chemical Constituents of Honey:** Carbohydrates 75–80% (mainly fructose ~38%, glucose ~31%) Energy source Water ~17–20% Affects viscosity and shelf-life Proteins & Enzymes Invertase, amylase, glucose oxidase Digestion aid.

**Uses: -**

- Moisturizer – Hydrates dry skin when used as a face mask.
- Acne treatment – Has antibacterial properties that help reduce acne.
- Hair care – Can add shine and moisture to hair when used in masks.
- Lip balm – Heals and softens dry, chapped lips.
- Cosmetic: Honey is used in face masks, lip balms, and other beauty products.

## 5)Tea Tree Oil:-



( Fig no: 7.Tea Tree Oil)

**Biological Source :** Tea tree oil is obtained from the fresh leaves and terminal branches of the plant

**Family:-** *Myrtaceae*

**Chemical Constituents ;** Terpinen-4-ol (30–40%) Main active component (strong antimicrobial action)

**Use Of Tea Tree Oil ;**

Skin Care Uses

Reduces skin infections and inflammation

Preservative

### 3) Plan Of Work



**6. Materials And Method :****Ingredients :**

Sr. No.	Ingredients	Main Components	Uses
1)	Rice	Starch, Vitamin B	Brightenes skin, Gentle Exfoliation.
2)	Gram Flour	Proteins, Carbohydrates	Remove Oils
3)	Turmeric	Essential Oils, Antioxidants	Anti-inflammatory, Antiseptic
4)	Honey	Glucose, Fructose	Moisturizer skin, Antibacterial
5)	Tea Tree Oil	Terpenes	Strong Antibacterial, preservative
6)	Rose Water	Flavonoids, Vitamins	Refresh skin

## 7. METHOD OF PREPARATION :

### Formulation :

Face scrubs are formulated by combining natural or synthetic abrasive agents. The natural ingredients were shed, dried, powdered and weighed accurately and mixed. For the evaluation of various parameters, the formulated face scrub was stored in air-tight containers.

### PROCEDURE TO PREPARE THE SCRUB: -

#### 1. Clean Workspace:

- Wash your hands and ensure all utensils and bowls are clean and dry.

#### 2. Add Dry Ingredients:

- Add rice powder
- Add gram flour (besan)
- Add a pinch of turmeric powder
- Mix all the dry ingredients well into the aloe vera gel.

#### 3. Add Liquids:

- Pour in of rose water
- Add of honey
- Add of glycerin
- Mix everything thoroughly until a smooth, thick paste is formed

## ❖ PREFORMULATION STUDY

1. Bulk density
2. Tapped density
3. Carr's index
4. Hausner's ratio
5. Angle of repose
6. % Ash Value
7. Solubility

### 1) Bulk density

The bulk density of a powder is the ratio of the mass of an untapped powder sample and its volume including the contribution of the inter-particulate void volume.

**FORMULA:-**

$$\text{BULK DENSITY} = \frac{\text{MASS}}{\text{BULK VOLUME}}$$

### 2) Tapped density

The tapped density is an increased bulk density attained after mechanically tapping a container containing the powder sample.

**FORMULA:-**

$$\text{TAPPED DENSITY} = \frac{\text{MASS}}{\text{TAPPED VOLUME}}$$

### 3) Carr's index

Carr's Index of any solid is calculated for compressibility of a powder which is based on true density and bulk density.

**FORMULA:-**

$$\text{CARR'S INDEX} = \frac{\text{TAPPED DENSITY} - \text{BULK DENSITY}}{\text{TAPPED DENSITY}} \times 100$$

#### 4) Hausner's ratio

Hausner ratio is defined as the ratio of a powder's tapped bulk density to its poured (loose) bulk density.

#### FORMULA:-

$$\text{HAUSNER'S RATIO} = \frac{\text{TAPPED DENSITY}}{\text{BULK DENSITY}}$$

#### 5) Angle of repose

Angle of repose powder poured from a vessel forms a cone-like pile. The angle of repose -the angle between the slope of the pile and the horizontal correlates with the strength of particle

Where,

h : the height in cm

r : the radius in cm

$\theta$  : the angle of repose

#### FORMULA:-

$$\text{ANGLE OF REPOSE}(\theta) = \tan^{-1}(h/r)$$

#### 6) % Ash value

The ash values usually represent the inorganic residues such as phosphates, carbonates and silicates present in herbal drugs.

#### FORMULA:-

$$\% \text{ ASH VALUE} = \frac{W_2 - W_0}{W_1} \times 100$$

W<sub>2</sub>: weight of crucible + ash

W<sub>0</sub>: weight of crucible

W<sub>1</sub>: weight of sample

## 7) Solubility

Solubility is the ability of a solid, liquid, or gaseous chemical substance (referred to as the solute) to dissolve in solvent (usually a liquid) and form a solution. We are going to check solubility of our sample in water, acidic and alkaline solution

## 7) Evaluation Parameters :

### ❖ Organoleptic Evaluation

Color: Natural shade depending on herbs used Odor: Characteristic herbal or pleasant aroma. Texture: Smooth and slightly coarse.

**Appearance:** Semi-solid or creamy paste.

### 1. pH Determination

Measured using a digital pH meter.

Ideal range: 5.0 – 6.5 (compatible with skin pH).

### 2. Spreadability

Determines how easily the scrub spreads on the skin. Measured by placing a small amount between two glass slides and applying pressure.

Good spreadability ensures even application.

### 3. Washability

The ability of the scrub to be easily removed with water after application.

Should not leave oily or sticky residue.

### 4. Moisture Content

Determines the amount of water in the formulation.

Helps maintain product stability and shelf life.

### 5. Skin Irritation (Patch) Test

Applied to a small skin area to test for irritation, redness, or itching.

Confirms product safety for topical use.

until constant weight is obtained.

$$\text{❖ Moisture Contents} = \frac{\text{Total weight}}{\text{Dry weight}}$$



(Fig no. 7. Moisture content Test)

- ❖ **IDENTIFICATION TEST:-**
- 1) **DETECTION OF PROTEINS :-**

**Ninhydrin test:**

1. To the extract, 0.25% w/v Ninhydrin reagent was added and boiled for few minutes. Formation of blue colour indicates the presence of amino acid.

## 2) Detection of Carbohydrate :-

### Molisch's Test :-

Sample of the rice powder was taken in test tube. Then 20% alcoholic solution and conc. Sulfuric acid, which is freshly prepared is added into test tube along the sides.

Observation :-

Developed Radish violet and purple ring at junction between two liquids.



(Fig no. 8 .Protien and carbohydrate test )

❖ **RESULT :-****A)Procurement:****B) Authentication:**

NANDED EDUCATION SOCIETY'S  
**SCIENCE COLLEGE, NANDED**  
(Affiliated to Swami Ramanand Teerth Marathwada University, Nanded)  
(Re-accredited with "A+" grade by NAAC (CGPA 3.35) 4<sup>th</sup> Cycle, CPE Status,  
DST-FIST, NIRF Ranking-72 (Year - 2017), Best College Award SRTMUN)  
P.O. Box No.62, Sneh Nagar, Nanded-431605 (MS, India) P (O) 02462-251648, 250465 Fax. 02462-250465  
Email : sciencecollege1950@gmail.com, www.sciencecollegenanded.org

03/02/2026

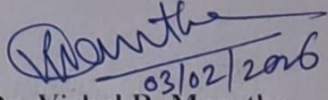
**Certificate**

I have studied the plant material submitted by **Mr. Kamble Nilesh, Mr. Karkhele Vishwajeet, Mr. Kawarkhe Aniket, Ms. Kendre Vaishnavi** and **Ms. Khandagale Divya** students of **B. Pharm** under the guidance of **Dr. N. G. Patre** (Project Guide), **D. K. Patil Institute of Pharmacy, Loha Dist. Nanded.**

I hereby identify and authenticate that the given Plant material is belonging to

Sr. No.	Botanical Name of Plant	Family
01	<i>Oryza sativa</i> L.	Poaceae

This certificate is issued as per request and is given only for academic and Research use.

  
**Dr. Vishal R. Marathe**  
 Professor in Botany,  
 (Plant Taxonomy Research Lab)  
 Department of Botany,  
 N.E.S. Science College, Nanded





(Fig no. 9. Anti Microbial test E-coli and Staphylococcus Bacteria)

- ❖ **Skin irritability Test:-** These scrub pass the skin irritability test.



(Fig.no.10-Skin irritability Test)

**Preformulation Table :-**

Sr.No	BATCH	A (60)	B (85)	C (120)
1)	<b>BULK DENSITY</b>	0.62	0.52	0.5
2)	<b>TAPPED DENSITY</b>	0.71	0.76	1.25
3)	<b>CARRS INDEX</b>	16.3%	7.5%	1.46%
4)	<b>HAUSNERS RATIO</b>	1.14	85	2.5
5)	<b>ANGLE OF REPOSE</b>	15°	14°	70°
6)	<b>ASH VALUE</b>	96%	80%	70%

**(Table no.1: Preformulation of Rice powder Sample)****1) Bulk Density****2) Angle of Repose****3) Ash Value****4) Tap Density**

- Solubility :-
- A. Oryza Sativa
- B. Table No. 2 Solubility of Oryza Sativa

Sr.No.	Solvent	Solubility
1)	Ethyl Acetate	Slightly soluble
2)	Ethanol	Slightly soluble
3)	Water	Insoluble



( Fig no.11 -Solubility Test)

## ❖ FORMULATION TABLE IN FACE SCRUB:-

Sr.No	Ingredients	A	B	C
1)	RICE(API) (Oryzasativa)	6 gm	8 gm	7gm
2)	Gram Flour	5 gm	4 gm	4gm
3)	Turmeric	3gm	2 gm	2gm
4)	Honey	1 ml	1 ml	1 ml
5)	Tea Tree Oil	1ml	1 ml	1 ml
6)	Rose Water	1 ml	1ml	0.5ml
7)	Aloe vera	2 gm	3 gm	3 gm



( Fig no. 11. Formulation Batches)

❖ **ORGANOLEPTIC CHARACTER:-**

Table No.4 Organoleptic characteristic of powder.

Parameter	Observation
Colour	White
Odour	Mild, Neutral
Texture	Fine, Smooth
Irritation	Non irritation
Nature	Natural

## ❖ Determination Of pH :-



(Fig no. 12 Digital pH Meter)

### 11) Conclusion:-

The rice-based herbal scrub proves to be an effective, natural, and eco-friendly skincare product. The combination of rice powder and herbal ingredients helps to gently exfoliate dead skin cells, remove impurities, and improve skin texture. Regular use of this scrub promotes smooth, radiant, and healthy skin without the side effects of synthetic chemicals. Thus, it serves as a safe and affordable alternative for maintaining natural beauty and skin health.

### 12) REFERENCE -

1) Aglawe et al. (2019) — Preparation and Evaluation of Polyherbal Facial Scrub (J. Drug Delivery and Therapeutics) A poly-herbal scrub including rice bran/powder among other herbal actives; assessed for cleansing efficacy and stability

- 2) Baride et al. (2025) — Formulation and Evaluation of Poly Herbal Facial Scrub (EPRA IJRD) Rice flour combined with aloe vera, turmeric, carrot powder, orange peel, rose water, coconut oil; evaluated for various physical and sensory parameters—found effective for skin exfoliation and brightening.
- 3) Ghode, D. S. P., et al. "Formulation and Evaluation of Facial Scrub Containing Sunflower Seeds and Other Natural Ingredients." *World Journal of Pharmaceutical Research* 8.9 (2019): 1772-1781.
- 4) Harshitha R et al. (2024) — Formulation and Evaluation of Natural Rice Flour Face Scrub Uses unpolished rice flour with shea butter, coconut oil, vitamin E for exfoliation and skin texture improvement; evaluated for pH, viscosity, spreadability, washability, etc.
- 5) Kumar Das, Manish, et al. "Formulation and Evaluation of Herbal Exfoliating Scrub." *The product does not dry out the skin Is the exfoliating action effective* (2022).
- 6) Mounika, Priya Kumari Sinha, and P. N. Kavitha. "Formulation And Evaluation of Herbal Face Scrub Using Exfoliating Agents.
- 7) Polly G, Shashank T, Kartikay P, Shukla T, Yadav P. Formulation and evaluation of face scrub: an herbal formulation. *Int. J. Pharm Sci.* 2024; 2(3): 579-88.
- 8) Prashant, Rahul & Sreekanth (2022) — Formulation and Evaluation of Herbal Face Scrub (IJPBA) A herbal scrub prepared using rice powder as key exfoliant along with sandalwood, orange peel and rose water; evaluated on pH, consistency, spreadability, irritability and found non-irritant and effective.
- 9) Sahu, Bharati, et al. "Research Article Formulation and Evaluation of Tan Removal Scrub Containing Chenopodium Quinoa." (2024).
- 10) S, Taped S. et al. "Polyherbal Facial Scrub." *International Journal for Research in Applied Science and Engineering Technology* (2023): n. page.