

## FORMULATION AND EVALUATION OF SKIN BRIGHTNING AND ANTI-MICROBIAL RICE STARCH CREAM

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### ABSTRACT

Rice has a long history of being recognized for its ability to heal and improve the skin, making it a popular ingredient in cosmetics. But no scientific evidence is provided. Aloe vera and neem also provides several skin benefits and are being used as herbal medicines in Ayurveda, siddha, and Homeopathic cosmetics, as well as certain medicinal products. Neem and starch exhibits antimicrobial and skin brightening properties resp. Aloe vera contains seventy five potentially lively constituents. The aim of this research is to prepare the cream using the ingredients such as rice starch, neem extract and aloe vera gel having the properties such as anti-acne, skin moisturizing and giving brightness effect to the skin.(1)

**Keywords:** Rice Starch, Neem, Skin Brightening, Antimicrobial, Moisturizing.

### I. INTRODUCTION

Creams, which are semisolid emulsions, can come in two types: oil in water or water in oil. These creams are designed for external use. They serve the purpose of protecting the skin from various environmental conditions, while also providing a soothing effect. Creams can be classified as either oil in water or water in oil emulsions and are applied to the outer or superficial parts of the skin, where they can remain for an extended period of time.. Our main goal for this project is to develop a herbal cream that has various advantages, such as hydrating the skin, decreasing acne and skin inflammation, easing skin problems like eczema, psoriasis, dryness, wrinkles, and rashes, and enhancing facial radiance. To accomplish this, we have included three herbal components in our formula: Rice starch, neem, and aloe vera gel. Starch is used to moisturize the skin and gives skin brightening effects. Aloe Vera gel is utilized for hydrating the skin, addressing pimples and acne, and aiding in the healing of burn wounds. Neem, on the other hand, is known for its antifungal and anti-inflammatory properties, which help reduce scars, pigmentation, redness, and skin itching.

**Face creams:** Face creams are cosmetic products that are used to soften and cleanse the skin. Emollients on the other hand, are non-cosmetic moisturizers that come in forms such as creams, ointments, lotions, and gels. These emollients help the skin feel comfortable and provide a protective film for patients with conditions like eczema or psoriasis. Emollients are also an essential part of skin care and can be found in beauty applications like lipsticks, lotions, and other cosmetic products.

### II. METHODOLOGY

#### Ingredients used in preparation of face cream:

**Rice starch:** Rice starch is the main component of cream and has many functions such as skin brightening, anti-inflammatory and moisturizing effects.

**Neem extract:** neem extract was collected using ultrasonication method and nimbolide was the main component of extract that has anti microbial effects.

**Aloe vera gel:** aloe vera gel has moisturizing effects and gives soothing and cooling effect to the skin

**Water:** Water is the primary raw material in skin cream production. It is widely used and inexpensive. It serves as a solvent to dissolve other cream ingredients, and it is essential to use water that is free of harmful, pollutant, and microbes. The amount of water in the formula determines whether it produces oil-in-water or water-in-oil emulsions. (2-5)

**Oils, fats and waxes:** Creams require oil, fats, and waxes as an important component. Waxes emulsify, fats thicken, and oil serves as a perfuming agent and preservative. Oil can be classified into mineral and glyceride types based on its purpose.

**Waxes:** Various types of waxes, such as beeswax, carnauba wax, ceresin, and spermaceti, are utilized in the production of cream. These waxes are incorporated into cosmetics to prevent the separation of oil and liquid components in emulsions. Additionally, these waxes have the ability to enhance the thickness of the lipid portion and adhere to the skin's surface.

**Emollients:** Stearic acid used as Emollient in skincare are often called moisturisers, are used to make the skin soft or to address dry skin. They function by enhancing the skin's water retention, creating a protective oil layer to reduce water loss, and lubricating the skin.(5)

#### **Materials and methods:**

##### **Method used for the extraction of neem**

##### **Ultrasound assisted Extraction:**

**Principle:** Ultrasound-assisted extraction (UAE) uses ultrasound energy and solvents to extract target compounds from various plant parts. Ultrasound are the mechanical waves having frequency (>20 kHz) higher than audible frequency range of human hearing (20 Hz to 20 k.

##### **Procedure:**

Fresh leaves were obtain and dried under shade for 7-8 days.



Leaves grounded into fine powder and passed through the sieve to obtain a uniform powder



Total 20gm of powder was taken and mixed with 320ml of dichloromethane.



This mixture was allowed for extraction on sonicator for 20 mins at 35°C temperature.

##### **Method used for the extraction of starch: (6)**

**Cleaning and soaking:** The initial step in acquiring rice starch involves putting off impurities such as dirt, stones, and overseas resources via cleansing the rice grains. Following this, the rice is soaked in water for an extended period to soften it, a step integral in making sure handy extraction of the starch from the grains.

**Grinding:** Once the rice is soaked, it is either milled or blended to structure a easy paste. When blended with water, this paste creates a slurry the place the starch granules from the broken down rice grains are suspended.

**Seperation:** The slurry is separated into two groups based totally on starch and protein content. As the slurry settles, the heavier starch sinks to the backside whilst the lighter protein floats to the top.

**Mixing:** Later, the starch is washed appreciably to remove any closing protein particles. This is achieved through mixing water with the starch and allowing it to separate. Removing the water leaves only the starch, resulting in an extend in its purity and the removal of impurities.

**Drying:** The starch drying completes the extraction process. The starch is usually dried in an oven or by way of the use of the advantage of spreading it out on a flat surface and allowing it to air dry. As soon as the starch has dried, it can be ground into a pleasant powder and used in a variety of skin care products. Drying is vital to prolong the starch's shelf life and eliminate any remaining moisture.

##### **Cream formulation:**

An emulsion-based cream, made with oil in water (O/W) formulation, was created. The stearic acid emulsifier, along with other oil-soluble ingredients like beeswax and potassium hydroxide, were dissolved in the oil phase (Part A) and heated to 75°C. In a separate container, preservatives and other water-soluble components such as neem extract, aloe vera gel, and starch were dissolved in the aqueous phase (Part B) and heated to 75°C as well. The aqueous phase was then gradually added to the oil phase while continuously stirring, until the emulsifier cooled and set.



**Composition of cream**

Sr.no	Ingredients	Formula%w/w		
		F1	F2	F3
1.	Neem extract: starch	1:2	1:1	2:1
3.	Aloe vera gel	2gm	2gm	2gm
4.	Stearic acid	3gm	3gm	3gm
5.	Potassium hydroxide	2gm	2gm	2gm
6.	Bees wax	1gm	1gm	1gm
7.	Preservative	0.5gm	0.5gm	0.5gm
7.	Rose water	Q.S.	Q.S.	Q.S.
8.	Water	Q.S.	Q.S.	Q.S.

**Evaluation of cream**

**Organoleptic evaluation:**

The Face Cream was assessed for its organoleptic characteristics such as color, scent, and texture. The cream's color and smoothness were observed and rated to determine its appearance.(7)

Sr.no	Parameter	F1	F2	F3
1.	Colour	Faint green	Faint green	yellow
2.	State	Characteristic	Characteristics	Characteristics
3.	Consistency	Smooth	Smooth	Smooth
4.	Phase separation	No phase separation	No phase separation	No phase separation
5.	Washability	Easily washable	Easily washable	Easily washable
6.	After feel	Good	Good	Good
7.	Irritancy	No irritation	No irritation	No irritation
8.	Greasiness	Little greasy	No greasiness	No greasiness
9.	Antimicrobial test	No microbial growth	No microbial growth	No microbial growth
10.	pH	7.38	7.39	8.57

**Antimicrobial testing of prepared cream formulation:**

The Formulated Creams were applied onto agar plates using the streak plate method, and a control plate was also set up without the cream. The plates were then placed in an incubator at 37°C for 24 hours. Following the incubation period, the plates were examined for microbial growth by comparing them to the control plate.

**Homogeneity:** The creams were confirmed to be homogeneous by their visual appearance and texture.

**After feel:** The smoothness, slipperiness, and residue amount of cream was examined and it was found to be good.

**Removal:** All the creams applied to the skin were easily washed off with tap water.

**Irritancy test:** All formulations demonstrate no signs of redness, swelling, inflammation, or irritation, indicating that they are deemed safe for skin use based on irritancy studies.(8)

Sr.no	Formulation	Irritancy effect	Erythema	Edema
1	F1	Nil	Nil	Nil
2	F2	Nil	Nil	Nil
3	F3	Nil	Nil	Nil

**Wash ability test:** In washability test a small amount of sample was applied on hand and checked. All the samples were easily washable(8)

Sr.no	Formulation	Washability
1	F1	Easily washable
2	F2	Easily washable
3	F3	Easily washable

**Skin brightening test:**

Five volunteers were chosen for a study, and after a month of applying and observing preparations, a skin test showed no pigmentation and the skin had become lighter.

**Phase separation:** The cream was kept in tightly packed container for 24 hours away from sunlight and observed for phase separation. No phase separation was observed.(8)

Sr. no	Formulation	Phase separation
1	F1	No phase separation
2	F2	No phase separation
3	F3	No phase separation

F1: Pharmacy 1 cream; F2: Pharmacy 2 cream F3: Pharmacy 3 cream

**pH test:** The pH was checked by dispersing 0.5gm pf cream in 50 ml distilled water and measured in digital Ph meter.(9)

Sr no	Formulation	pH
1	F1	7.38
2	F2	7.39
3	F3	8.57



**Stability studies:** To test the stability of the formulations, stability studies were conducted where each formulation was stored at different temperatures (4°C, room temperature, and 40°C) for one month to observe any changes in physical stability, such as color.

**Report of stability studies:** The colors were slightly changed for a temperature of 40°C, while remaining consistent at 4°C temperature.

### III. RESULT

#### Herbal cream formulation:

The formulation involves combining an specific amount of each ingredient to create a product containing natural phytochemicals and phytoconstituents with their medicinal properties. The product is carefully packed and prepared. Its lightweight and cooling properties work wonders on the skin, brightning and nourishing it. It serves as a remedy for pigmentation, dark spots, pimples and ensures skin hydration. The formulation meets the required physicochemical standards.



### IV. DISCUSSION

The research work performed was the formulation and evaluation of skin brightening and antimicrobial face cream.

This cream was a O/W type of emulsion, hence passed the washability test. It also had smooth consistency and was easily spreadable over the skin surface. It had a good viscosity and acceptable pH value and no phase separation was observed. The cream was non irritant and non greasy. No microbial growth was observed at the zone of inhibition and hence claimed to be Noncontaminated.

### V. CONCLUSION

It was determined in the discussion that by combining extracts of rice i.e starch and neem along with aloe vera gel in varying ratios, a multipurpose effect can be achieved on the skin, including whitening, brightning, antimicrobial, anti-acne, and nourishing effects. While it's difficult to enhance the effectiveness of a single plant extract, combining different extracts can increase their efficacy. Therefore, we combined starch and neem extracts to enhance and synergize the cosmetic properties of the products compared to using the extracts individually. These studies indicate that the composition of the extracts and the cream base of F2 is stable and safe, potentially leading to a synergistic action.

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