



## AREVIEWONFORMULATIONANDEVALUATIONOF HERBAL SUNSCREEN CREAM

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### ABSTRACT

The objective of the current study was to formulate and develop a herbal sunscreen cream incorporating extracts from plant materials, specifically *Azadirachta indica* and *Aloe barbadensis miller*. The evaluation of the cream was conducted based on various parameters, including pH, viscosity, spreadability, and stability. The herbal sunscreen cream demonstrated excellent spreadability and consistency. Furthermore, the formulated herbal sunscreen cream was found to be safe for skin application, currently, herbal sunscreens are commonly utilized by individuals worldwide to protect against the harmful effects of UV radiation from sunlight. Herbal formulations are favoured due to their reduced side effects and enhanced safety profiles. This study focuses on the preparation and assessment of a herbal sunscreen cream that exhibits anti-UV radiation

**Keywords:** *Azadirachta indica*, *Aloe barbadensis miller*.

### INTRODUCTION

Sunscreen, commonly known as sunblock cream, is a topical product designed to protect the skin from the harmful effects of the sun's rays and prevent sunburn.[1] Herbal components like Neem, Aloe Vera, and strawberry have demonstrated the ability to absorb a wide range of UV rays..[2] UV-absorbing agents need to concentrate in upper layers of the skin to create a thick light-absorbing barrier and ensure water resistance.[3]the ultraviolet (UV) radiation from the sun, which mitigates sunburn and other forms of skin damage.[4]Numerous natural ingredients possess qualities that shield the skin from the sun, including shea butter, coconut oil, and vitamin E[5]. The human body or any of its parts for the purposes of cleansing, enhancing beauty, increasing attractiveness, or modifying appearance.[6,7]

• Sun-blocking agents can be categorized based on the type of protection they provide, into the following groups:

### 1. Inorganic (Physical blockers)

The two main inorganic UV filters are titanium dioxide (TiO<sub>2</sub>) and zinc oxide (ZnO) which is commonly utilized in the cosmetic and pharmaceutical sectors.[8]

### 2. Organic (Chemical absorbers)

ultraviolet (UV) filters, including benzophenones, function by absorbing UV radiation, which elevates them to a higher energy state. The surplus energy is then released either through the emission of longer wavelengths or by undergoing photochemical relaxation processes.[9]

### 3. Natural (Chemical blockers )

Natural compounds such as polyphenols (including flavonoids and tannins), carotenoids, antioxidants, certain vitamins, triglyceride oils, and volatile oils derived from vegetables, fruits, and various parts of medicinal plants (such as leaves, flowers, fruits, and berries).[10]

## OBJECTIVES

1. Protection from Ultraviolet rays
2. Natural ingredients consistency antioxidant and soothing properties
3. Reduced risk of skin damage.

## ADVANTAGE[11]:

1. Easy availability.
2. Absence of side effects.
3. No special equipment required for preparation.
4. They are economical.
5. The ingredients are easily accessible.
6. Renewable resource.

## DRUG PROFILE

Table 1: Drug profile

| Sr | Constituents                                                                                                 | Uses of ingredients                                                                                                                                                                                                                          |
|----|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  |  <p>Fig 1. Neem extract</p> | Neem has antibacterial properties that help improve skin texture, clarity, and promote an even skin tone, giving your skin healthy, glow.                                                                                                    |
| 2  |  <p>Fig 2. Strawberry</p>  | A natural source of antioxidants that may improve sun protection by counteracting free radicals and reducing UV damage.                                                                                                                      |
| 3  |  <p>Fig 3. Rose water</p> | A rose is a woody perennial flowering plant belonging to the genus Rosa, within the family Rosaceae, or it may refer to the flower produced by this plant.[12,13]                                                                            |
| 4  |  <p>Fig 4. Beeswax</p>    | This substance is obtained from honeybees belonging to the genus Apis and is classified as a natural wax. Primarily, beeswax foundation serves as an emulsifier and thickening agent, and it can also function in stabilizing emulsions.[17] |

|   |                                                                                     |                                                                                                                                                                                                                                                                                   |
|---|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 |    | primarily serving as a humectant, it draws moisture to the skin and maintains hydration. Additionally, it functions as a protective barrier against environmental elements such as pollutants and ultraviolet rays.                                                               |
|   | Fig 5. Glycerine                                                                    |                                                                                                                                                                                                                                                                                   |
| 6 |    | Vitamin E aids in cleansing the skin by removing impurities and enhancing skin elasticity. When combined with lemon juice, it contributes to skin whitening[18]                                                                                                                   |
|   | Fig 6. Vitamin E capsule                                                            |                                                                                                                                                                                                                                                                                   |
| 7 |   | Titanium dioxide serves as a UV filter in sunscreens, offering protection against UVA and UVB rays. It functions by reflecting, scattering, and absorbing Ultraviolet light.                                                                                                      |
|   | Fig 7. Titanium dioxide                                                             |                                                                                                                                                                                                                                                                                   |
| 8 |  | Coconut oil maintains skin softness and smoothness while helping to prevent premature aging. It serves as an effective moisturizer, aids in the removal of dead skin cells, and is beneficial for individuals with conditions like eczema by providing hydration to dry skin[19]. |
|   | Fig 8. Coconut oil                                                                  |                                                                                                                                                                                                                                                                                   |

## INGREDIENTS

Table 2: Ingredients

| Sr.no | Ingredients        | Quantity |
|-------|--------------------|----------|
|       | Aloe vera          | 20 ml    |
|       | Strawberry extract | .6 ml    |
|       | Teem extract       | .6 ml    |
|       | Rose water         | .4 ml    |
|       | Shea butter        | .4 gm    |
|       | Beeswax            | .2 gm    |



|   |                   |       |
|---|-------------------|-------|
|   | Glycerine         | .4 ml |
|   | Vitamin E capsule | .3 ml |
|   | Titanium dioxide  | .4 gm |
| 0 | Coconut oil       | .7 ml |

## Procedure

- 1. Preparation:** Verify that all equipment and surfaces are thoroughly cleaned and sterilized to avoid any risk of contamination.
- 2. Ingredient Measurement:** Accurately measure the required amounts of each ingredient according to the intended SPF level and texture of the sunscreen. The proportion of Titanium dioxide relative to the other components will dictate the sun protection factor provided by the sunscreen.
- 3. Combining the Ingredients:** In a sanitized mixing bowl, blend the titanium dioxide with aloe vera, rose water, neem extract, strawberry extract, coconut oil and Shea butter, beeswax glycerine, Vita min E capsule. Utilize a whisk or spoon to mix the components thoroughly until a smooth and uniform mixture is achieved.
- 4. Modifying Consistency and SPF:** To achieve the preferred consistency and SPF rating of the sunscreen, it may be necessary to alter the proportions of the ingredients. Increasing the amount of Titanium dioxide will enhance the sunscreen's SPF, whereas modifying the other components can affect the product's texture and overall sensory experience.
- 5. Testing:** Prior to applying the sunscreen to your skin, it is advisable to conduct a patch test to identify any potential allergic reactions or sensitivities to the components. Apply a small quantity of the sunscreen to a limited area of skin and monitor for any negative reactions over a 24-hour period.
- 6. Storing the Sunscreen:** Pour the sunscreen mixture into a clean, airtight container for proper storage. Keep the sunscreen in a cool, dry location, shielded from direct sunlight, to preserve its efficacy.

## EVALUATION PARAMETERS

- 1. Physical characteristics:** The cream is evaluated based on its physical attributes, including color, scent, visual appearance, and texture.
- 2. Viscosity:** The thickness or viscosity of a substance influences its

ability to spread and its overall texture.

3. **Solubility:** This term describes the ability of a substance to dissolve in a solvent, reflecting the degree to which its particles can spread and blend uniformly within that solvent. Solubility plays a vital role in assessing the efficacy and compatibility of various substances in formulations, such as sunscreen.

4. **pH determination:** This process assesses the acidity or alkalinity of a solution on a logarithmic scale ranging from 0 to 14, where 7 is considered neutral. Values below 7 indicate acidity, while those above signify alkalinity. The pH level affects chemical reactions and the compatibility of ingredients in sunscreen formulations.

5. **Viscosity:** This term quantifies a fluid's resistance to movement, reflecting how readily a substance flows. It plays a vital role in assessing the texture, ease of application, and overall effectiveness of sunscreen formulations.

6. **Spreadability:** This concept pertains to the simplicity with which a substance can be evenly distributed across a surface. In the context of sunscreen, it indicates the product's capability to be applied smoothly on the skin for uniform coverage.

7. **Film formation:** This refers to the capacity of a substance to establish a cohesive and uninterrupted layer on a surface. In sunscreen applications, it pertains to the effectiveness of the product in creating a protective barrier on the skin after it is applied.

8. **Drying time:** This refers to the period required for a substance to evaporate or solidify after it has been applied. In the context of sunscreen, it signifies the speed at which the product dries on the skin, influencing both comfort and usability.

9. **Transparency:** This term describes the clarity or translucency of a substance, indicating how much light can pass through it. In sunscreen, it pertains to the visibility of the product on the skin, whether it appears clear or opaque.

10. **Physical stability:** This term indicates the formulation's capacity to retain its physical characteristics over time, resisting alterations such as separation, settling, or degradation. In sunscreen.

11. **Sun Protection Factor Determination:** SPF of formulated creams were calculated by the application of equation:

$$\text{SPF} = \text{CF} - \sum \text{EE}(\lambda) \times 1(\lambda) \times \text{Abs}(\lambda)$$

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The prepared formulation was analyzed using a UV Spectrometer, and the absorbance readings were recorded for the wavelength range of 290 to 320. These absorbance values were then multiplied by the EE x I value, and the resulting figures were further adjusted by a correction factor of 10.

### OBSERVATION TABLE

Table 3: Observation table

| Sr.no | Parameters        | Observation            |
|-------|-------------------|------------------------|
|       | Colour            | White                  |
|       | Texture           | Smooth                 |
|       | Spreadability     | Good                   |
|       | pH                | 5.5                    |
|       | Test of irritancy | No irritation reaction |

### CONCLUSION

The impact of ultraviolet radiation on skin health is extensive and often surprising. Consequences include sunburn, inflammatory skin disorders, hyperpigmentation, premature aging, and skin cancer. Herbal-based cosmetics can shield the skin from harmful solar radiation without adverse or pore-clogging effects. This review primarily examines the scientific rationale behind the incorporation of herbal solutions in cosmetic products. The active ingredients found in herbal extracts exhibit considerable UV-blocking properties. Furthermore, herbs are more accessible, environmentally sustainable, and harmonious compared to synthetic alternatives.

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