

## FORMULATION AND EVALUATION OF HERBAL SUNSCREEN CREAM

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### **ABSTRACT:**

*Sunscreen cream helps you to protect from UV rays. Sunburn is caused by ultraviolet B radiation but ultraviolet A may be more damaging to the skin. Sunscreen should ideally block both wavebands. The aim of this study was to develop herbal topical sunscreen formulation based on some fixed oils, in combination with some herbal powder. Regular use of sunscreen reduces the development of actinic keratosis, squamous cell carcinoma and melanoma. Sunscreen is also known as sunblock lotion; the product that absorbs or reflect the sun's ultraviolet radiation and protect the skin. The increasing incidence of skin cancers and photo damaging effects caused by ultraviolet radiation has increased the use of sun screening agents, which have shown beneficial effects in reducing the symptoms. Sun screening agents should be safe chemically, inert, non-irritating nontoxic, photo stable and able to provide complete protection to the skin against damage from solar radiation.*

**Keyword:** Herbal Sunscreen, SPF(sun protection factor), skin burn.

### **INTRODUCTION:**

Herbal Sunscreen (also known as Herbal sunblock, Herbal suntan lotion) is a lotion, spray or other topical product that helps protect the skin from the sun's ultraviolet (UV) radiation, and which reduces sunburn and other skin damage, with the goal of lowering the risk of skin cancer with the help of herbs. However, in the United States, the term suntan lotion usually means the opposite of sunscreen, and instead refers to lotion designed to moisturize and maximize UV exposure and tanning rather than block it. These are

commonly called indoor tanning lotions when designed for use with tanning beds or just suntan lotion if designed for outdoor use and may or may not have SPF protection in them.

### **Advantages of Herbal Sunscreens:**

- (1) Easily available.
- (2) No side effects.
- (3) No special equipment needed for preparation.
- (4) Renewable resources.
- (5) Botanical ingredients are easily available.
- (6) They are inexpensive.

### **Possible adverse effects**

Some individuals can have mild to moderate allergic reactions to certain ingredients in sunscreen, particularly the chemical benzophenone, which is also known as phenyl ketone, biphenyl ketone, or benzoyl benzene. It is not clear how much of benzophenone is absorbed into the bloodstream, but trace amounts can be found in urinalysis after use. Sunscreens are effective in reducing sunburn, but not necessarily the risk of cancer.

### **Photo protection**

Sunscreens alone may provide insufficient protection from UVR. Sunscreens function best to prevent sunburn from UV-B radiation. They provide more limited protection from UV-A radiation. Sole dependence on sunscreens can have the unwanted effect of increasing outdoor

exposure times, particularly in those individuals who burn easily and then poorly. Sun avoidance remains the most desirable form of sun protection.

### **Sun protection**

It is vital to protect skin and eyes from the damaging effect of the sun because exposure to ultraviolet radiation contributes to ageing skin and is the main cause of skin cancer. Some people may need to take particular care because of photosensitivity. You should also be careful to protect your skin if you are at high altitude in any season, particularly when in the snow because it reflects extra ultraviolet radiation onto your skin.

### **Chemical vs. Physical Sunscreens**

Chemical Sunscreens are synthetic chemical substances with the following properties:

They are powerful absorbers of UV radiation when they absorb radiation they remain relatively these sun filters are formulated with other compounds in order to obtain highly effective products with protection factors varying from 4 to 30. Importantly, they often have to be reapplied quite frequently.

### **Physical sunscreens**

Contain inert mineral particles that reflect UV rays like a mirror. The most common type used is ultra-fine titanium dioxide (TiO<sub>2</sub>), made up of minute particles only 20-30 nm<sup>3</sup> in size. These products have advantages over chemical sunscreens in that they are inert substances that do not break down over time. They are far less liable to cause skin irritation, since they are in the form of insoluble particles that are

not absorbed through the skin. Because of the small size of the particles, modern physical sunscreens reflect radiation in the UVB and short UVA regions better than earlier products.

### **MATERIALS AND METHODOLOGY**

**YASHAD BHASMA:** - It offers protection against "Broad Spectrum Ultraviolet Rays" (UVA/UVB), unlike chemical sunscreens that usually only block one type of UV light. Due to its astringent property, the Bhasma helps in regulating oil or sebum production in the skin and therefore works well on acne and oily skin types.

**ALMOND OIL FOR SKIN:** - When used externally, Almond Oil has the potential to alleviate and pacify irritated skin, diminish redness and swelling, and expedite the healing process. When ingested, Almond Oil has the capacity to reduce inflammation throughout the entire body, encompassing the joints and digestive system.

The Vitamin A and E contained in Almond Oil are like protectors for your skin. They team up to fix sun damage, help your skin against impurities and make it appear young and healthy. Almond Oil also contains Linoleic Acid which protects your skin's barrier and helps retain moisture. So, if your skin is dry from the sun, Almond Oil is a great choice to make it better.

### **Skin Tone and Complexion Improvement:**

If you want a natural way to make your skin look better and feel smoother, Almond Oil is a fantastic choice. Owing to its levels of Vitamin E, it can help improve the complexion of skin and smooth blemishes. It can make wrinkles and fine lines less

noticeable and give your skin a brighter look.

**ROSE WATER:** -Rose water contain vitamin b. Which often used in Sunscreen and sun product .it helps to bolster the effectiveness of SPF. rose water can be used to lighten the skin pigmentation. Rose water can remove oils and dirt from your skin by unclogging your

pores. It helps maintain pH level of your skin. It is hydrating and nourishing agent for skin and protect skin against harmful environmental aggressors, GulabJal has antioxidant levels that tackle free radicals and keep skin healthy and glow.

**VITAMIN -E CAPSULES:** - Vitamin E it provides extra protection against acute UVB damage and protect against cell mutation caused by sun and pollution exposure. Vitamin E it helps cleanse your skin and removing the impurities from and help improve skin elasticity. vitamin-E help to whiten the skin.it is most commonly known for its benefits of skin health and appearance.it has antioxidant and anti-inflammatory properties.

**SAFFRON:** -The name “saffron” derives from an Arabic word meaning “to become yellow” which refers to Safran’s use as bright yellow dye. The Latin name “crocus” most likely stems from an ancient Sanskrit word for saffron. Saffron is the dried stigma from the crocus sativus used as natural U.V. absorbing agent. The 4% saffron lotion showed an SPF value equivalent to the 8% homovalvate lotion.

**BENEFITS:** - Anti-ageing, sun damage protection, pigmentation treatment, improving skin texture, skin inflammation treatment.



ALMOND OIL



YASHAD BHASMA



VITAMIN E CAPSULES



ROSE WATER



SAFFRON

**Preparation of cream:**

Oil in water (O/W) emulsion-based cream (semisolid formulation) was formulated. The emulsifier and other oil soluble components (almond oil) were dissolved in the oil phase (Part A) and heated to 75°C. The preservatives and other water-soluble components were dissolved in the aqueous phase (Part B) and heated to 75° C. After heating, the aqueous phase was added in portions to the oil phase with continuous stirring until cooling of emulsifier took place.

**METHODOLOGY**

**Preparation of PART A (OIL PHASE)**

- Take almond oil in china dish and Add vitamin E capsules and heat it upto 75\*c temperature for few minutes and allow it to cool at room temperature.

**Preparation of PART B (AQUEOUS PHASE)**

- Take yashad Bhasma in china dish and add rose water and mix it well to obtain thick mixture.
- To the above mixture add colouring agent, and heated upto 75\*c temperature for few minutes and allow it to cool at room temperature.
- The aqueous phase was added in portions to the oil phase with continuous stirring until cream is formed.
- Finally, thick golden colour sunscreen cream of yashad Bhasma is obtained.

SL NO	INGRIDENTS	FORMULATION-1 (45gm)	FORMULATION-2 (45gm)	FORMULATION-3 (45gm)
1	YASHAD BHASMA	6(gm)	8(gm)	10(gm)
2	ALMOND OIL	11(ml)	10(ml)	10(ml)
3	ROSE WATER	14(ml)	13(ml)	13(ml)
4	VITAMIN E	8(ml)	8(ml)	7(ml)
5	SAFFRON	6(gm)	6(gm)	5(gm)

## EVALUATION OF SUNSCREEN CREAM

### 1. Physical parameters:

- (a) **COLOUR:** The colour of formulation was checked manually and observed.
- (b) **ODOUR:** The Smell of Formulation was checked by applying preparation on hand and feel the fragrance.
- (c) **APPEARANCE:** Visually checked the appearance of the formulation.

**2.Determination of pH:** The pH of sunscreens was determined using a digital pH meter. pH was measured after 1 g of the formulation was dissolved in 100 ml of newly prepared distilled water for 2 hours. The purpose of this study was to guarantee that the pH of the produced herbal sunscreens is similar to the pH of the skin after 24 hours of use. The results were triple-checked, and S.D. was recorded.

**3.Determination of Viscosity:** The Brookfield viscometer was used to test viscosity, with the proper number of spindles selected. A 50 ml beaker was used

to hold 50 g of preparation until the spindle groove was dipped and the rpm was set. Sunscreen viscosity was measured at 5, 10, 20, 50, and 100 rpm. The viscosity was computed using the factor obtained from the reading.

**4.Spread ability:** The spread ability of sunscreens determined their therapeutic efficiency. The appropriate amount of sunscreen was applied between two slides, and under specified load directions, and the

two sides took the time in seconds to slide off. Spreadability was defined as the amount of time it took to separate two slides in less time.

The formula for calculating it is:  $S = M \times L / t$

Where,

M = weight tied to the upper slide

L = length of glass slide

T = time taken to separate the slides.

**5.Wash ability:** This test is carried out by simply washing applied sunscreen lotion with water.

**6.Homogeneity:** The formulation was tested for homogeneity by visual appearance and touch.

**7.Irritancy Test:** Mark an area (one sq. cm) on the left-hand dorsal surface. The lotion was applied to the specified area and time was noted. Irritancy, erythema, edema was checked if any for regular interval up to 24 hours and reported.

**8.Stability Testing:** Stability testing of prepared formulation was conducted at room temp, studied for 7 days. And then the formulation was studied at  $45 \pm 1^\circ\text{C}$  for 20 days. The formulation was kept both at room and elevated temperature and observed on 0th, 5th, 10th, 15th and 20th day for all the evaluation parameters.

### Determination of SPF

A UV Visible spectrophotometer was used to examine the in-vitro efficacy of herbal sunscreens. A 0.10 percent solution (w/v) of

herbal sunscreen lotions in ethanol was made by dissolving 0.050 g of herbal sunscreen lotions in 50.0 ml of ethanol. Between 290 and 320 nm, aliquots of each herbal sunscreen were scanned at 5 nm intervals. SPF was calculated using the equation below. Three times each sample was analysed.

$$SPF = CF \sum_{290}^{320} EE(\lambda) \times I(\lambda) \times A(\lambda)$$

Whereas,

CF= Correction factor;

EE= Erythemogenic effect;

I= Intensity of solar light of wavelength;

A= Absorbance

**RESULTS AND DISCUSSION**

PARAMETERS	RESULT OF FORMULATION-1	RESULT OF FORMULATION-2	RESULT OF FORMULATION-3
Appearance	Smooth and opaque	Smooth and opaque	Smooth and opaque
Colour	Golden	Dark Golden	Golden
Consistency	Good	Good	Good
Texture	Smooth	Smooth	Smooth
Odour	Pleasant	Pleasant	Pleasant
Spreadability	Good	Good	Good
Stability	Good	Good	Good
pH	7.2	7.0	7.4

Irritation	None	None	None
Viscosity	0.5(pa)	0.4(pa)	0.4(pa)
SPF by U. V	45.30	48.40	50.35

The cream was prepared using natural ingredients such as Yashad bhasma, almond oil, rose water, vitamin E, saffron. The cream had a smooth and opaque in appearance and had a golden colour with easy spread ability. The pH was found to be in the range of 7-7.4. The pH is compatible with natural pH of human skin, minimizing the risk of irritation. The SPF of three different formulations was found to be 45.30, 48.40, 50.35 respectively. The yashad bhasma played a significant role in enhancing SPF. No phase separation, colour change, or texture alteration over 3 months under various temperature conditions.

**CONCLUSION**

The study attempted to develop herbal sunscreen cream using Yashad Bhasma and examined their efficacy for preventing sunburn. UV Radiation causes various damaging effects on the skin. It causes skin cancer, hyperpigmentation, photo-aging, sunburn and skin irritation. Herbal cosmetics possess property to protect skin from damaging effects of sun rays with no comedogenic and side effects. The present study focuses on formulation of sunscreen using herbal ingredients to achieve maximum stability of formulation and U.V protecting effect and the scientific account of herbals in cosmetics. Active constituents extracted from herbals have a potent UV shielding effect. Herbs are eco-friendly, compatible, and widespread compared to synthetic ones. From the results,

**Formulation 3** evolved as the optimized formulation and it shows the maximum stability and optimum SPF. the success of this project highlights the growing demand for eco friendly and sustainable skin care solutions by choosing herbal ingredients this sunscreen cream aligns with consumer preferences for natural and chemical free products. However, further research is recommended to refine the formulation, optimize sun protection factor, and conduct clinical trials to verify long term efficacy and safety.

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