



# “Formulation and Evaluation of Herbal Sunscreen Cream”

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## Abstract

Sunscreen is a chemical compound that help protect you 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 medical plants. Regular use of sunscreen reduces the development of actinic keratosis , squamous cell carcinoma and melanoma . Sunscreen may be organic or inorganic chemicals . Sunscreen is also known as sunblock lotion. The product that absorb or reflect the suns 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 sunsreening agents, which have shown beneficial effects in reducing the symptoms .

Sunsreening agents should be safe chemically inert , non irritating non toxic , photo stable an able to provide complete protection to the skin against damage from solar radiation.

## Keyword:

herbal Snscreen, SPF(sun protection factor),skin burn, Asian pigeonwings.

## Introduction :

Herbal sunscreen also known herbal sunblock .Herbal suntan lotion is a lotion ,spray or other topical product that helps protect the skin from the suns uv radiation and which reduce sunburn and other skin damage Sunscreen can be classified into two types sunscreen

### 1) Physical sunscreen

Those that reflect the sunlight.

### 2) Chemical sunscreen

Those that absorb the uv light

Sunscreen agents are for external use only .the use of sunscreen as photo protecting agents for uv protection.the sunscreen formulationis which when applied topically protect the treated area from sunburn sunscreen depends on ability to protect against uv induced sunburn and their chemopreventive activity . Excessivesolar ultraviolet radiationare responsible for various skin damages such as sunburn ,skin pigmentation premature aging and photo carcinogenesis .The main mechanism of skin damage by uv radiations is formation of Reactive Oxygen Species(ROS) that interact with proteins lipids and subsequently alter them.UVB and to a lesser extent UVA are responsible for inducing skin damages .

Sunscreen should contain antioxidant agent in addition to sunblock agent to be effective in prevention of photoaging and skin cancer .plants due to their antioxidant potential are known as attractive option to be used in Sunscreen formulation for prevention of skin damage due to solar radiation .sunscreen is topical product that protects the skin against harmful effects of the sun .

## Classification of sunscreen and the mechanism of photoprotection

Sunscreen are classified as either topical or systemic based on the route of administration. Topical sunscreen are divided into two classes on their mechanism of protection.

Organic sunscreen

Inorganic sunscreen

### Organic Sunscreen

Organic sunscreen works by absorbing into skin and converting UV rays into heat. It is thin and ideal for everyday use, allowing for skincare ingredients to be added easily. Organic sunscreen contains chemical carbon-based compounds. It contains non-mineral active ingredients.

### Inorganic sunscreen

These are particles that scatter and reflect UV rays back to the environment. They act as a physical barrier to incident ultraviolet and UV light. They are considered broad spectrum as they cover the entire ultraviolet spectrum. Inorganic sunscreens are also referred to as sunblock.

## Mechanism of photoprotection

Sunscreen acts by preventing and minimizing the damaging effects of the ultraviolet sun rays. Following exposure to the sunscreen, it has been demonstrated to increase the tolerance of the skin to UV exposure. They work on two mechanisms:

Scattering and reflection of UV energy from the skin surface. Mineral-based inorganic sunscreen works on this mechanism. They provide a coating that blocks sun rays from penetrating through the skin.

Absorption of the UV energy by converting it to heat energy, thus reducing its harmful effects and reducing the depth which can penetrate the skin. Organic sunscreen works on this mechanism.

## Main role of ingredients used in formulation

### Aloe vera

Aloe vera is a good active ingredient to reach in Sunscreen arsenal. It has been proven to both treat and prevent burns on your skin. The leaves of aloe vera and *A. Barbadensis* are the source of aloe vera gel. Aloe vera gel is used in cosmetics lotion for its moisturizing and revitalization. It blocks UVA and UVB rays and maintains skin's natural moisture balance. It stops the sunburn and stimulates the immune system intervention. Aloe vera gel can be used to help with the healing process of sunburn; it helps relieve pain and redness by reducing inflammation. The gel also stimulates the production of collagen, which helps the healing process.



### Butterfly pea flower:

#### Packed with antioxidant

Butterfly pea flower contains many antioxidants such as flavonoids, anthocyanin, and polyphenols. Your skin needs antioxidants to improve general health and elasticity. Antioxidants help to minimize fine lines and improve your skin's appearance.

## **Soothes minor skin irritation**

Butterfly pea flower it helped calm itching and general irritation. The butterfly pea flower used for use in rejuvenating the skin.



## **Reduce redness**

Because of butterfly pea flowers ability to soothe irritated skin, it also minimize redness caused by acne, dryness, and general irritation. These nourishing properties are further enhanced when combined with other nutrients that benefit skin health.

## **Improve moisture retention**

This helps increase skin turnover to naturally restore itself. Moisture retention helps stop dryness and promote lipid balance.

## **Improve the skin barrier**

Because butterfly pea flower contain plant based antioxidants and antioxidants vitamin such as vitamins, it help improve skin barrier

## Suitable for all skin type

Butterfly pea flower is a hidden skin care rockstar. It is gentle enough for use on all skin types, no matter what time of year it is.

### Coconut oil:

Coconut oil keeps the skin soft and smooth while preventing premature ageing of the skin. Coconut oil for skin use as a moisturizer, remove dead skin cells. Coconut oil moisturizing dry skin including in people with condition such as eczema. Promoting wound healing it has antibacterial, antifungal and antiviral properties which prevent free radicals from causing damage to the skin. Coconut oil has anti-inflammatory properties which reduce redness on skin. This can be helpful for both dry and oily skin conditions by reducing inflammation of the skin.



### Rose water

Rose water contains vitamin B, which is often used in sunscreen and sun products. It helps to bolster the effectiveness of SPF. Rose water can be used to lighten skin pigmentation. Rose water can remove oils and dirt from your skin by unclogging your pores. It helps maintain the pH level of your skin. It is a hydrating and nourishing agent for skin and protects skin against harmful environmental aggressors. Gulabjal has antioxidant levels that tackle free radicals and keep skin healthy and glowing.



### Vitamin E Capsule

Vitamin E it provides extra protection against acute UVB damage and protect against cell mutation caused by sun and pollution exposure.vitamin E it help cleanse your skin and removing the impurities from and help improve skin elasticity .vitamin E combination with lemon juice it 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.



## Formulation of sunscreen cream

### Formulation of butterfly pea flower extract:

To make an extract of butterfly pea flower for herbal sunscreen ,steep about a dozen fresh or dried flower leaves in a cup of boiling water . After about 15minutes ,strain the liquid and discard the leaves . The deep blue water is then ready to be used in Sunscreen cream.

### Butterfly pea flower contain

Soluble minerals	8.94mg
Ash.	0.9mg
Crude protein.	41.27mg
Soluble carbohydrates.	29.18mg

### Formulation of sunscreen cream was prepared by following procedure -

I have to take butterfly pea flower extract.then I have take aloe vera gel because it has proven to both treat and prevent burns on skin. Then added rose water in mixture rose water provide cooling effect.then gradually add coconut oil and vitamin E.all the ingredients were mixed vigorously using spatula for about 20-30min and placed .

### List of ingredients used in formulation

Aloe vera.	5 gm
Rose water.	2ml
Butterfly pea flower Extract.	4gm
vitamin E.	2gm
coconut oil.	2ml



## Final Product



### Evaluation of sunscreen cream for suncreening activity

#### Effectiveness of sunscreen:

The effectiveness of sunscreen is usually expressed by sunscreen protection factor (SPF), which is the ratio of UV energy required to produce a minimal erythemal dose in protected skin to unprotected skin. A simple, rapid and reliable in vitro method of calculating the SPF is to screen the absorbance of the product between 290-320nm at every 5nm intervals. SPF can be calculated by applying the following formula known as Mansur equation.

- $SPF_{\text{spectrophotometric}} = CF \times \sum_{\lambda} EE(\lambda) \times I(\lambda) \times Abs(\lambda)$

Where CF=correction factor (10), EE=erythemogenic effect of radiation with wavelength, Abs=spectrophotometric absorbance values at wavelength.

The value of  $EE \times I$  constants.

- **PH of the cream :**

The pH meter was calibrated using standard buffer solution. About 0.5g of the cream was weighed and dissolved in 50.0ml of distilled water and its pH was measured.

- **Homogeneity:**

The formulations were tested for the homogeneity by visual appearance and by touch.

Appearance:

The appearance of cream was judged by its colour, pearlscence and roughness and graded.

- **Removal:**

The ease of removal of the cream applied was examined by washing the applied part with tap water.

- **Irritancy test:**

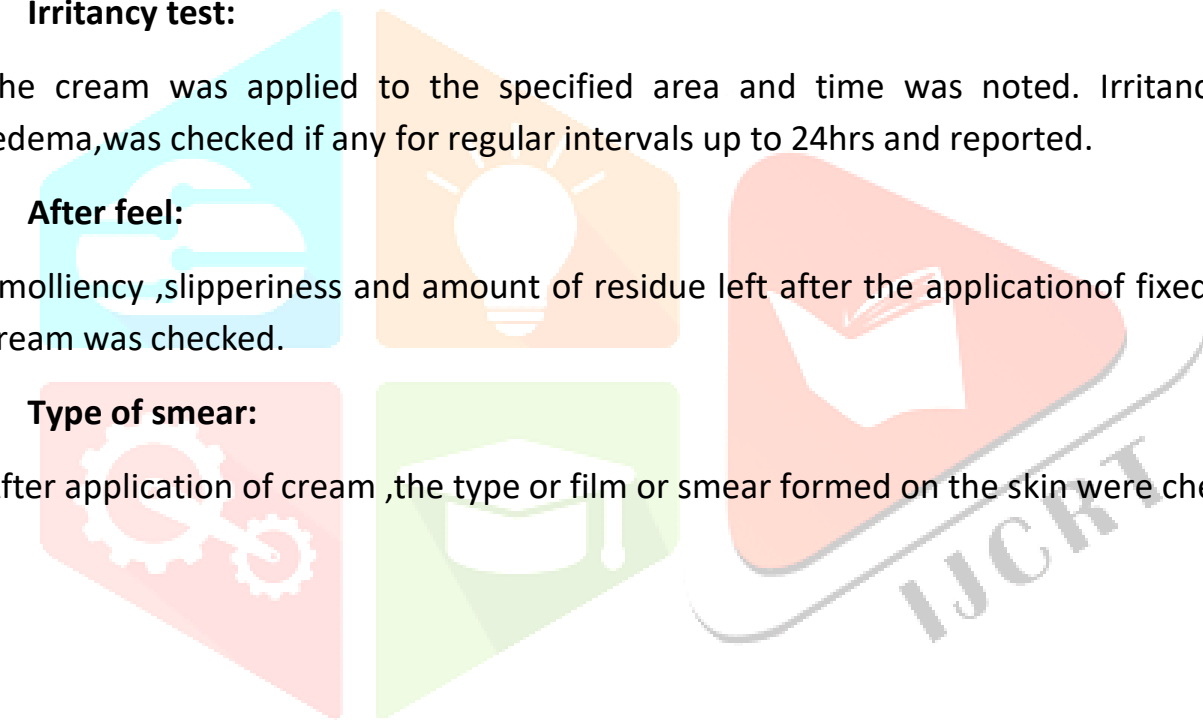
The cream was applied to the specified area and time was noted. Irritancy,erythema ,edema,was checked if any for regular intervals up to 24hrs and reported.

- **After feel:**

Emolliency ,slipperiness and amount of residue left after the applicationof fixed amount of cream was checked.

- **Type of smear:**

After application of cream ,the type or film or smear formed on the skin were checked.



## Types of skin and SPF

Types.	Description	SPF.	Character
1	Always burn easily. And never tans	More than 8.	Sensitive
2	Always burn and tan. Minimally	6-7.	Sensitive
3	Burn moderatory and. Tan gradually	4-5	Normal
4	Burn minimal and. Always tan well	2-3	Normal
5	Barely burn and tan. Profusely	2	Insensitive
6	Never burn and. Become deeply Pigmented	None	Insensitive

## Observations

Sr.No.	Parameters	Observation
1	Colour	Light Blue
2	Odour	Characteristics
3	Spreadability	Good and uniform
4	PH	6.5
5	Test for Irritancy	No.irritation reation

## Benefits of sunscreen

- Reduce risk of skin cancer
- Protect against sunburn
- Avoid inflammation and redness
- Avoid blotchy skin and hyperpigmentation
- Stop DNA damage
- Prevent the early onset of wrinkles and fine lines
- Lower skin cancer risk
- Shields from harmful UV rays
- Maintain the brightness of your natural complexion
- Maintain the look and texture of your skin
- Delays premature signs of aging
- Reflects UVA and UVB rays
- Works immediately when applied on the skin.

## Advantages

- Easily available
- No side effects
- No special equipment needed for preparation
- They are inexpensive
- Ingredients are easily available
- Renewable resources

- Be non toxic and non irritant
- Be neutral
- Be stable to heat
- Easy to manufacture

### **Disadvantages**

- They are difficult to hide taste and odour
- Manufacturing process are time consuming and complicated
- Herbal drug have slow effects as compare to allopathic dosage form it also requires long term therapy.

### **Result**

To be effective in preventing sunburn and other skin damage ,a sunscreen product should have a wide range of absorbance .during the storage and handling of cosmetic formulation spreadability and viscosity are the prime parameter which affects the formulation acceptability.the formulated cream exhibited no redness, inflammation and irritation .when formulation were kept for long time ,it found that no change in colour of cream .The cream was easily removed by washing with tap water .

### **Conclusion**

The study attempted to develop herbal sunscreen cream using extract of butterfly pea flower and examined their efficacy for preventing sun burn .

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