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PREPRATION AND EVALUTION OF SUNCREEN CREAM

Komal Mundhe*, Ms. Aswini Bahir, Dr. Sunil Jaybhye

India.

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Corresponding Author: Komal Mundhe

Address: India.

ABSTRACT

Presently herbal sunscreens are widely used by almost everyone on this planet to prevent from harmful effects of UV radiation from sunlight, Due to the hastypaced life of today, our life is affected by pollution and harsh synthetic chemicals, hence, nature has rendered us with its everlasting notable ingredients of herbal. The major cause of sunburn is UV rays which leads to precarious skin cancer. Sunscreen is a topical product that absorbs or reflects some of the sun's UV radiation on the skin from excessive exposure to UV radiation. It has the potential to prevent Sunburn and reduce the harmful effects of the sun such as premature aging and skin cancer. The present research work portrays the formulations and evaluation of tapical photoprotector, containing antioxidant, anti-malignant, wound healing. moisturizer, & other photo-protective.

KEYWORD'S

1. Antioxidants.
2. Sun protection factor.
3. UV protection
4. Sunblock
5. Broad spectrum protection
6. Skincare
7. Sunscreen lotion

AIM AND OBJECTIVES

Aim: To study the formulation and evaluation of herbal sunscreen cream

Objectives

1. Sunscreen inhibit the transmission of UV (ultra- violet) radiation into the skin by reflecting, absorbing or scattering such radiation.
2. Sunscreen have been recommended as a form of protection against sunlight, with protection increasing with higher sun protection factor
3. To develop sunscreen formulation using herbal ingredients.
4. To develop various formulation.
5. To perform physiochemical characterization.
6. To achieve maximum stability of formulation.
7. To achieve maximum UV protecting effects.[10]

INTRODUCTION

Cosmetics are defined as "The items with mild action on human body for the purpose of cleaning, beautifying adding to the attractiveness, altering the appearance, or keeping or promoting the skin or hair in good condition" while functional cosmetics even after falling the cosmetics are designated as “Items fulfilling specific conditions like skin whitening, minimizing the appearance of items in the face and body, protecting from the sun and sun tanning.[1]

Sunscreen also known as sunblock or Suntan lotion, is a photoprotective topical product for the skin that absorbs or reflects some of the sun's ultraviolet (UV) radiation and thus helps protect against sunburn and most importantly prevent skin cancer. Sunscreen come on lotion Spray, gels, foams, sticks powders and other topical products. Sunscreen are common supplements to clothing particularly sun sunglasses, protective sunhats and special sun protective clothing and other form of protection (e.g- Umbrellas).

Many natural ingredients have properties that protect you from sun, sandalwood is one of them some commonly used natural product is seed oil sunflower oil, sesameoil sheabutter, Jojoba oil, coconut oil, saffron and vitamin E oil. Herbal sunscreen (also known as herbal Sunblock, suntan, lotion) is a lotion spray or topical product containing herbal ingredients which help to protect from the UV radiations of the sun and hence lowering the risk of skin cancer.

UV rays are absorbed by certain bioactive substance in the environment, which protects the skin from their harmful effects. Because of their safety, absence of unpleasant responses, lack

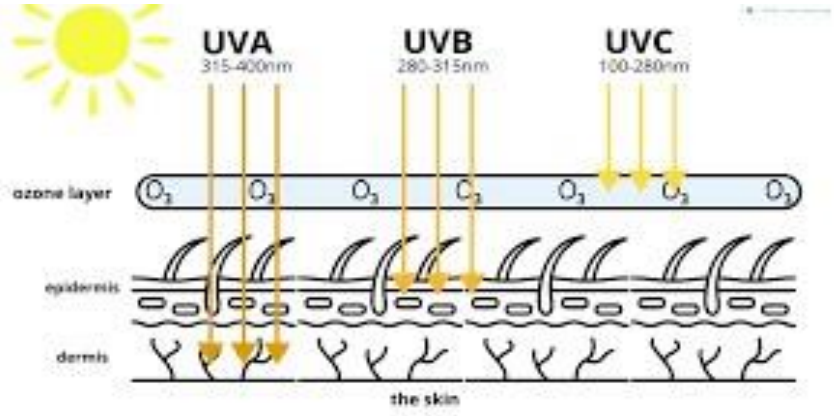
of dangerous chemical components and environmental integrity, biologically active compounds photo-protective chemical are more likely to be dangerous and carcinogenic, phytoconstituents are gaining favor as major cosmetics ingredients due to their natural anti-cancerous, anti-mutagenic, non-toxic properties.[2]

The light emitted by consists of Frequency bonds of infrared, visible and ultraviolet radiation of these UV rays are harmful to most humans (UV spectrum 100-400 nm).

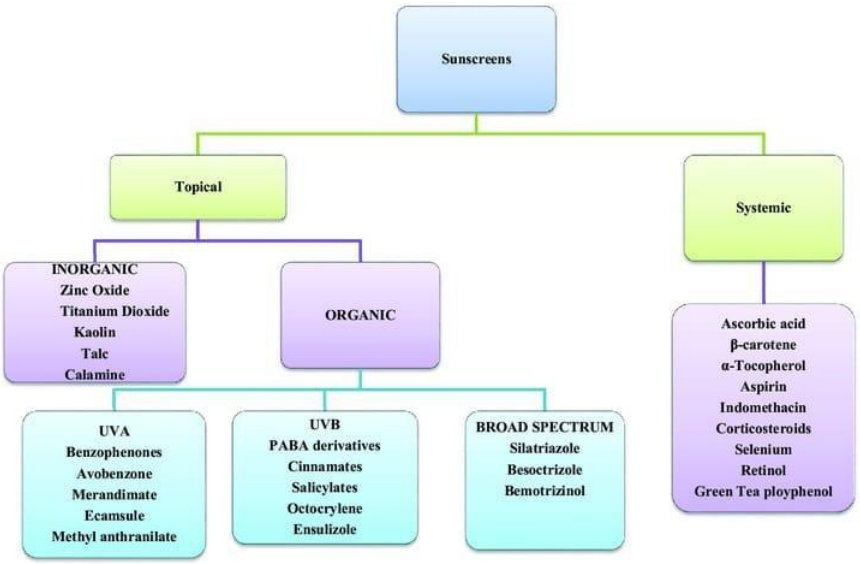
UVA (315-400nm) radiation penetrates the skin and cause damage to cell membrane, cause ageing of skin.

UVB (280-315 nm) rays cause skin cancer cause damage to cornea and lens of eye.

UVC (100-200 nm) generally absorbed by earth's atmosphere and are not harmful.[3]



CLASSIFICATION



Properties of Sunscreen

1. Must absorb a broad range of UV rays causing sunburn.
2. Must be stable in the presence of sunlight.
3. Should be able to provide complete protection for skin.
4. Should be safe effective, chemically inert, at low temperature.
5. Should not cause irritation, sensitization and toxicity.
6. Activity against UVA and UVB radiation.
7. Anti-oxidant property.
8. Anti-cancer property.
9. Anti-mutagenic property.[4]

Advantages of herbal sunscreen cream

1. Easily available
2. Do not show allergy
3. Easy to manufacture
4. Cheap in cost
5. No side effect
6. Effective with small quantity
7. No special equipments needed for preparation
8. Renewable resources
9. Ingredients are easily available[5]

Disadvantages of herbal sunscreen cream

1. They are difficult to hide taste and odour.
2. Manufacturing process are time consuming & complicated.
3. Herbal drug have slow effects as compare to allopathic dosage form it also requires long term therapy.
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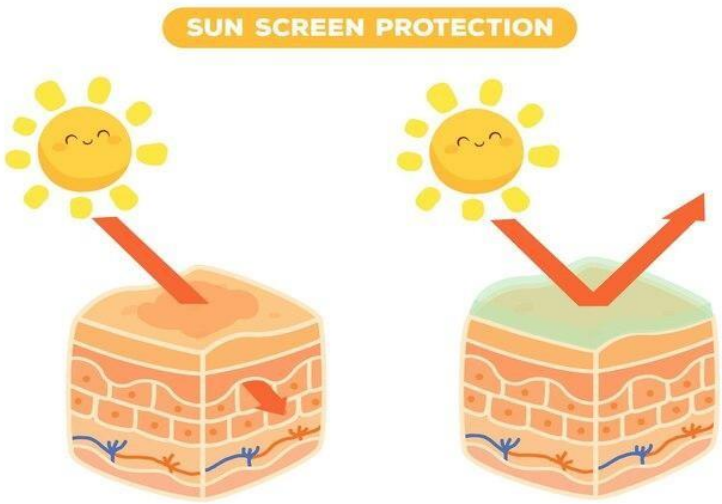
7. Manufacturing process are time consuming and complicated[6]

Importance of sunscreen cream

UV radiation is essential to human healing such that it helps in the intestinal absorption of calcium, phosphorous and for the production of vitamin D3, on the other hand, these

radiations also known harm our health by direct interacting with DNA. RNA proteins, lipids and thereby causing potential carcinogenic effects. The most efficient way to protect skin from harmful UV radiation is the topical application of any active molecule which has UV absorbing or reflecting properties. This is why the sunscreen has gained important in the current scenario. Apply sunscreen is one of the best and easiest ways to protect your skin's appearance and health at any age. Used regularly sunscreen helps prevent skin cancer & premature aging. To help make sunscreen a part of your daily routine.[7]



Why we use sunscreen?

- To much-unprotected sun exposure leads to
- Premature skin ageing
- Sun burn
- Skin cancer[8]

Mechanism of photoprotection

UV rays mediated photo oxidative damage reaches the dermal capillary via epidermis and dermis and cause depletion of enzymatic and non-enzymatic antioxidants in stratum corneum, epidermis and dermis. Photo oxidation of preexisting melanin and its precursors will occur which result in immediate and persistent pigment darkening.

Sunscreen act by preventing and minimizing the damaging effects of the ultraviolet sunrays following exposure to the sunscreen have been demonstrated to increase the tolerance of the skin to UV exposure. The work on two mechanisms:

Scattering and reflection of UV energy from the skin surface mineral based on inorganic sunscreen works on this mechanism they provide a coating that blocks sun rays from penetrating through the skin.[9]

MATERIALS AND METHODS

Aloe Vera

Aloe-vera is a good active ingredient to reach in sunscreen arsenal. it has been proven to both treat on your skin. The leaves of aloe-vera and A. Barbadensisare the source of aloe vera gel is used in cosmetic lotion for its moisturizing and revitalization

It blocks UVA & UVB rays and maintain skin natural moisture balance. It stop the sunburn and stimulate immune system intervention. aloevera gel con be used to help with the healing process of sunburn it help, relieve pain & redness by reducing inflammation The gel also stimulate the production of collagen which help the healing process.[11]

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 have antibacterial, antifungal and antiviral properties which prevents free radicals from causing damage to the skin

Coconut oil has anti-inflammatory properties which reduce redness skin this can be helpful for both dry & oily skin conditions by reducing inflammation of the

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 con remove oils and dirt from your skin by unclogging yours pores.

It helps maintain PH level of your skin. It is hydrating and nourishing agent for skin against harmful environment aggressors gulabjal has antioxidant levels that tackle free radicals and keep skin healthy & glowing.[13]

Butterfly pea flower

Butterfly pea flower contain many antioxidant such as flavonoids authocyanin and polyphenols your skin need antioxidant to improve general health and elasticity. antioxidant help to minimize fine line and improve your skin and appearance.

Butterfly pea flower it helped calm itching and general irritation. It help to used rejuvenating the skin. Butterfly pea flower ability to soothe irritated skin, it also minimize redness caused by acne, Dryness and general imitation.[14]

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.

Sunscreen formulation

1) Emulsion Formulation.
2) Gel formulation
3) Aerosol formulation
4) Sun stick formulation

1) Emulsion formulation

An emulsion is termed a lotion or creams depending on its viscosity, respectively below 50.000 and in the range of 150,000 - 500.000 centipoises, providing almost ultimited versatility. It is normally produced from two unmixable liquid phases, namely "water-in-oil" and "oil-in-water" emulsions.

These formulations possess the ability to spread more easily on the skin and disperse from battles.[16] emulsion sunscreens also -provide an elegant medium that can give a smooth and silky feeling without greasy shine.[17]

2) Gel Sunscreen-

Sunscreen gel seems to represent an ideal vehicle from on aesthetic perspective due to its purity and elegance. It is categorized into four main forms, namely aqueous, hydro alcoholic, micro emulsion, and oil anhydrous formulations.

The hydro alcoholic gels are formulated by alcohol The in conjunction with water which are important in reducing additional salutes because most lipophilic ingredients are readily miscible in alcohol.[18]

3) Aerosol sunscreen

Aerosol sunscreens are topically applied to protect skin disorders from harmful sunlight. These products can be easily spread onto the surface of skin and distribute active ingredients to form a thin film on the skin.[19]

4) Sun Stick

The sun stick is undoubtedly one of the mast convenient products due to its small size and light weight. The sun stick is produced by two main emulsion components namely oil and oil soluble components, through the incorporation of petrolatum and waxes.[17] This form is subdivided into three categories, namely transparent, semi-transparent and matte sunscreens.

The transparent formula contains only chemical UV filters, while semitransparent is formulated mainly by chemical and mineral substances and matte is composed of only mineral sunscreen ingredients.[20]

Preparation of Sunscreen lotions

Ingredients	Quality
Rosemary extract	1gm
Turmeric extract	0.5gm
Alovera gel	5gm
Coconut oil	2ml
Rose water	1ml
Cetyl alcohol	2gm
Stearic acid	4gm
Glycerine	2ml
HPMC	3gm
Propyl paraben	19gm
Carbopol	2gm
Vitamin E	1ml
Triethanolamine	1g
Water	q.s

Preparation method

1. Prepare alovera gel and add little amount of carbapol in it and heat it to form a gel.
2. weight an accurate quantity of cetyl alcohol, stearic acid, glycerine, HPMC, propyl paraben, mix it well and melt it.[21]
3. In a beaker add 1g of triethanolamine and accurate quantity of water, heat it upto. 80-85 degree Celsius.
4. Transfer alovera extract in mortar and pestle.[22]
5. Add rosemary extract, turmeric extract, tomato extract, and triturate all the chemicals with continuous mixing.
6. Transfer it in a suitable container and label it properly.[23]

Evaluation of sunscreen

1. Physical parameters

Colour - The colour of formulation was checked manually and observed.

Odour - The smell of formulation was checked by applying preparation on hand & feel the fragrance.

Appearance - visually checked the appearance of the formulation.[24]

2. Determination_of_PH

The PH of sunscreens was determined using digital pH meter. pH was measured after 1g of the formulation was dissolved in 100ml of newly prepared distilled water for 2 hrs. The

purpose of this study was to guarantee that the pH of the produced herbal sunscreens in similar to the pH of the skin after 24 hours of use. The result were triple-checked, and S.D. was recorded.[24]

3. Determination of Viscosity

The brookfield viscometer was used to test viscosity, with the proper number of spindles Selected. A 50ml beaker was used to hold 50g of preparation until the spindle groove was dipped and the rpm was set. Sunscreen viscosity was measured at 5, 10, 20, 50 & 100 xpm. The viscosity was computed using the factor obtained from the reading.[25]

4. Spreadability

About 0.5 gm of cream was placed in a circle. Of 1cm diameter on a 20x20 cm glass plate over which the second glass plate was placed. A weight of 500gm was allowed to rest on the upper glass plate for 5 min & then on increase in the diameter of the cream due to spreading was noted.

5. Washability

This test is carried out by simply washing applied sunscreen lotion with water.

6. Homogeneity

The formulation was tested for homogeneity by visual appearance & touch.

7. Irritancy test.

Mark on 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 hrs & 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 ± 1°C for 20 days. The formulation was kept both at room and elevated temp. And observed on 0th, 5th, 10th, 15th, 20th days for all the evaluation parameters.[26]

9. Determination of SPF

A UV visible spectrophotomete was used to examine the in-vitro efficacy of herbal sunscreens. A 0.10%. solution (w/v) of herbal sunscreen. lotions in ethanol was made by

dissolving 0.050g of herbal sunscreen lotions in 50.0ml of ethanol Between 290 and 320 mm, aliquots of each herbal sunscreen were scammed at 5nm intervals.[27]

10. Solubility

The solubility of the material was described using the common descriptive phrases of solubility and the corresponding quantitative solubility ranges given in the BP 2013 and expressed in the terms of "parts", which represented the number of milliliters (ml) of the solvent, in which 1g of solid was soluble.

Table 2

Soluble. (Table: 2)

Descriptive phrase	Approximate quantities of solvent by volume for 1 part of solute by weight
Very soluble	Less than 1 part
Freely soluble	From 1 to 10 parts
Soluble	From 10 to 30 parts
Sparingly soluble	From 30 to 100 parts
Slightly soluble	From 100 to 1000 parts
Very slightly soluble	From 1000 to 10000 parts
Partially soluble	More than 10000 parts

FUTURE PROSPECTS OF SUNSCREEN

The future of sunscreen cream looks promising with a number of trends and innovation on the horizon, including.

1. Broad-spectrum sunscreens

Brands may promote the use of broad-spectrum Sunscreens to protect against visible light. infrared (IR), as well as UVA & UVB rays.

2. Lighter formulations

Suncare products may become lighter and less sticky or greasy, them thanks to new ingredients and particle shapes.

3. Natural ingredients

Natural plant extracts and botanicals may become more popular in sunscreens, due to their many benefits.

4. Novel technologies

New technologies and approaches are being explored to address problems with existing Sunscreens

5. Protection from environmental aggressors.

Sunscreens may be able to protect against pollution, blue light, UV rays. and IR in addition to UV rays.

6. Higher SPF

Sunscreens may combine UV filters with botanicals, vitamins, DNA repair enzymes and film forming polymers to achieve a higher SPF.

CONCLUSION

In order to effectively guard against damaging ultraviolet (UV) radiation, the current study successfully developed and assessed a sunscreen cream employing appropriate chemicals. Good consistency, a smooth texture, non-greasiness, and ease of spreadability were among the desirable physical attributes of the created formulation. Evaluation metrics such as spreadability, viscosity, and pH were found to be within acceptable bounds. The cream provides substantial UV protection, according to the SPF (Sun Protection Factor) number. Overall, the findings indicate that the sunscreen cream is stable, safe, and effective when applied topically, offering a cost-efficient and natural substitute for store-bought sunscreen formulations.

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