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A REVIEW ON HERBAL SUNSEREEN

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ABSTRACT
Sunscreen is a herbal lotion designed to shield the skin from UV radiation. Sunburn mainly results from ultraviolet B (UVB) rays, whereas ultraviolet A (UVA) rays can lead to more serious long-term skin damage. Ideally, sunscreen should protect against both UVA and UVB rays. This study aimed to create a topical sunscreen formulation using fixed oils combined with selected medicinal plants. Consistent use of sunscreen can lower the risk of actinic keratosis, squamous cell carcinoma, and melanoma. Sunscreen, also referred to as sunblock lotion, functions by absorbing or reflecting the sun's ultraviolet rays to safeguard the skin. With the rising rates of skin cancers and the damaging effects of UV radiation, the demand for effective sunscreen agents has increased. These agents have been shown to help alleviate symptoms associated with sun damage. An effective sunscreen should be safe, non-irritating, non-toxic, photostable, and provide complete protection from solar radiation. The developed sunscreen lotion includes skin-friendly components like aloe vera, turmeric, olive oil, and vitamin E. Testing criteria included pH, spreadability, and skin feel. The prepared sunscreen lotion exhibited a strong SPF rating, excellent uniformity, consistency, and appearance, with no indications of phase separation, making it safe and non-irritating for skin application. [1]

KEYWORDS: *UV radiation, Clitoria ternatea sunscreen ingredients, Sun Protection Factor (SPF), and natural sunscreens.*

INTRODUCTION

Sunscreens are substances that block UV radiation by absorbing or reflecting it. They help prevent harmful effects such as premature aging, which can cause skin sagging, wrinkles and other problems associated with UV exposure. The active ingredients in sunscreens are classified into organic and inorganic based on their mode of action and chemical structure. Organic elements absorb UV radiation, while inorganic elements protect the skin by scattering and reflecting it. These products are widely available in supermarkets and pharmacies, and in the United States, they can even be prescribed by doctors. In Italy, they are sold in hospitals, and in Australia, they are offered by cancer charities and organizations focused on cancer control. Vitamin E is a fat-soluble antioxidant with photoprotective properties, which is important for human health. Vitamin E obtained from food (RRR tocopherol) is different from vitamin E found in supplements (synthetic RRR tocopherol). Since plants can synthesize vitamin E, it should be consumed in limited quantities, mainly from external sources. Coconut oil, which is primarily obtained from the dried seeds of coconut trees (known as copra), contains large amounts of lauric acid. This oil has been used historically as a moisturizer and to treat dry skin due to its rich, smooth texture. Formulations incorporating photoprotective coconut oil can reduce inorganic UV radiation exposure, thereby meeting the demand for more natural products, while research has also shown that humans exhibit remarkable sunscreen protection factor (SPF) levels.[2]

SELECTION OF SUNSCREEN BASED ON SKIN TYPE

1.Oily/Acne-Prone Skin
Seek out "oil-free" and "non-comedogenic" options that won't block pores.
Opt for gel-based or water-based formulas with a matte finish.

2.Dry Skin
Choose cream-based or lotion sunscreens.
Look for products enriched with moisturizing agents like hyaluronic acid or glycerine.
Refrain from using alcohol-laden items that may exacerbate dryness.

3.Combination Skin
Pick lightweight, hydrating formulations that won't obstruct pores.
Find gel or fluid-based sunscreens that provide moisture without a greasy feel.

4.Sensitive Skin
Choose products that are fragrance-free and hypoallergenic.

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Mineral sunscreens with zinc oxide or titanium dioxide are generally safer, as they are less likely to irritate.
Steer clear of ingredients such as oxybenzone and avobenzone, which can often irritate the skin. [3]

CLASSIFICATION OF SUNSCREEN

Sunscreen is classified as systemic or topical depending on how it is applied. Based on how they work, topical sunscreens are further divided into two classes.

Organic Sunscreen
Inorganic Sunscreen

Organic Sunscreen

By penetrating the skin and converting UV rays into heat, organic sunscreen works. It is thin and ideal for everyday use, making it easy to incorporate skincare ingredients. Chemicals based on carbon make up the active ingredients in organic sunscreen. It contains a non-mineral active ingredient



Inorganic Sunscreen

Because these particles Scatter and reflect UV rays into the surrounding environment, they act as a physical barrier to indent ultraviolet and UV light. They are considered broad spectrum because they cover the entire ultraviolet spectrum. Inorganic sunscreen is also known as sunscreen. [3]

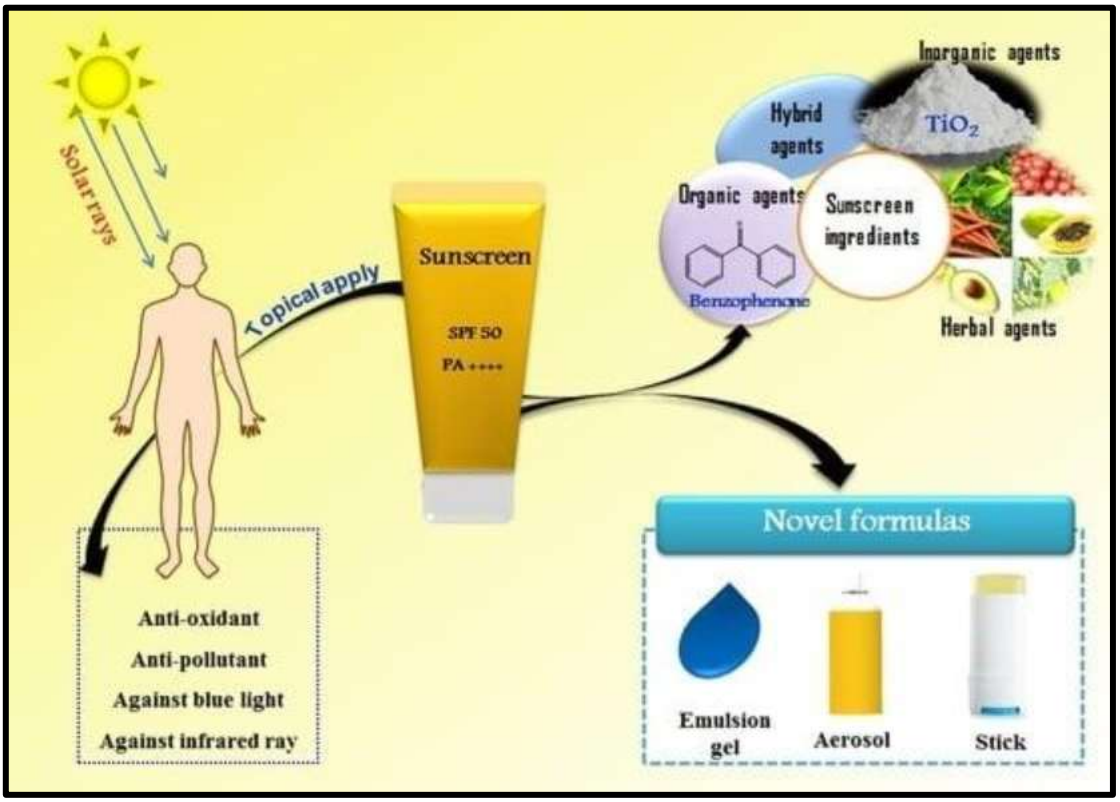
MACHANISM OF PHOTO PROTECTION

Sunscreen has been shown to prevent and minimize the harmful effects of ultraviolet sun rays, thereby increasing the skin's tolerance to UV exposure. Two mechanisms are employed by them.

Mineral-based inorganic sunscreen produces a coating that blocks sun rays from penetrating the skin by using this mechanism to scatter and reflect UV rays from the skin's surface.

Organic sunscreen reduces the negative effects and the depth at which UV rays can penetrate the skin by absorbing UV energy and turning it into thermal energy.

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Photooxidative damage caused by UV radiation enters the dermal capillaries through the epidermis and dermis. This results in the depletion of enzymatic and non-enzymatic antioxidants in the stratum corneum, photooxidation of pre-existing melanin and its precursor in the epidermis and dermis, and immediate and long-lasting pigment darkening.

It has been shown that sunscreen increases the skin's tolerance to UV exposure by preventing and reducing the harmful effects of UV radiation. They operate on two mechanisms: Inorganic sunscreens work by scattering and reflecting UV radiation from the skin's surface mineral, creating a coating that prevents sunlight from penetrating the skin. When exposed to artificial sunlight source. In the United States the FDA mandates such in vivo testing. It can also be measured in vitro with the help of a specially constructed spectrometer. In this example, both the actual transmittance of the sunscreen and the degradation of the product as a result of exposure to sunlight are measured. In this example, the transmittance of the sunscreen should be measured at all wavelengths in the UVB-UVA range of sunlight (290–400 nm), along with a standard intensity spectrum of sunlight (see figure) and a table showing how effective different wavelengths are in causing sunburn (erythemal action spectrum). These in vitro and in vivo measurements agree quite well [attribution needed].

A variety of techniques have been developed to assess UVA and UVB protection. The subjective aspect of grading erythema is eliminated by the most dependable Spectro photochemical techniques.

A comparable rating system for fabrics used in sun protection apparel is the ultraviolet protection factor (UPF). Recent testing by Consumer Reports indicates that standard summer fabrics typically have a UPF of about 20, whereas protective fabrics typically have a UPF of about 30+.[4]

MATERIAL AND METHOD

1.Butterfly Pea Flower

Clitoria ternatea is the scientific name of the butterfly pea flower, which has a beautiful blue color. It promises potential health benefits. It may discolor your mixed drinks. It is also useful for cosmetics lovers. It is said to be rich in antioxidants, which probably gives it its vivid color. Additionally, Sturdieck suggests that they have health-promoting properties. [6]

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Fig 1) Butterfly Pea Flower

Synonyms
Blue Pea Flower, Asian Pigeanwing ,Cordofan Pea

Biological Source
Clitoria Ternatea L

Family
Fabaceae (The family is Leguminosae.)

Chemical Constituents
Proteins, Peptides, Polyphenols, Alkaloids, Saponins, Anthocynins, and Flavonoids.
Uses: Butterfly pea flowers are used in herbal teas, cosmetics, natural food coloring, and traditional medicine due to their high antioxidant content. Because of its high antioxidant content, pea flowers (Clitoria ternatea) may have sun-protective properties. Particularly flavonoids like quercetin and kaempferol, as well as anthocyanins (ternatins).

2. Aloe Vera
The Aloe vera plant has been known and used for centuries for its health, beauty, medicinal and skin care properties. The name Aloe vera derives from the Arabic word “Alloeh” meaning “shining bitter substance,” while “vera” in Latin means “true.” 2000 years ago, the Greek scientists regarded Aloe vera as the universal panacea. The Egyptians called Aloe “the plant of immortality.[7]



Fig .2 Aloe Vera

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Synonyms
Aloe, Mussbar,Aloe Forex, Nomens, Aloe indica Royle nudum,
Aloe Perfoliatavae.

Biological Source
It consists of dried and fresh mucilage of Aloe Vera

Family
Asphodelaceae Liliaceae

Chemical Constituents
Polysaccharides (like glucomannan and acemannan), vitamins (A, C, and E), enzymes, amino acids, fatty acids, and minerals.

Uses
Rich in Minerals and Vitamins
Rich in fatty and amino acids
Aloe Vera is an effective adaptogen
Aloe aids in digestion
Aids in detoxification
Alkalizes the body
Encourages the heart
Strengthens the immune system
Excellent for the skin
Antibacterial disinfectant Antiviral, antifungal, and antiseptic
Aloe Aids in Inflammation Reduction

3.Coconut Oil
Coconut oil prevents the skin from aging too quickly while maintaining its smoothness and softness. Use coconut oil to moisturize your skin and get rid of dead skin cells. Dry skin, including that of those with eczema, is moisturized by coconut oil. Its antibacterial, antifungal, and antiviral qualities aid in wound healing by preventing free radicals from harming the skin. Because of its anti-inflammatory qualities, coconut oil can help with both dry and oily skin conditions by lowering skin inflammation.[8]



Fig.3 Coconut Oil

Synonyms
Coconut oil,
Coconut butter,
Copra oil.

Biological Source:
The dried solid portion of the endosperm of the coconut, Cocos nucifera L., a member of the Palmae family, is used to make coconut oil.

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Family
Palm (Arecaceae

Chemical Constituents
Coconut oil is used as concrete oil in temperate regions below 23°C. Coconut butter is a white or pearl white, creamy substance with a bland taste and either no smell or a strange coconut smell. It melts between 23 and 26 degrees Celsius. At 60°C,it dissolves in two volumes of alcohol, but it is very soluble in carbon disulfide, ether, and chloroform. When exposed to air, the oil quickly turns rancid. Among the common vegetable oils, coconut oil has the lowest iodine value (7–10) and the highest saponification value (250–264).

Uses
In many parts of the world, coconut oil is used in food products. Fractionated coconut oil is referred to as "Thin vegetable oil" in the European pharmacopoeia. Certain medications can be administered orally using it as a nonaqueous medium. Drugs that are unstable in aqueous media are prepared as an oral suspension using fractionated coconut oil.

Conditions like cystic fibrosis, enteritis, and steatorrhea that are linked to poor fat absorption are treated with diets based on medium chain triglycerides, including preparations made from coconut oil. Patients following a diet based on medium chain triglycerides have reported experiencing diarrhea and abdominal pain.

4. Rose Water
A rose water is either the flower it produces or a woody perennial flowering plant belonging to the Rosaceae family. There are tens of thousands of cultivars and more than three hundred species. They make up a group of plants with stems that are frequently covered in sharp prickles and can be upright shrubs, climbing, or trailing. The majority of species are indigenous to Asia, with smaller populations found in Europe, North America, and Northwest Africa. Rose plants come in a variety of sizes, from tiny, tiny roses to seven-meter-tall climbers**.** [9]



Fig 4) Rose water

Synonyms
Rose hydrosol or gulab jal

Biological Source
Rose water's biological source is the petals of various species of rose, most commonly the Damask rose (Rosa\ damascena)

Chemical Constituents
The volatiles consisted mainly of 2-phenylethanol (69.7–81.6%), linalool (1.5–3.3%), citronellol (1.8–7.2%), nerol (0.2–4.2%), geraniol (0.9–7.0%) along with rose oxides and all other characteristic minor rose compounds. Key Word Index: Rosa damascena. Rosaceae.

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Uses

- Skincare: Hydrates and balances skin pH.
- Aromatherapy: Relieves stress and anxiety.
- Makeup: Natural toner or setting spray.
- Haircare: Adds shine, reduces frizz.
- Culinary: Flavoring in desserts and drinks.
- Medicinal: Anti-inflammatory and antiseptic properties.
- Relaxation: Calming face mist or bath additive**.**

5.Vitamin E Capsule

Tocopherols and tocotrienols, which are fat-soluble antioxidants that shield cells from damage caused by free radicals, are abundant in vitamin E capsules, a popular dietary supplement. Although they are used for a variety of medical and cosmetic reasons, it is usually advised to get this nutrient from a balanced diet rather than taking large doses of supplements. [10]



fig 5) Vitamin E Capsule

Synonyms

Multivitamin, vitamin pill, vitamin supplement, and nutrient capsule

Biological Source

Vitamin capsules have a biological source from plants, animals, or microorganisms

Chemical Constituents

Plant-based oils (wheat germ, sunflower, safflower), nuts and seeds (almonds, peanuts, sunflower seeds), and certain fruits (avocado, kiwi, mango

Uses

Moisturizing skin: Hydrates and softens skin, reducing fine lines and wrinkles.
Fighting free radicals: Protects skin from damage caused by pollution, UV rays, and stress.
.Wound healing: Promotes collagen production and speeds up healing.
Skin issues: Helps with acne, eczema, and psoriasis.
Anti-aging: Boosts skin elasticity and reduces age spots**.**

Method and Preparation

- One tablespoon of fresh or dried butterfly pea flowers
- Two tablespoons of fresh or store-bought aloe vera gel
- One tablespoon of coconut oil
- One tablespoon of rose water
- One (or half a teaspoon) liquid vitamin E oil capsule
- Approach:

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Make the extract from butterfly pea flowers

To extract the vivid purple color and antioxidants from dried butterfly pea flowers, steep them in warm water for ten to fifteen minutes. To preserve the liquid, strain out the flowers. To extract juice from fresh flowers, just crush or blend them.

About two tablespoons of butterfly pea extract should be available.

Combine Coconut Oil and Aloe Vera

Combine the coconut oil and aloe vera gel in a sanitized mixing bowl. Mix them until a creamy, smooth consistency is achieved. Aloe vera calms and heals the skin or scalp, while coconut oil helps hydrate and retain moisture.

Incorporate Rose Water

To the mixture, add rose water. Rose water adds a pleasant scent, revitalizes the skin, and aids in pH balance.

Incorporate Rose Water

To the mixture, add rose water. Rose water adds a pleasant scent, revitalizes the skin, and aids in pH balance.

Add Vitamin E

Squeeze the oil into the mixture after puncturing the vitamin E capsule. Because of its antioxidant qualities, vitamin E is excellent for restoring and revitalizing the skin and hair.

Add the extract from butterfly peas

Lastly, incorporate the extract from butterfly pea flowers into the mixture. Anthocyanins, which are antioxidants that support healthy skin and hair and fight free radicals, are abundant in butterfly pea flowers.

Combine Well

Stir everything until the mixture is uniform and smooth. [11]

ADVANTAGES OF HERBAL SUNSCREEN

- Easily available.
- Do not provoke allergy.
- Cheap in cost.
- No side effect.
- Renewable resources.
- Be natural.
- Be stable to heat..
- Easy to manufacture.
- Botanical ingredients are easily available.
- Lasts longer when in direct UV light. [12]

DISADVANTAGES OF HERBAL SUNSCREEN

- They are difficult to hide taste and colour
- Manufacturing process are time consuming and complicated
- Herbal drug have slow effect as compare to allopathetic dosage form it also requires long term therapy. [13]

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 fromharmful UV ras
- 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.[14]

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CONCLUSION

Thus, the current study's findings indicate that the formulated cream has the energy to shield against UVA and UVB rays, indicating sunscreen exertion as well as the phrasings generated. Excerpts can be tailored to different skin types by incorporating different attention. Separately based on the SPF value. Crack-mending butterfly pea flower, potent antioxidant quercetin, print-defensive resveratrol, moisturizing, and cooling saffranal are all combined in current research to create an effective sunscreen product. In-depth research on the safety, effectiveness, and toxicity of specific print defenders is advised In order to establish the product in request without any supporting evidence.

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