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(REVIEW ARTICLE)

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A short review on natural components in sunscreen

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Abstract

Herbal sunscreen is a lotion, spray, or other topical treatment that uses herbs to help protect skin from UV radiation, limit sunburn and other skin damage, and lower the risk of skin cancer. It is also frequently referred to as herbal sunblock or herbal suntan lotion. Herbal sunscreens are a vital component of modern skincare regimens since they offer several benefits that tackle both health and environmental concerns. By obstructing UV rays, sunscreen composition seeks to improve protection against them. Herbal sunscreens have grown in popularity as an appealing substitute for traditional sun protection treatments as a result of the growing consumer demand for natural and environmentally friendly skincare products. Because of their antioxidant qualities and capacity to absorb UVA rays, flavonoids, phenolic compounds, and herbal oils are crucial for UV protection. Because these sunscreens are composed of minerals and plant-based ingredients, they provide effective protection against UV (ultraviolet) rays from the sun. Herbal sunscreens have attracted a lot of attention as natural substitutes for conventional sunscreens because they offer protection against harmful ultraviolet (UV) radiation while minimizing potential adverse effects linked to synthetic ingredients. An effective and sustainable alternative to traditional sunscreens are herbal sunscreens.

Keywords: Herbal Sunscreen; UV Radiation; Antioxidant; Protection and Broad Spectrum

1. Introduction

Herbal sunscreens have emerged as a strong substitute in response to the growing desire for safe natural sun protection in recent years. Herbal sunscreens use natural minerals and botanical extracts to block UV radiation as opposed to conventional sunscreens that are packed with artificial chemicals. This new trend appeals to people who are concerned about their health as well as those who have sensitive skin or environmental concerns. Known for their calming and shielding qualities, zinc oxide, titanium dioxide, green tea extracts, and aloe vera, cucumber, potato, liquorice, and saffron are common components included in herbal sunscreens. Because of their natural formulation herbal sunscreens are a more gentle option, especially for delicate skin types. This makes them appealing to those who are concerned about putting chemical components on their skin [1]. Herbal sunscreens are also good for the environment and the skin. Concerns regarding the impact of chemical sunscreens on marine life and coral reefs develop they usually have biodegradable formulations that are less damaging to these environments. Through the integration of contemporary technology and traditional herbal knowledge these sunscreens provide a more mild yet effective barrier against UV damage enhancing skin well-being without sacrificing effectiveness [2].

2. Components of natural sunscreen

Numerous natural substances with calming and sun-protective qualities are frequently found in herbal sunscreens. Here are a few typical parts:

- **Mineral Filters**: zinc oxide and titanium dioxide, which physically scatter and block UV radiation.

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- **Plant Extracts**: such as grape seed extract (antioxidant), coconut oil (moisturizing), aloe vera (soothing and hydrating), and green tea extract (antioxidant).
- **Essential Oils**: Occasionally utilized for scent and other skin advantages, though these can differ greatly [3].
- **Natural Emollients and Moisturizers**: Such as jojoba oil, cocoa butter, or shea butter, which maintain the skin's smoothness and hydration.
- **Antioxidants:** It is frequently made from plant sources, such as vitamin E, which has the ability to combat free radicals produced by UV radiation [4]

3. Ideal properties of natural sunscreen

- Absorb light preferentially over the range of 280mm-320mm.
- Be stable to heat light and perspiration.
- Be non-toxic and non-irritant.
- Not be rapidly absorbed [5].
- Be rapid soluble in suitable vehicle.
- Be neutral.

4. Natural sunscreen formulation

The regular daily use of modern cosmetic products can potentially be very important for the long-term health of the skin. Among the most useful ingredients are sunscreens, which block ultraviolet radiation absorption by the skin either wholly or in part [6]. The many formulations that are on sale include lotions, creams, pastes, gels and either chemical or physical agents for their protective action. Herbal sunscreens are available in a variety of formulations, each with unique textures and application experiences. Below are a few typical kinds:

- **Creams type**: These have a thicker texture and a feeling of increased moisture. Herbal sunscreens with a cream base work well on dry skin types and frequently provide longer-lasting moisture.
- **Lotions type**: Lotion compositions spread well and are lighter than cream formulations. They soak quite rapidly without leaving a heavy residue, making them suited for skin types ranging from normal to slightly dry.
- **Gels**: Quickly absorbed into the skin, herbal sunscreen gels have a lightweight viscosity. They leave a matte finish and are non-greasy, making them perfect for skin that is prone to acne or oiliness [7].
- **Sprays:** Sunscreen sprays are convenient for application, especially in hard-to-reach areas. They provide a light, even coverage and are suitable for all skin types depending on the formulation.
- **Sticks**: Sunscreen sticks resemble solid balms and are convenient for spot application, such as around the eyes or on the nose. They are portable and easy to carry.
- **Powders**: Powdered herbal sunscreens are applied using a brush or sponge and offer a matte finish. They are suitable for reapplying sunscreen over makeup throughout the day [8].

5. Natural sunscreens

5.1. Aloe vera

Aloe vera is named after the Arabic word "Alloeh" which means "shining bitter substance".Aloe vera was thought to be the all-purpose cure by Greek scientists 2,000 years ago. Aloe was referred to as "the plant of immortality" by the Egyptians. *Aloe barbadensis* miller is the botanical name for aloe vera. It is a perennial, xerophytic, shrubby or arborescent plant with pea-green colour that is a member of the Asphodelaceae (Liliaceae) family [9]. Active components of aloevera involves amino acids, vitamins, minerals, carbohydrates, lignin, saponins, enzymes, and salicylic acids are among the 75 potentially active ingredients found in aloe vera. Aloe vera gel works well as a moisturiser for dry or damaged skin types because it is a natural humectant which means it pulls moisture into the skin. Sunburn relief is one of aloe vera's most common applications. Its cooling qualities instantly soothe burned or distressed skin by lowering redness and irritation. Aloe vera includes antioxidants including vitamins A, C, and E, which can help shield the skin from UV ray damage. Its anti-inflammatory qualities can also relieve burnt skin, minimizing redness and irritation. Aloe vera is frequently blended with other organic substances, such as titanium dioxide or zinc oxide, which act as physical UV ray reflectors [10]. These mixtures produce a broad-spectrum sunscreen that offers UVA and UVB protection.

Figure 1 Aloe vera

5.2. Cucumber

Cucumis sativus L, belongs to the Cucurbitaceae family commonly known as gourd family. Since ancient times, this well-liked vegetable crop has been utilised in traditional Indian therapy. This vegetable has extremely little calories and a high water content. Due to their natural healing characteristics, cucumbers are a great choice for relaxing and shielding the skin from sun damage. Cucumbers are a good natural sunscreen substitute, but they can also help calm the skin and offer some protection. Using a broad-spectrum sunscreen with the right SPF is essential for providing adequate protection from UV radiation [11]. Cucumber extracts are a popular ingredient in cleansers, toners, and face mists because of their natural cleaning and refreshing qualities. They assist to leave the skin feeling refreshed and clean while removing residue, extra oil, and pollutants.

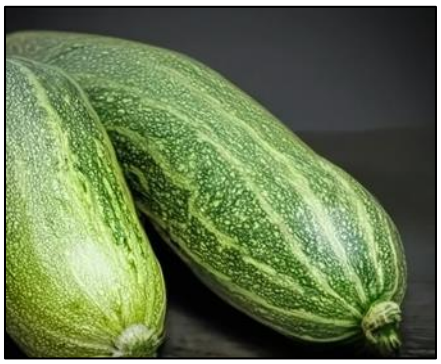

Figure 2 Cucumber

5.3. Green tea

Camellia sinensis, the scientific name for the green tea plant is a tiny, evergreen shrub that is indigenous to East Asia. Green tea has gained popularity as a component in natural sunscreen formulas due to its strong antioxidant qualities. Green tea provides substantial protection against the harmful effects of ultraviolet (UV) radiation due to its high content of polyphenols particularly catechins. By assisting in the neutralization of free radicals produced by sun exposure, these antioxidants help lower oxidative stress and shield the skin from harm [12]. Furthermore, green tea's anti-inflammatory qualities calm the skin, reducing redness and irritation brought on by UV radiation. Green tea provides an additional line of defense against skin malignancies caused by UV radiation by preventing the growth of skin tumors. Typically physical sunblock ingredients like zinc oxide or titanium dioxide which offer broad-spectrum UV protection are used with green tea extract in natural sunscreens. The total effectiveness of the sunscreen is improved by this synergistic combination. Green tea-infused sunscreens are an excellent and mild way to protect against the sun's rays and they work well for all skin types even those with sensitive or acne-prone skin. Green tea improves the protective properties of these products and also promotes a calm, moisturized complexion, which benefits skin health in general [13]. It also offers complete protection and skin benefits thus stands out as a beneficial natural element in sunscreen formulations.

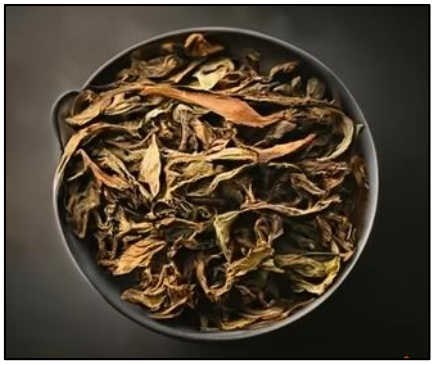

Figure 3 Green tea leaves

5.4. Potato

The potato (*Solanum tuberosum*), is a widely distributed and abundant crop that originated in South America's Andes. Because of their many advantageous qualities potatoes are becoming more and more recognized as a potential component of natural sunscreens. Potatoes being high in antioxidants like vitamin C and several phenolic compounds can aid in shielding the skin from UV rays and free radical damage [14]. These antioxidants are essential for reducing oxidative stress which is a major cause of skin damage and aging. Potatoes also have anti-inflammatory qualities that help relieve and calm burnt or irritated skin, which makes them a perfect ingredient in after-sun care products. According to some study, potato extracts can absorb UV rays providing a sun protection option that is natural. In addition, potatoes high water content and vital nutrients hydrate and nourish the skin improving its general resilience and health. Potato extracts can be used to boost the protective efficiency of other natural components, such as zinc oxide or titanium dioxide, in natural sunscreen formulations. It is advised to use potato-based sunscreens as a supplemental strategy rather than as a major type of sun protection until further thorough studies are available.

Figure 4 Potato

5.5. Liquorice

It is derived from the root of the Glycyrrhiza glabra plant, liquorice extract exhibits potential as a natural component in sunscreen compositions (15). It has ingredients including licochalcone A and glabridin, which have been researched for their photoprotective qualities. A polyphenolic flavonoid present in liquorice extract called glaciridin has been shown to have antioxidant properties as well as the capacity to prevent the synthesis of melanin. Melanin is the pigment that gives skin its color and functions as a UV protection agent. Glabridin may attenuate the effects of sun exposure and lower the risk of sunburn and skin damage by decreasing the formation of melanin.A further active ingredient in liquorice extract called licochalcone A has anti-inflammatory qualities that may help soothe and calm skin after sun exposure [16-17]. Additionally, it might enhance licorice extract's general protective properties in sunscreen compositions.

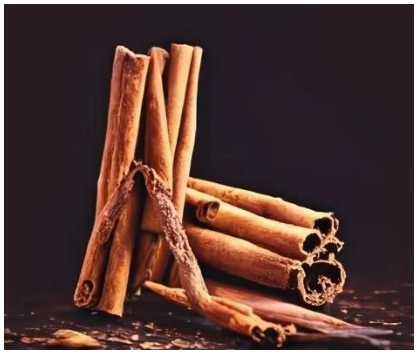

Figure 5 Liquorice

5.6. Amla

Amla, also known as Indian gooseberry or *Emblica officinalis* is a fruit that is highly valued in Ayurvedic medicine for its various health benefits. The fruit contains high amounts of ascorbic acid which slows down the aging process. Its strong antioxidants and high vitamin C content contribute to its reputation as a fruit that revitalizes. One of the key elements in amla's advantages for sun protection is its high vitamin C concentration. Vitamin C's antioxidant properties are well known for their capacity to combat free radicals generated by ultraviolet radiation. Free radicals have a part in early aging and skin cancer in addition to having the ability to damage skin cells (18). By scavenging these free radicals, the vitamin C in amla helps to mitigate some of the harmful effects of sun exposure. Amla also contains flavonoids and polyphenols, two other types of antioxidants. These compounds also aid in the fruit's resistance to UV-induced oxidative damage.

Figure 6 Amla

5.7. Saffron

The golden-hued spice saffron which is made from the stigmas of Crocus sativus flowers has long been prized for its culinary and therapeutic uses. Recently, because of its bioactive compounds especially its high antioxidant content, it has drawn interest for its possible use as a natural sunscreen [19]. Carotenoids with potent antioxidant qualities, such as crocin and crocetin are found in saffron. By aiding in the neutralization of free radicals produced by ultraviolet (UV) light these substances shield the skin from cellular damage and oxidative stress. Additionally, saffron has inherent anti-inflammatory qualities that may help lessen sunburn-related redness and swelling. Apart from its antioxidant properties, saffron also has a chemical called safranal which helps shield the skin from ultraviolet light. Safranal may be able to absorb UVA and UVB rays, providing a layer of defense against the sun's damaging rays, according to research. Because of this, saffron is a useful component in natural sunscreen recipes. Saffron-based products have the potential to be a helpful addition to holistic skincare routines that protect the skin from sun damage [20].

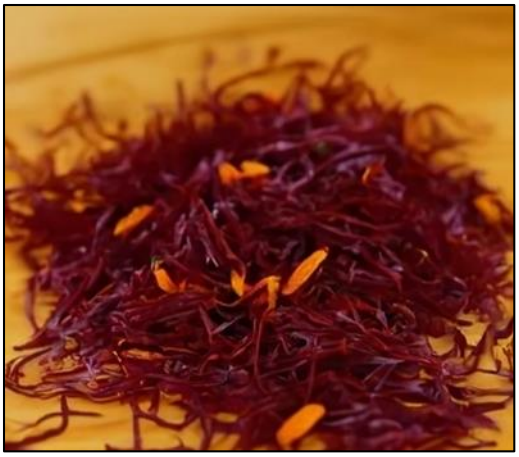

Figure 7 Saffron

5.8. Tomato

Tomatoes (*Solanum lycopersicum*) are widely consumed fruits that are frequently used as vegetables in cooking. They are abundant in vital minerals and vitamins, including as potassium, folate, and vitamins C, K, and A. Growing evidence points to tomatoes' potential application in herbal sunscreens, which can harness their inherent chemicals to offer substantial UV protection. Lycopene, a potent antioxidant present in high concentrations in tomatoes, lies at the core of this potential. Lycopene works to prevent UV-induced skin damage by scavenging free radicals, which are dangerous chemicals produced when exposed to the sun. This antioxidant effect helps prevent skin cancer and premature aging in addition to lowering the risk of sunburn. Consuming tomatoes has been linked to better skin health, possibly providing UV protection and fostering a smooth complexion [21].

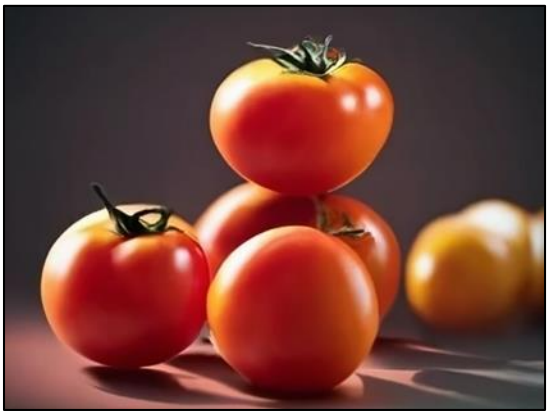

Figure 8 Tomato

6. Conclusion

Herbal sunscreens combine the advantages of plant-based chemicals with a lower environmental effect making them a promising natural substitute for conventional sun protection solutions. They provide a safer more natural substitute for traditional sunscreens by shielding the skin from damaging UV radiation with plant-based components. The way herbal sunscreens are made has a significant impact on how well they block UV rays. The phytoconstituents found in plants are the best ingredient for sunscreen compositions because of their additive qualities. Since plant actives have a broad spectrum of UV absorption and a preventive impact against oxidative stress, inflammation, and cancer, they are recommended over chemical sunscreens.

Compliance with ethical standards

Disclosure of conflict of interest

There is no conflict of interest to be disclosed.

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