

Harnessing Nature Protection: A Review of Polyherbal Sunscreen

Satyajeet Dadabhau Walunj, Disha Nipurte, Omkar Gosavi, Sakshi Nagarkar, Kalpesh Prajapati
Babasaheb R. Manchare

Samarth Institute of Pharmacy, Belhe, Pune, Maharashtra, India

Abstract: *Sunscreen plays a vital role in protecting human skin from the harmful effects of ultraviolet (UV) radiation. Synthetic sunscreens have been the mainstay of sun protection for decades, but concerns regarding their safety and environmental impact have driven the exploration of natural alternatives. Polyherbal sunscreens, formulated using a blend of herbal extracts, have emerged as a promising option. This review examines the efficacy and safety profile of polyherbal sunscreens. It explores the mechanisms of action of various plant-based ingredients used in these formulations and analyzes their potential to absorb or reflect UV radiation. The review also discusses the limitations of current research on polyherbal sunscreens and highlights areas for future investigation. Finally, it considers the consumer perception and market potential of these natural sunscreens*

Keywords: Polyherbal, natural ingredients, eco- friendly, UV protection, biodegradable

I. INTRODUCTION

The sun, a source of life and warmth, also poses a significant threat to human skin in the form of ultraviolet (UV) radiation. Overexposure to UV rays can lead to sunburn, premature aging, and even skin cancer. Sunscreens have become an essential line of defense, protecting our skin from these harmful effects. While synthetic sunscreens have long been the mainstay of sun protection, concerns about their safety and environmental impact have propelled the search for natural alternatives. This review delves into the world of polyherbal sunscreens, a novel approach to sun protection that harnesses the power of nature. Formulated using a blend of meticulously chosen herbal extracts, these sunscreens offer a promising alternative to synthetic options. We will explore the efficacy and safety profile of polyherbal sunscreens, examining how these plant-based ingredients work to shield our skin from UV radiation. By delving into the mechanisms of action of these natural components, we will assess their potential to absorb or reflect UV rays and provide sun protection.

Main Role of Ingredients used in Formulation:

1. Turmeric :

Turmeric has been explored for its potential benefits in skincare, including its use as an ingredient in sunscreen. Turmeric contains compounds like curcumin that have antioxidant and anti-inflammatory properties, which may help protect the skin from sun damage and reduce inflammation caused by UV rays. However, while some studies suggest that turmeric may offer mild sun protection when applied topically, it's not a substitute for conventional sunscreen. It's always essential to use a broad-spectrum sunscreen with an SPF of 30 or higher to adequately protect your skin from harmful UV radiation.



2. Aloe vera:

Aloe vera is often included in sunscreen formulations for its soothing and moisturizing properties. While it doesn't provide sun protection itself, it helps to hydrate and calm the skin, making it an excellent addition to sunscreens. Aloe vera can also help to alleviate sunburn and reduce inflammation caused by UV exposure, making it a popular choice for after-sun products as well.



3. Neem:

Neem, known for its medicinal properties, is sometimes included in sunscreen formulations due to its potential to offer additional skin protection. Neem contains compounds like nimbidin and nimbin, which have antibacterial and anti-inflammatory properties. These properties may help soothe and protect the skin from damage caused by sun exposure. However, research on neem's specific role in sunscreen is limited, and it's often used in combination with other ingredients for overall skin health and protection.



4. Orange peel:

Orange peel contains natural compounds such as flavonoids and limonoids, which have antioxidant properties. These antioxidants can help neutralize free radicals generated by UV radiation, potentially reducing skin damage and premature aging caused by sun exposure. However, there is limited research on the specific role of orange peel in sunscreen formulations. It's more commonly used in skincare products for its potential to brighten the skin, reduce inflammation, and promote collagen production. While orange peel may offer some additional skin benefits, it's important to rely on proven sunscreen ingredients for adequate sun protection.



5. Tulsi:

Tulsi, or holy basil, is known for its medicinal properties and is sometimes included in skincare products, including sunscreens. Tulsi contains compounds like flavonoids, rosmarinic acid, and eugenol, which possess antioxidant and anti-inflammatory properties. These properties may help protect the skin from UV-induced damage and reduce inflammation caused by sun exposure. However, research specifically on tulsi's role in sunscreen formulations is limited. It's often used in combination with other ingredients to provide overall skin protection and nourishment. As with any sunscreen ingredient, it's crucial to use a broad-spectrum sunscreen with a sufficient SPF level for effective sun protection.



6. Papaya:

Papaya contains vitamins A, C, and E, which are antioxidants that can help protect the skin from free radical damage caused by UV rays. Papaya contains papain, an enzyme with gentle exfoliating properties. This can help remove dead skin cells, which might indirectly contribute to more even sunscreen application. In sunscreens with papaya extract, this could be intended to help reduce the appearance of sun spots or hyperpigmentation after sun exposure, not prevent it directly.



Electromagnetic Radiation and Photoaging :

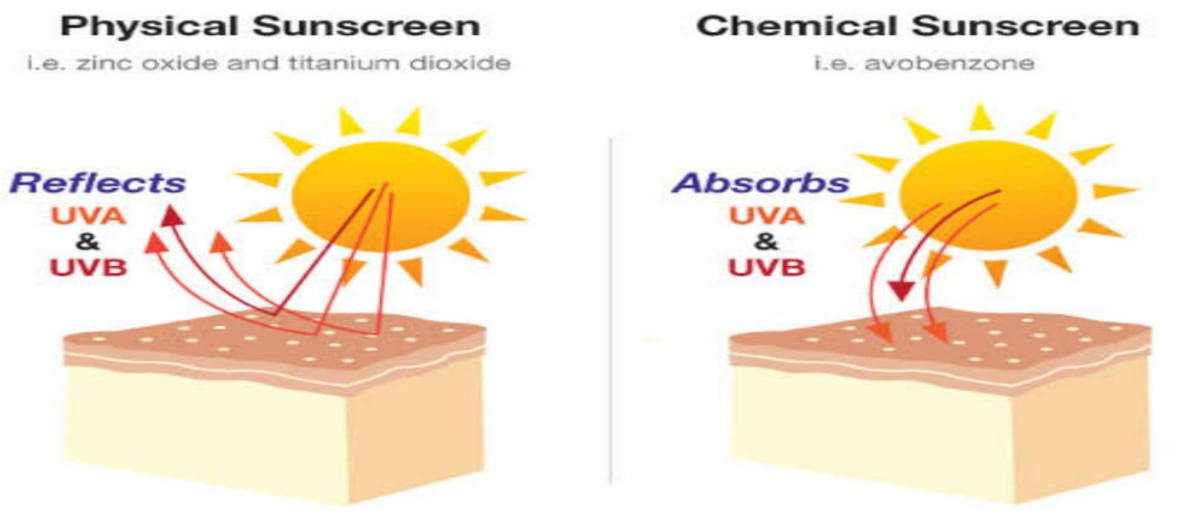
Solar UV radiation (UVR) consists of UVA (320–400 nm), UVB (280–320 nm), and UVC (100–280 nm). UVA is further categorized as UVA1 (340–400 nm) and UVA2 (320–340 nm). UVC is the shortest wavelength and considered the most damaging type of UVR. However, it is completely absorbed by the ozone and does not reach the earth's surface.

UVB is predominantly absorbed by the skin's epidermis, whereas UVA has a longer wavelength and therefore deeper dermal penetration, making it the primary driver of photoaging .

Studies of UVA on skin models demonstrated that UVA caused the induction of apoptosis in dermal fibroblasts and increased MMP levels, which are enzymes involved in collagen degradation.

Furthermore, in a study of 22 participants exposed to multiple sessions of low-dose UVA1, increasing levels of MMP-1 and MMP-3 were observed in a dose-dependent response in the dermis, further highlighting the role of UVA in collagen breakdown and photoaging.

There is increasing evidence that infrared light (IR; 700 nm–1 mm) and VL (400–700 nm), predominantly in the blue light range (380–455 nm), play a role in photodamage and photoaging. Studies have demonstrated that VL can independently generate ROS, proinflammatory cytokines, and MMP-1 expression and potentiate the effects of UVR.



Roles of sunscreen in Photoaging :

UV-induced erythema is mostly attributed to UVB, with a minor contribution by UVA₂. The concept of SPF, an assessment using UV-induced erythema as an endpoint, as a sole measurement of sun protection persisted for many decades despite advances in the study of UVR suggesting that UVA may play a significant role in photoaging .

Although other methods of evaluating the efficacy of UVA filters have been proposed, the FDA currently uses critical wavelength (CW) determination. With this method, sunscreen products whose 90% UV absorbance occurs at ≥ 370 nm are allowed to be labeled as “broad spectrum”.

In recent years, tinted sunscreens have become more prevalent as a means of protection against VL. Most FDA-approved compounds for UV protection do not adequately protect against VL because compounds must be opaque to filter VL .

Benefits of Sunscreen :

- Reduce the risk of skin cancer
- Protect against skin burn
- Avoid inflammation
- Stop DNA damage

II. 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.

III. CONCLUSION

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

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