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REVIEW ON HERBAL SUNSCREEN

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Abstract

Herbal sunscreens have gained attention as safe and effective alternatives to conventional chemical sunscreens. They utilize plant-based compounds with photoprotective, antioxidant, and anti-inflammatory properties to protect the skin from harmful ultraviolet (UV) radiation. This review explores the sources, mechanisms, formulation strategies, efficacy, safety, and challenges associated with herbal sunscreens.

Introduction

Skin is the largest organ of the human body, protecting internal organs from environmental stress, including UV radiation. Excessive exposure to UV rays can lead to sunburn, premature aging, hyperpigmentation, and skin cancer. Conventional sunscreens contain chemical filters like oxybenzone or physical filters like titanium dioxide. However, concerns about their toxicity, photodegradation, and environmental impact have led to interest in herbal sunscreens, which use plant extracts to provide natural UV protection.

Definition

According to the World Health Organization (WHO)

Herbal medicines are "finished, labeled medicinal products that contain active ingredients derived from plants in crude form or as preparations."

Herbal sunscreens are topical formulations containing plant-derived compounds that provide protection against UV radiation.

Mechanism of Action

Herbal sunscreens protect the skin primarily through:
UV Absorption -Certain flavonoids and polyphenols absorb UVA and UVB rays. Antioxidant Activity – Neutralize free radicals generated by UV exposure.
Anti-inflammatory Effects – Reduce skin inflammation and erythema. Collagen Protection – Prevent breakdown of collagen and elastin, slowing photoageing.

Table 01: Common Herbal Ingredients and Their Role

Herb/Plant	Active Constituents	UV Protective Role
Aloe vera(Aloe barbadensis miller)	Polysaccharides, flavonoids	Anti-inflammatory, antioxidant

Rose water	Daburgulabari	Fragnance promoter
Zinc oxide	mineral zincite	Active ingridient
Turmeric(Curcuma longa)	Curcumin	Anti-inflammatory, antioxidant
Neemoil (Azadirachtaindica)	flavonoids	Antimicrobial, antioxidant
sesame seed oil(Sesamumindicum)	Sesamumindicum	Natural emollient
Carrot seed oil(Daucuscarota)	Carotenoids	Antioxidant

Formulation of Herbal Sunscreens

Base: Cream, lotion, gel, or oil-in-water emulsions.
Herbal Extracts: Selected based on UV absorbance and skin benefits.
Additives: Natural oils (coconut, sesame) for emolliency, antioxidants to enhance stability.
Challenges: Stability of phytoconstituents, uniform UV protection, skin penetration, and shelf life.

Advantages

- Reduced risk of skin irritation compared to chemical sunscreens.
- Added skin benefits (moisturizing, anti-aging, anti-inflammatory).
- Biodegradable and eco-friendly.
- Suitable for sensitive skin.

Limitations

- Lower Sun Protection Factor (SPF) compared to synthetic sunscreens.
- Shorter duration of action; may require frequent application.
- Stability issues (oxidation, photodegradation).
- Variability in extract quality and concentration

Evaluation Parameters

- Herbal sunscreens are evaluated for:
- SPF (Sun Protection Factor)
- UVA protection factor
- Physical properties: pH, viscosity, spreadability

Safety: Skin irritation, allergy tests
Antioxidant activity: DPPH assay, total phenolic content

Current Trends

- Incorporation of nanotechnology to enhance penetration and stability.
- Combining herbal and synthetic UV filters for broad-spectrum protection.
- Use of standardized extracts to ensure reproducibility.
- Growing consumer demand for "natural" and "chemical-free" sunscreens.

Research Gaps

- Lack of standardized clinical trials to confirm efficacy.
- Need for formulations with high and stable SPF.
- Optimization of synergistic herbal combinations.
- Long-term safety and photostability studies are limited.

Conclusion

Herbal sunscreens present a promising alternative to chemical sunscreens, offering UV protection along with therapeutic benefits for the skin. Despite their limitations, ongoing research in formulation technology, standardization of extracts, and clinical validation can enhance their effectiveness and consumer acceptance.

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