

REVIEW ARTICLE

Comprehensive Review on Sunscreen Lotion Using Natural Extracts

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ABSTRACT

Sunscreen lotions are applied topically on the skin to avoid damage to the skin and preventing from tanning and sunburns. There are disputable aspects to how the sun and skin interact. The most effective method to prevent sunburn and oedema is topical application of sunscreens. Sunscreen use is often due to its ability to protect the skin from UV rays like UV-A, UV-B, UV-C. This review focuses on study to develop sunscreen lotion formulation with herbal products like *Oryza sativa* and *aloe vera* which are having high sun protection factor (SPF) i.e by incorporating components of *Oryza sativa* in the method of preparation that have anti-inflammatory and antioxidant properties which help to slow down the ageing process of the skin, lessen UV damage, promote skin whitening, and enhance skin and hair regrowth. The sun rays harm is repaired by *aloe vera*. *Aloe vera* is an extremely adaptable plant that has the ability to both heal sunburns and slow down skin ageing. Its gel also has healing capabilities. The stability, safety, and SPF of the sunscreen creams were assessed using four distinct compositions. The sunscreen cream has SPF for normal skin and is non-mutagenic, non-irritating, stable, according to the results.

KEY WORDS: SPF, Sun protection, UV Rays, Sun burn, Photoaging, Tanning.

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INTRODUCTION

The skin is the largest and most important protective organ of the body, covering the entire external surface and acting as a first-order physical barrier against the environment. Temperature regulation and protection against ultraviolet (UV) light, trauma, pathogens, microorganisms, and toxins are among its functions. The skin also aids in immunologic surveillance, sensory perception, control of insensible fluid loss, and overall homeostasis. The skin is also highly adaptable, with varying thicknesses and specialized functions at various body sites. The anatomy of the skin will be discussed in this article, including its structure, function, embryology, blood, lymphatic, and nerve supply, surgical and clinical significance. [1,2]. *Aloe vera* is an ancient and well-known Liliaceae medicinal plant. This is a pea-green shrubby or arborescent perennial xerophytic succulent. Polyphenols and compounds are abundant in *aloe-vera* leaf extracts. Vitamin supplements, minerals, carbohydrates, enzymes, lignin, saponins, and tannins are among the 75 potentially active ingredients in *aloevera* [3,4,5] The most often used herbs in natural sunscreen include *aloe vera*, vitamin E, turmeric, and cucumber [6,7,8]

STRUCTURE OF SKIN

The epidermis is the topmost and outermost layer of skin. Depending on where it is, the epidermis is a stratified squamous epithelium with four to five layers:

Stratum Basalis: The first layer, known as the stratum basalis or basal cell layer, is the deepest and closest to the dermis. It has melanocytes, a single row of keratinocytes, stem cells, and is mitotically active [9]. The cell type that generates melanin, the pigment that gives our skin its colour, is known as a melanocyte. This layer's keratinocytes develop and mature as they move outward and upward to form the subsequent layers.[10]

Stratum Spinosum: (prickle cell layer): The majority of the epidermis is made up of this layer, which has many layers of cells joined by desmosomes. Desmosomes with its structural resemblance to "spines" enable cells to stay closely attached to one another. [11,12]

Stratum Granulosum: (granular cell layer): This layer is made up of numerous layers of cells that are rich in lipid granules. As cells in this layer travel away from the nutrients in the deeper tissue, they start to immortalise and shed their nuclei.

Stratum Lucidum: This layer is found only in the thick skin of the soles and palms this layer is primarily made up of immortalised cells.

Stratum Corneum (keratin layer): This keratinized layer, which is the epidermis' outermost layer, acts as a protective covering. This layer controls water loss by inhibiting internal fluid evaporation because of keratinization and lipid content.[13]

SUNSCREEN LOTION

The largest and most exposed bodily part is the skin, which can suffer photodamage if it is exposed to the sun directly. The ultraviolet portion of the electromagnetic spectrum is responsible for the majority of the effects of solar energy which can have an impact on the immune system, skin, and eyes by causing photoaging, pigmentation, erythema [14, 15].

UV radiation exposure can affect the skin's metabolic pathways and cause photoaging, erythema, sunburn, lines and wrinkles, photosensitivity, immunosuppressants, DNA damage, collagen breakdown and skin cancer [16, 17].

Sunscreen's primary function is to protect the skin from UVA and UVB rays and must provide protection and be photo stable, nontoxic, non-irritating, and chemically inert

There are three types of solar radiation that reach the earth's surface: visible, ultraviolet, and infrared. The majority of the beneficial and harmful effects that we associate with sunlight are caused by UV Rays, especially those with wavelengths below 320 nm.

The UV Spectrum is broken in to three parts:

1. Very high energy (UVC)
2. High energy (UVB)
3. Low energy (UVA)

Ultraviolet is categorized in three ranges:

1. UVA is radiation in the 320-400 nm range
2. UVB is radiation in the 290-320 nm range
3. UVC is radiation in the 100-290 nm range

- Whereas Visible and IR radiations do not harm to the skin.
- Very high energy radiation (UVC) is currently blocked by ozone layer.
- High energy radiation (UVB) does the more immediate damage.

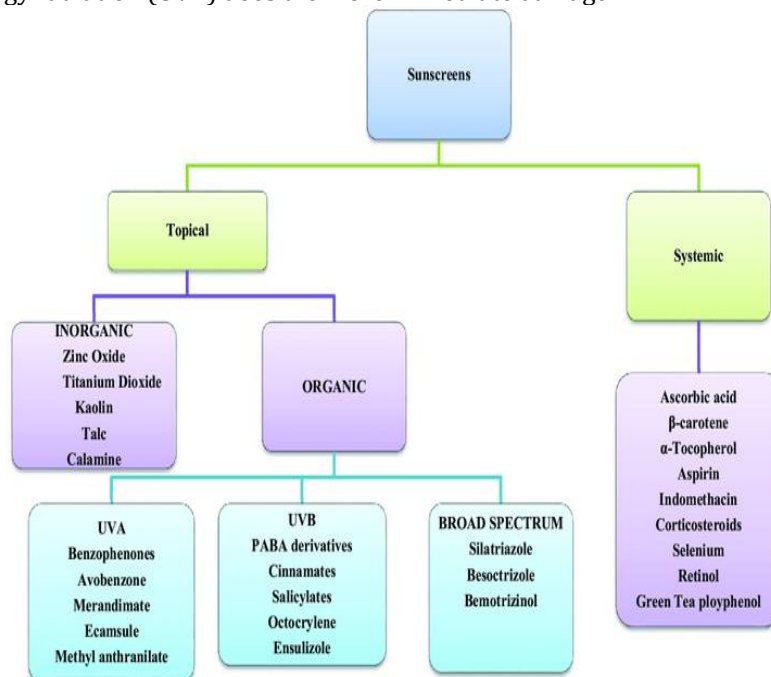


Fig 1: Classification of sunscreen lotions

ADVANTAGES

Shields From Harmful UV Rays

Because of the ozone layer's loss, our environment is exposed to dangerous UV radiation. While sunlight provides the body with the vitamin D it needs, excessive sun exposure without the use of sunscreen products can be harmful to your health. By applying sunscreen lotion, you can fend off the harm caused by UV radiation, which can also cause skin conditions.

Prevents Premature Aging

Every woman aspires to have skin that is younger-looking, beautiful, and healthy. However, according to many studies, those under 55 who routinely used sunscreen lotion had a 24% lower risk of premature ageing.[18]

Lowers Skin Cancer Risks

Your skin can begin to lose its barrier if exposed to UV radiation, making it more susceptible to skin conditions like cancer, particularly melanoma. Regular application of sunscreen can protect your skin against cancer and help it preserve its radiance. Usage of sunscreens can reduce melanoma [19]

Prevents Sunburns

Everyone enjoys relaxing in the sun, especially in the winter. However, going outside without protection from the sun can result in sunburns, which in the case of sensitive skin can cause hives, skin peeling, redness, blotchiness, and itching.[20]

Prevents Tanning

Most individuals adore getting a tan. In contrast, you run the danger of damaging your skin from UV radiation while tanning to get that flawless shine. Use sunscreen with a high sun protection formula, such as 30 or above, to prevent this condition.

DISADVANTAGES

Disrupts Hormones

According to studies, oxybenzone, triclosan, parabens, and phthalates can interfere with how hormones work. Commercial sunscreens frequently contain these chemicals. It is worthwhile to switch to products free of these chemicals because studies have shown that when teenagers moved to cleaner products without these compounds, the levels of these compounds in their systems quickly decreased.[21]

Damages Cells

Since it absorbs UV rays, oxybenzone is a common ingredient found in commercial sunscreens. The disturbance of hormones and possibly cell damage are also possible side effects, though[22]. Oxybenzone use among elderly women has been associated with endometriosis in studies. Daughters were born at lower weights when their mothers' oxybenzone levels were higher during pregnancy.[23]

Promotes Growth of Cancer Cells

The harm that these substances inflict can lead to the development of cancerous cells. As a result of the genetic changes they bring about, cancer may eventually arise.[24]

Increases Risk of Breast Cancer

Studies have shown that substances called benzophenones, which are found in sunscreen, can mimic the effects of too much oestrogen in the body. Diseases like breast cancer are more likely to develop as a result[25]

Encourages Skin Lesions And Tumours

Specifically Vitamin A or retinyl palmitate because it is an antioxidant that delays ageing, palmitate is a component found in many skincare products. However, studies reveal that mice given a topical vitamin A formulation had skin lesions and tumours spread more quickly [26].

METHODS OF PREPARATION

Most lotions are oil-in-water emulsions using a substance such as cetostearyl alcohol to keep the emulsion together, but water-in-oil lotions are also formulated. The key components of a skin care lotion, cream or gel emulsion (that is mixtures of oil and water) are the aqueous and oily phases, an emulsifier to prevent separation of these two phases, and, if used, the drug substance or substances.

METHOD OF PREPARATION :

➤ A water bath is used to individually heat two phases to a temperature of 80° C: first an oil phase containing lipophilic materials and later an aqueous phase containing hydrophilic materials [27] and the extracted aloe vera gel from the aloe vera plant is added[28] and are heated separately. After that, while continuously stirring, the aqueous phase was gradually introduced into the oil phase until the combination gets mixed at room temperature.

APPLICATIONS OF SUNSCREEN

- Sunscreen use can help to prevent melanoma and squamous cell carcinoma.
- There is little evidence that it is effective in preventing basal cell carcinoma.[29]
- Sunscreen can slow or temporarily prevent the development of wrinkles and sagging skin.[30]
- Reduces skin discoloration.[31]
- Skin lighting benefits.[32]
- Prevention of brown spots and pigmentation [31].

CONCLUSION

An essential part of sun protection is using sunscreen. UV radiation exposure is linked to a reduced risk of numerous skin issues and malignancies with regular and adequate use. The goal of the current study was to develop a stable herbal sunscreen with an appropriate SPF. Sunscreen made from *oryza sativa* and *aloe vera* are stable and have great antioxidant activity as well as anti-inflammatory and blocks the harmful rays and protects the skin from sunburns and tanning of skin due to ultraviolet rays.

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