

Review of Sunscreens and Natural Sunscreening Agents

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ABSTRACT:

UVR is reflected or scattered by physical blocks. The outcome of going back to the ground state is that the absorbed energy is transformed into longer, lower-energy wavelengths (such as infrared radiation, hence heat). Inorganic particles, which are smaller versions of physical blocks, also work in part by absorption. Sunscreens, both chemical and physical, have long been used to prevent and treat a variety of UV-related illnesses, including sunburn, photoaging, skin cancer, and phototoxic responses. At the moment, sunscreens come in a variety of forms, including creams, lotions, gels, sticks, and sprays. It's essential to apply sunscreen in a sufficient amount and with a sun protection factor that is suitable for the skin type and exposure habits of the user. Prudent sunscreen application must be combined with avoiding midday sun exposure and wearing protective clothes as part of a comprehensive sun protection strategy. Indeed, there is a need to raise public awareness and education about sunscreen use. The goal of this study was to create sun protection factor (SPF)-rich sunscreen cream compositions with desirable properties. There are disputable aspects to how the sun and skin interact. The best method to prevent sunburn is universally acknowledged to be topical application of sunscreens.

KEYWORDS: - UVR, Photoprotection, SPF, Phototoxic, Sunscreen

I. INTRODUCTION:

Sunscreen is being used as photoprotective agents for UV protection. The definition of a sunscreen preparation is a substance that, when applied topically, shields the treated region from sunburn. Sunscreens are used to support the body's natural defense mechanisms against the sun's damaging UV rays. Its operation depends on its

capacity to either absorb, reflect, or scatter solar radiation. The Sun protection factor (SPF) of a sunscreen is determined by comparing the time required to create sunburn on skin protected by sunscreen to the time required to cause sunburn on skin that is not protected [1].

The effectiveness of sunscreens depends on both their capacity to suppress chemo preventive action and UV-induced sunburns [2].

Sunscreen is sun preventive cream. It is a lotion, spray, gel, or other topical product that absorbs or reflects some of the sun's ultraviolet (UV) rays onto sun-exposed skin, helping to prevent the sun burns. Skin lightening products contain sunscreen to protect light skin, as light skin is more susceptible to sun damage than dark skin. The increase in the incidence of skin cancer in recent decades is closely linked to the growing popularity of outdoor activities and recreational activities. Excessive sun exposure is widely recognized as the root cause of harmful effects on the skin, eyes and immune system. Experts estimate that four out of five skin cancers are preventable because most damage caused by UV rays is preventable. Sun protection is key to preventing skin cancer: about 90% of non-melanoma skin cancers and about 86% of melanomas are linked to exposure to ultraviolet rays from the sun. Sun camps are urgently needed to raise awareness of the health risks of UV rays and to make lifestyle changes to halt the growing trend of skin cancer. Umbrellas, clothing and hats offer the best protection - sunscreen should be applied to exposed parts of the body such as the face and hands. Sunscreen should never be used to prolong sun exposure. The sun, our nuclear furnace at the center of the solar system, produces a wide range of electromagnetic radiation, some of which sustains life on our planet. Although we are

most familiar with visible light from the sun, the only light we can see with the naked eye, there are many types of light we cannot see. A mild sunburn is a first-degree radiation burn that causes red, painful skin. In general, the redness may persist while the skin heals and the outer layer of the epidermis peels off within a week with itching. Prolonged exposure can cause second degree burns characterized by blistering of the skin and more intense pain. One of the body's defenses against UV rays is the production of melanin, a pigment that darkens the skin. [3][4]

II. METHODOLOGY ADOPTED

The methodology for reviewing sunscreens typically involves evaluating the product based on various criteria, such as:

1) Sun protection factor (SPF): The SPF measures the level of protection the sunscreen provides against UVB radiation, which is the primary cause of sunburn. Sun Protection Factor (SPF) is a measure of how well a sunscreen or sunblock product can protect your skin from the sun's harmful UV (ultraviolet) rays. The higher the SPF rating of a product, the more protection it provides. SPF is calculated by comparing the amount of time it takes for unprotected skin to turn red (i.e., burn) to the amount of time it takes for skin covered with the sunscreen to turn red. A sunscreen's effectiveness is typically measured by its sun protection factor (SPF), which is calculated as the UV energy needed to create a minimal erythema dose (MED) on skin that is protected divided by the UV energy needed to produce a MED on skin that is not protected. The Minimum Erythema Dose (MED) is the shortest period of time or amount of UV light exposure required to cause a barely visible erythema on unprotected skin. The cream is more effective at preventing sunburns the higher the SPF. Therefore, it is essential to standardise the processes used to calculate these products' SPF values. The amount of sun exposure a person receives depends on more factors than just the amount of time spent in the sun, so it is a common misconception that the effectiveness of a sunscreen can be determined by simply multiplying the SPF by the amount of time it takes for someone to burn without sunscreen. The length of exposure, time of day, location, and weather conditions are some of the variables that affect how much solar exposure occurs. Using an

SPF 15 sunscreen would enable one to stay in the sun without burning for roughly 150 minutes if skin ordinarily burns after 10 minutes in the sun (a factor of 15 times longer). This is an approximate estimate that is influenced by the kind of skin, the amount of sunscreen worn, and the intensity of the sun. SPF is not intended to assist you decide the length of exposure; rather, it is a measure of protection from UVB radiation. Reviewers may evaluate the SPF claimed by the product and compare it to other sunscreens on the market.[7][9]

- 2) Broad-spectrum protection:** Sunscreens that provide broad-spectrum protection protect against both UVA and UVB radiation. Sunscreen is a crucial tool in protecting our skin from the damaging effects of the sun's UV rays, which can cause premature aging, sunburn, and even skin cancer. When choosing a sunscreen, it's important to look for one that provides broad-spectrum protection. Broad-spectrum sunscreen protects against both UVA and UVB rays. UVB rays are the primary cause of sunburn and can also contribute to the development of skin cancer, while UVA rays can penetrate deeper into the skin, leading to premature aging and also increasing the risk of skin cancer. When reviewing a sunscreen, look for one that has an SPF (sun protection factor) of at least 30 and is labelled as broad-spectrum. Make sure to apply it generously and reapply every two hours or after swimming or sweating. It's also important to note that while sunscreen can help protect your skin, it's not a substitute for other protective measures like seeking shade, wearing protective clothing, and avoiding sun exposure during peak hours (10am-4pm). Reviewers may evaluate whether the product claims to provide broad-spectrum protection and whether it meets the requirements for this claim according to regulatory guidelines [7][10][11]
- 3) Active ingredients:** Reviewers may evaluate the active ingredients in the sunscreen to determine their efficacy and safety, and whether they are well-researched and commonly used in other sunscreens. The active ingredients in sunscreen are responsible for protecting your skin from the harmful effects of the sun's ultraviolet (UV) radiation. There are two types of UV radiation that can cause

damage to your skin: UVA and UVB. UVA radiation penetrates deep into the skin and can cause premature aging, wrinkles, and other signs of sun damage. UVB radiation is what causes sunburns and can also contribute to skin cancer.

The active ingredients in sunscreen work by absorbing or reflecting UV radiation. The most common active ingredients in sunscreen are:

Chemical filters: These absorb UV radiation and convert it into heat that is then released from the skin. Common chemical filters include avobenzene, octinoxate, and oxybenzone.

Physical blockers: These reflect UV radiation away from the skin. Physical blockers include zinc oxide and titanium dioxide.

Sunscreen products typically contain a combination of these active ingredients to provide broad-spectrum protection against both UVA and UVB radiation. The amount of active ingredient in a sunscreen product is measured by its Sun Protection Factor (SPF) rating, which indicates how much protection the product provides against UVB radiation.

It is important to note that while sunscreen can provide some protection against UV radiation, it should be used in conjunction with other sun protection measures [8][9]

4) Formulation: The formulation of the sunscreen can affect its texture, ease of application, and how it feels on the skin. When it comes to protecting your skin from the harmful effects of the sun, a good sunscreen is a must-have. But not all sunscreens are created equal. People these days are looking for sunscreens that not only provide effective protection but also have a good texture, minimal fragrance, and give a natural tone to the body. And it doesn't stop there - the design of the product matters too. Gone are the days of glass containers, people now prefer tubes and roll-on sunscreens for their convenience and efficiency. Roll-on sunscreens are particularly popular as they prevent excess use and are easy to apply on the go. So, if you're looking for a sunscreen that ticks all these boxes, make sure to check the texture, fragrance, and tint before making a purchase. And don't forget to consider the product design too - a roll-on sunscreen might just be the perfect solution for your sun protection needs. Reviewers may evaluate the texture,

scent, and overall user experience of the sunscreen. [9][10]

5) Water resistance: Water resistance is an important factor to consider when choosing a sunscreen, especially if you will be spending time in the water or sweating. A sunscreen that is water-resistant can help to maintain its effectiveness even after exposure to water or sweat. When a sunscreen is labelled as water-resistant, it means that the product has been tested to determine how long it will maintain its effectiveness after exposure to water. Sunscreens can be labelled as either water-resistant (effective for up to 40 minutes in water) or very water-resistant (effective for up to 80 minutes in water). It's important to note that even water-resistant sunscreens will begin to break down over time, especially with prolonged exposure to water or sweating. Therefore, it's important to reapply sunscreen every two hours, even if the product is labelled as water-resistant. To ensure that you are getting the maximum benefit from your water-resistant sunscreen, it's important to apply it generously to all exposed skin before going into the water or sweating. Be sure to follow the instructions on the product label for application and reapplication. When choosing a water-resistant sunscreen, look for a product that provides broad-spectrum protection against both UVA and UVB rays, and has an SPF of at least 30. It's also a good idea to choose a sunscreen that is labelled as non-comedogenic (won't clog pores) and hypoallergenic (less likely to cause an allergic reaction). In summary, water-resistant sunscreen is an important factor to consider when choosing a sunscreen, especially if you will be spending time in the water or sweating. Look for a water-resistant sunscreen that provides broad-spectrum protection, has an SPF of at least 30, and follow the instructions on the product label for application and reapplication. Sunscreens that claim to be water-resistant must meet specific criteria, such as retaining their SPF after 40 or 80 minutes of water immersion. Reviewers may evaluate the water resistance claims and whether the product lives up to them. [12][13]

6) User feedback: Feedback activity of sunscreen refers to the ability of a sunscreen to provide immediate visible feedback to the user about the amount and evenness of the product

application. This feature helps to ensure that the user is applying enough sunscreen to all exposed areas of the skin.

There are several types of feedback mechanisms that can be found in sunscreens. Some examples include:

Colour-changing: Some sunscreens change colour when applied to the skin to indicate the areas where the product has been applied. This can help the user to ensure that they have covered all exposed areas evenly.

Spray application: Spray sunscreens can provide a visible mist on the skin, which can help the user to see where the product has been applied. This can also help to ensure that the product is applied evenly.

Texture: Some sunscreens have a texture that makes it easy to see where the product has been applied. For example, some products may have a slight sheen or shine when applied to the skin, which can help the user to see where the product has been applied.

Application indicators: Some sunscreens may have markings or symbols on the packaging or container to indicate the appropriate amount of product to use or where the product should be applied on the skin. [14]

By providing immediate feedback to the user, feedback mechanisms can help to ensure that the user is applying enough sunscreen and applying it evenly, which can improve the effectiveness of the sunscreen. When choosing a sunscreen with feedback activity, look for a product that provides broad-spectrum protection against both UVA and UVB rays, and has an SPF of at least 30. Additionally, consider the type of feedback mechanism that works best for you and your skin type. Reviewers may also consider user feedback, including customer reviews and testimonials, to gain insights into the product's performance and user experience. Overall, the methodology for reviewing sunscreens is designed to provide consumers with objective and informative evaluations of these products, taking into account their performance, safety, and user experience. [14][15]

III. RESULTS AND DISCUSSIONS

Sunscreen and sun screening agents are products that are designed to protect the skin from the harmful effects of the sun's ultraviolet (UV) radiation. Sun exposure can cause a wide range of

damage to the skin, including sunburn, premature aging, and an increased risk of skin cancer. Sunscreen is a product that is applied to the skin and works by absorbing, reflecting, or scattering the sun's UV radiation. Sunscreen is rated by its sun protection factor (SPF), which is a measure of the amount of UV radiation that is blocked by the product. A higher SPF indicates more protection, although it is important to note that no sunscreen can completely block all UV radiation.

When using sunscreen, it is important to apply it generously and frequently, especially after swimming or sweating. Sunscreen should also be used in combination with other sun protection measures, such as seeking shade, wearing protective clothing, and avoiding sun exposure during peak hours. Sunscreen use is essential in protecting our skin from the harmful effects of UV radiation, which can lead to premature skin aging, sunburn, and even skin cancer. However, now not all sunscreens are created equal. In recent years, there has been a growing preference for photostable sunscreens or those that have built-in photostability into their formulations. Photostability refers to a sunscreen's ability to maintain its protective properties when exposed to UV radiation. Photostable sunscreens are preferred because they provide longer-lasting protection and are less likely to break down and become ineffective when exposed to sunlight. On the other hand, natural sunblock's have also been gaining popularity among consumers due to their decreased chance of having negative side effects compared to synthetic sunscreens.

Natural sunblock's use mineral-based ingredients such as zinc oxide or titanium dioxide to physically block UV rays from penetrating the skin. These ingredients are considered safe and less likely to cause skin irritation or other adverse reactions. Another area of research that has been generating considerable interest is the use of natural antioxidants for UV filtering. Bioactive compounds such as rutin, found in plants like buckwheat and citrus fruits, have been found to have photoprotective and antioxidant potential. Studies have shown that adding rutin to sunscreen formulations can boost their sun protection factor (SPF) value and give them multifunctional properties. The use of natural antioxidants in sunscreen formulations is well-supported, as it offers a safer and more sustainable alternative to synthetic ingredients. Additionally, the use of natural ingredients can provide additional benefits

such as anti-inflammatory and anti-aging properties.

Protecting our skin from the harmful effects of UV radiation is crucial, and sunscreen is a vital tool in achieving this. Consumers can choose between synthetic sunscreens with built-in photostability or natural sunblock's that use mineral-based ingredients to physically block UV rays. Recent research has shown that combining nanostructured lipid carriers and tocotrienol-rich fraction in sunscreen formulations can improve its effectiveness and safety. Natural antioxidants like rutin are also being explored as a viable ingredient for UV filtering in sunscreens. As research in this field continues, we can expect to see more effective and safer sunscreen formulations in the market. In conclusion, sunscreen and sun screening agents are important tools for protecting the skin from the harmful effects of the sun's UV radiation. When used in combination with other sun protection measures, they can help reduce the risk of sunburn, premature aging, and skin cancer.

IV. CONCLUSION: -

Based on the information available to us, it is generally recommended to use sunscreen with a minimum sun protection factor (SPF) of 30 and to apply it generously and frequently when exposed to the sun. Sunscreen helps protect the skin from harmful ultraviolet (UV) radiation, which can cause skin cancer and premature aging.

In addition to sunscreen, other sun protection measures include seeking shade, wearing protective clothing, and avoiding sun exposure during peak hours. Sun screening agents such as zinc oxide and titanium dioxide can also provide physical protection against UV radiation by reflecting it away from the skin.

It's important to note that while sunscreen and sun screening agents can reduce the risk of skin damage from sun exposure, they are not fool proof and should be used in combination with other sun protection measures. It's also important to choose a sunscreen or sun screening agent that is appropriate for your skin type and to check the label for any potential allergens or irritants.

As always, if you have concerns about your skin or the use of sunscreen or sun screening agents, it's best to consult with a medical professional or dermatologist for personalized advice.

In future, sunscreen will be an essential part of daily skin care routine of maximum percent of population.

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