



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. It is well recognized that sunscreens are essential for photoprotection. 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. Experts' clinical expertise and recent research on the usage of sunscreen chemicals were highlighted. It is 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

INTRODUCTION:

SUNSCREENS:

Sunscreen is a type of skincare product that is designed to protect the skin from the harmful effects of ultraviolet (UV) radiation from the sun. UV radiation can cause skin damage, premature aging, and increase the risk of skin cancer. Sunscreens work by absorbing or reflecting UV radiation before it can penetrate the skin. Chemical sunscreens work by absorbing UV radiation and converting it into heat energy, while physical sunscreens reflect UV radiation away from the skin. Sunscreens are available in a variety of forms, including lotions, creams, sprays, and sticks.

They are also available in different levels of sun protection factor (SPF), which is a measure of the sunscreen's ability to block UVB radiation. The higher the SPF, the more protection the sunscreen provides. It's important to use sunscreen correctly by applying it generously and reapplying it every 2 hours, or more often if you're sweating or swimming. Additionally, it's recommended to wear protective clothing, hats, and sunglasses to further reduce your exposure to UV radiation. Using sunscreen regularly is an important part of maintaining healthy skin and reducing your risk of skin damage and skin cancer. It's important to choose a sunscreen that works well for your skin type and to use it consistently as part of your daily skincare routine.

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. Follow these simple steps to get sun protection. [1][2]

A nice day at the beach? boating? to walk? Do you work in the garden? Do you have a sunburn? Did you use any guarantees? Do you use sunscreen?

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.

LITERATURE REVIEW OF SUNSCREENS

Vijay R. Gadgil a, Aarya Darak b, Shubham J. Patil b, Abhinandan Chopada b, Revati A. Kulkarni b, Sharvari M. Patil b, Nupur A. Gupta b, Tanmay N. Mehta b, Shreerang V. Joshi b. et al ¹ (2023)

UV radiation from the sun's rays should never be exposed to human skin in excess because it can lead to cancer and other skin conditions. Dermatologists all across the world advise using skin creams, lotions, and sunscreen to guard against such negative effects. New organic, inorganic, and hybrid sunscreens are constantly being developed and added to these skin care solutions. However, it has been discovered that some of these materials are unstable to UV light and that the sun protection they provide gradually diminishes over time. As a result, the majority of formulators now favour photostable sunscreens or have built-in photostability into their formulations. In this review, we have discussed the chemistry involved in the synthesis of many organic sunscreens, problems with some of them, and various methods for improving their photostability.

Muhammad Arif Darmawan a, Nurul Hikmah Ramadhani a, Nadhira Alifa Hubeis a, Muhammad Yusuf Arya Ramadhan a, Muhammad Sahlan b, Suraini Abd-Aziz c, Misri Gozan. et al ² (2021)

Natural sunblock's have a decreased chance of having negative side effects. In this study, the effect of adding lignosulfonate to tengkawang butter to improve its quality and SPF value was assessed. Tengkawang butter, which serves as the main component of sunscreen, is combined with lignosulfonate, a naturally occurring activator, to create the sunscreen formulation. In this investigation, different lignosulfonate types (Ca-, Mg-, and Na-lignosulfonates) and concentrations (1%, 2.5%, 5%, and 10% w/w) were used. According to the findings, adding Ca, Mg, and Na-lignosulfonate to tengkawang butter decreased its acidity from 4.795 0.125 mg NaOH/g sample to 3.28 0.13, 3.18 0.28, and 2.39 0.28 mg NaOH/g sample, respectively. By the addition of Ca, Mg, and Na-lignosulfonate, the peroxide number of tengkawang butter was similarly decreased from 3.68 0.73 meq O₂/kg sample to 3.59 0.62, 3.62 0.67, and 3.59 0.52 meq O₂/kg sample, respectively. The results revealed that the SPF value of tengkawang butter increased from 4.04 0.12-13.12 0.26 (224%), 13.05 0.11 (223%), and 16.98 0.95 (320%), respectively, when 10% (w/w) Ca-lignosulfonate, Mg-lignosulfonate, and Na-lignosulfonate were added. The chromophore chemicals in lignin are related to the rise in SPF value. The findings of this study can be used to create high SPF cosmetic formulations that shield skin from UV radiation.

REVIEW OF NATURAL SUNSCREENING AGENTS

There are several natural suncreening agents that can be used to protect the skin from the harmful effects of the sun's UV rays. Some of these natural suncreening agents include:

Zinc oxide: Zinc oxide is a mineral that provides broad-spectrum protection against UV radiation. It reflects and scatters UV rays and sits on top of the skin, forming a protective barrier. Zinc oxide is safe for all skin types, including sensitive skin. Zinc oxide is a widely used active ingredient in sunscreen formulations due to its ability to provide effective and reliable protection against both UVA and UVB rays. It works by creating a physical barrier on the skin that reflects and blocks UV rays from penetrating the skin. Zinc oxide is also a broadspectrum suncreening agent, which means it can protect the skin from both UVA and UVB rays, which are associated with premature aging and skin cancer. Unlike chemical sunscreen agents, which may cause skin irritation or trigger allergic reactions, zinc Oxide is usually taken into consideration secure and appropriate for all pores and skin types, together with touchy pores and skin. Furthermore, Zinc oxide is also a photostable ingredient, meaning it doesn't degrade or break down when exposed to sunlight, making it an ideal ingredient for long-lasting sun protection. It is important to choose a sunscreen product that contains at least 20% zinc oxide to ensure adequate sun protection. Overall, Zinc oxide is an effective and safe suncreening agent that is widely used in a range of skincare products and is recommended by dermatologists and other skin experts for daily sun protection. [20][39]

Titanium dioxide: Titanium dioxide is another mineral that provides broad-spectrum protection against UV radiation. Like zinc oxide, it sits on top of the skin and forms a protective barrier. It is safe for all skin types, including sensitive skin. Titanium dioxide is another widely used active ingredient in sunscreen formulations due to its ability to provide effective and reliable protection against both UVA and UVB rays. Like zinc oxide, it works by creating a physical barrier on the skin that reflects and blocks UV rays from penetrating the skin. Titanium dioxide is also a broad-spectrum suncreening agent, which means it can protect the skin from both UVA and UVB rays. It is generally considered safe and suitable for all skin types, including sensitive skin, and is less likely to cause skin irritation or allergic reactions compared to chemical sunscreen agents. Furthermore, Titanium dioxide is also a photostable ingredient, meaning it doesn't degrade or break down when exposed to sunlight, making it an ideal ingredient for long-lasting sun protection. It's important to note that titanium dioxide may leave a white cast on the skin, especially in higher concentrations or in formulations that are not wellformulated. However, many modern sunscreen formulations using nanotechnology have improved its dispersion and overall aesthetic appeal. Overall, Titanium dioxide is an effective and safe suncreening agent that is widely used in a range of skincare products and is recommended by dermatologists and other skin experts for daily sun protection. [22][39]

Red raspberry seed oil: red raspberry seed oil is a natural oil that contains antioxidants and has a high SPF value. It protects the skin from UVB and UVA rays and is safe for all skin types. It also has anti-inflammatory properties that can help soothe and calm irritated skin. Red raspberry seed oil has been suggested as a natural suncreening agent due to its potential ability to absorb UV radiation. However, its efficacy as a standalone sunscreen has not been scientifically proven and it is not recommended as a primary sunscreen agent. According to a study published in 2010, red raspberry seed oil has a relatively low sun protection factor (SPF) of about 6 for UVB rays, which are the primary cause of sunburns. This is significantly lower than the recommended SPF of at least 30 for adequate protection against sunburn. However, red raspberry seed oil may still have some benefits when used as part

of a broader sun protection regimen. It contains antioxidants such as vitamin E and polyphenols, which can help to neutralize free radicals generated by UV radiation and prevent damage to the skin. Overall, while red raspberry seed oil may have some potential as a natural sunscreensing agent, it is not a reliable substitute for conventional sunscreens with proven SPF values. For best protection against UV radiation, it is recommended to use a sunscreen with an SPF of 30 or higher, and to follow other sun safety practices such as avoiding peak sun hours and wearing protective clothing.[40]

Carrot seed oil: Carrot seed oil is another natural oil that contains antioxidants and has a high SPF value. It protects the skin from UVB and UVA rays and is safe for all skin types. It also has anti-inflammatory properties that can help soothe and calm irritated skin. There is some evidence to suggest that carrot seed oil may have some sunscreensing properties due to its high content of beta-carotene, which is a natural pigment that can absorb UV radiation. However, it's important to note that carrot seed oil is not a conventional or approved sunscreensing agent and is not included in the list of ingredients approved by regulatory agencies for use in sunscreens. While carrot seed oil may provide some level of protection against the sun's harmful rays, it's unlikely to provide sufficient protection on its own, and it's not a replacement for conventional sunscreens. It's always important to use a broad-spectrum sunscreen with an SPF of 30 or higher, and to reapply it every two hours or immediately after swimming or sweating. Additionally, carrot seed oil may cause photosensitivity in some individuals, meaning that it can actually make the skin more sensitive to the sun's rays and increase the risk of sunburn and skin damage. Therefore, it's always a good idea to do a patch test before using any new skincare product and to talk to a healthcare professional before using carrot seed oil or any other natural remedy as a sunscreensing agent. [41]

Green tea extract: green tea extract is a natural antioxidant that protects the skin from UV damage. It also has anti-inflammatory properties that can help soothe and calm irritated skin. Green tea extract is a popular ingredient in many skincare products due to its antioxidant properties. While it has been studied for its potential as a sunscreensing agent, it is important to note that it is not a conventional or approved sunscreensing agent and is not included in the list of ingredients approved by regulatory agencies for use in sunscreens. The polyphenols found in green tea, particularly epigallocatechin gallate (EGCG), have been shown to have photoprotective effects against UV radiation. However, the protection offered by green tea extract may not be sufficient on its own and is likely to be less effective than conventional sunscreens.[8][9]

AIMS & OBJECTIVES

The aim of reviewing sunscreen is to assess its effectiveness in providing protection against harmful UV radiation from the sun. The review should evaluate the quality and performance of different sunscreens, and provide consumers with reliable information that can help them make informed decisions when purchasing and using sunscreen.

The objectives of reviewing sunscreen may include:

- Assessing the SPF (sun protection factor) of different sunscreens and their ability to protect against both UVA and UVB radiation.
- Identifying any potential harmful ingredients in the sunscreen that may cause irritation, allergic reactions, or other adverse effects.
- Evaluating the water resistance and durability of the sunscreen under different conditions, such as swimming or sweating.
- Comparing the texture, scent, and overall user experience of different sunscreens to determine which ones are most comfortable and convenient to use.
- Providing recommendations and guidance to consumers on how to choose and use sunscreen effectively to reduce their risk of sun damage and skin cancer.



SKIN CLASSIFICATION

Skin type	Characteristics	Suitable skin care
Normal skin	has a uniform tone, is soft, smooth, without pores, and does not have any oily or flaky spots. Has a surface that is transparent, fine, elastic, and smooth and is neither greasy nor dry.	Pomegranate Leaves juice, gingili oil. Essential Oils- Chamomile, Lavender, lemon
Dry skin	Reduced sebum production and sensitivity. looks parched and feels constricting. Chapping is an indication of excessively dry and dehydrated skin cracking.	Calendula, olive oil, aloe vera. Essential oils- fennel, rose oil, almond oil, sandal wood, avocado.
Oily skin	dull, thick, and shiny skin tone. Oily skin features rough pores, zits, and other unsightly blemishes. susceptible to black heads	rose buds, oat straw, Thyme, Chamomile, Aloe vera, Lemon grass. Essential oils- Juniper, Lemon, Lavender, Sage.
Combination skin	face has some dry or flaky areas, whereas the center of the nose, the chin, and the forehead are oily.	menthol, turmeric, sweet flag, aloe vera. Essential oils- Citrus oil, Jasmine. Sandal wood oil.

- 1) **Normal Skin:** This skin type is neither very oily nor underdeveloped. In general, it is quite simple to maintain and less reactive to outside aggressors.
- 2) **Dry Skin:** This type of skin might appear powdered, is frequently flaky, and is always peeling in some fashion. Your face feels tight and it is dehydrated. Sensitivity to goods is also brought on by dry skin. For instance, it's pretty typical for foamy face washes or exfoliating serums to irritate dry skin.
3. **Oily Skin:** This type of skin is distinguished by its general greasiness on the face. The excessive production of sebum (oil) on the skin as a result of overactive sebaceous glands causes this.
- 4) **Combination Skin:** Combination skin is characterized by a dry cheek area and an oily Tzone. The severe oiliness that occurs in the summer and the dryness that occurs in the winter are both reactions to the weather.
- 5) **Sensitive skin:** This type of skin is characterized by more lasting reactions to foods, products, and environmental triggers. [33]



SKIN COLOR

A wide range of colours, from dark brown to nearly white, can be seen in human skin. Although there are many elements that affect a person's skin colour, melanin content is by far the most important. Melanin is the pigment that also determines the colour of your hair and eyes. Genetics plays a major role in determining melanin levels. Constitutive pigmentation describes the degree of hereditary skin pigmentation. Intrinsic factors are those that are inherited at birth and cannot be altered. [31]

The Fitzpatrick skin type classification method is most frequently employed when determining the likelihood of developing skin cancer. These are the Fitzpatrick skin types:

Type I: Very fair skin that never tans or burns.

Type II: Fair skin that occasionally tans and always burns.

Type III, occasionally burns, always tans.

Type IV: Olive skin that never tans and hardly ever burns.

Type V: Brown skin that is moderately pigmented, never burns, always tans.

Type VI: Black skin that is noticeably pigmented, never burns, and always tans. [31]

SKIN CANCER

It is caused by the abnormal growth of skin cells, which can form tumors that may be either benign (non-cancerous) or malignant (cancerous). There are 3 principal kinds of pores and skin cancer: basal mobileular carcinoma, squamous mobileular carcinoma, and melanoma. Basal cell carcinoma and squamous cell carcinoma are collectively known as non-melanoma skin cancers, while melanoma is the deadliest form of skin cancer.[21][38]

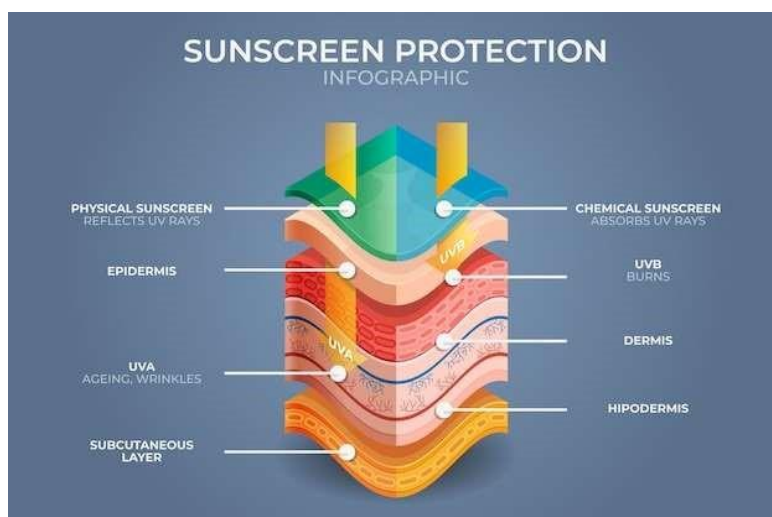
Basal cell carcinoma: - Basal cell carcinoma is the most common type of skin cancer. It is because of long-time period publicity to ultraviolet (UV) radiation from the sun. This type of skin cancer usually appears as a small, raised bump or a red, scaly patch on the skin. It may also appear as a flat, pale, or yellow area that looks like a scar.[24]

Squamous cell carcinoma: - Squamous cell carcinoma is the second most common type of skin cancer. It is also caused by long-term exposure to UV radiation from the sun. Squamous cell carcinoma typically appears as a firm, red bump or a scaly patch on the skin. It may also appear as an open sore that does not heal or a raised, wart-like growth.[24]

Melanoma: - Melanoma is the most dangerous type of skin cancer. It is caused by a combination of genetic factors and exposure to UV radiation from the sun. Melanoma usually appears as a dark brown or black mole with an irregular shape and uneven color. It may also be red, pink, or white.[24]

Risk factors for skin cancer include a family history of the disease, a history of sunburns or excessive sun exposure, having fair skin, and having a weakened immune system. People who have had skin cancer in the past are also at increased risk of developing the disease again.

The great manner to save you pores and skin most cancers is to shield your pores and skin from the sun. This can be done by wearing protective clothing, using sunscreen with an SPF of 30 or higher, avoiding the sun during peak hours, and staying in the shade when possible. It is also important to perform regular self-examinations of your skin and to visit a dermatologist for annual skin checks. If you notice any changes in the color, size, or shape of a mole or lesion, it's important to see a doctor as soon as possible. Early detection and treatment can improve the outcome for people with skin cancer.



METHODOLOGY ADOPTED

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

Sun protection factor (SPF): The SPF measures the level of protection the sunscreen provides against UVB radiation, which is the primary cause of sunburn. Reviewers may evaluate the SPF claimed by the product and compare it to other sunscreens on the market.

Broad-spectrum protection: Sunscreens that provide broad-spectrum protection protect against both UVA and UVB radiation. 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.

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.

Formulation: The formulation of the sunscreen can affect its texture, ease of application, and how it feels on the skin. Reviewers may evaluate the texture, scent, and overall user experience of the sunscreen.

Water resistance: 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.

User feedback: 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. [27]

SUNSCREEN CLASSIFICATION

Organic Sunscreen -

Organic sunscreen has been the backbone of sunscreen composition for decades, and while inorganic sunscreen is becoming more popular, organic sunscreen continues to be used in higher quantities. Organic sunscreens are frequently classed as anthranilates, benzophenones, camphor, cinnamates, and healthy. Ultimately derivatives. These aromatic compounds absorb a specific section of the UVR spectrum, which is then re-emitted at a less energy, longer wavelength, such as heat or light, or employed in a photochemical process, such as cis trans or keto enol photochemical isomerization. Because no organic sunscreen agent, when taken at the levels currently permitted by the United States Food and Drug Administration, can give a high UV protection factor, organic sunscreen is virtually always used in combination. Furthermore, individual organic sunscreens have a very narrow absorption spectrum that can be widened depending on the intended product usage, such as recreational or daily photo protection, as well as the desired characteristic such as waterproof or sweat resistant. [23][33]

Inorganic Sunscreen:

Inorganic sunscreen has been increasingly popular in beach and daily use UV protection products during the last decade. This is due, in part, to their safety and efficacy, notably in blocking UVA, as well as concerns about the potential detrimental effects of organic sunscreen. Inorganic sunscreens are typically thought to be innocuous pigments that cannot penetrate the skin and are mainly unaffected by light energy, unlike organic sunscreen. Titanium dioxide and zinc oxide are the two most often used inorganic sunscreens. While the appearance and attenuation spectra of these two metal oxides differ significantly, they have several common features that are briefly addressed. Zinc oxide and Titanium dioxide are odorless, white powders with a typical particle size distribution. Microfine powder, which is utilized in sunscreen products, has an average particle size of 0.20 micron or less and a limited and wellcontrolled distribution. [23][33]

CLASSIFICATION BASED ON CHARACTERISTICS: -

Physical sunscreen: - Physical sunscreens contain active mineral components like titanium dioxide or zinc oxide that lie on top of the skin and deflect and scatter harmful UV rays away from the skin. They are also known as physical blockers. Physical blockers provide nearly total protection, but they are thick, opaque, and oily. Physical blockers such as red petrolatum, titanium oxide, and zinc oxide provide good UVA and UVB protection. Physical blockers also have the advantage of being water resistant. The table below outlines the benefits and drawbacks of physical sunscreens. Physical Sunscreens: Physical sunscreens, also known as mineral sunscreens, work by reflecting UV radiation away from the skin. These sunscreens contain ingredients such as titanium dioxide or zinc oxide, which form a protective barrier on the skin. They tend to be thicker and may leave a white or chalky residue on the skin, but they are generally considered to be gentler and less likely to cause skin irritation or allergic reactions. Physical sunscreen is applied directly to the skin and reflects the sun's rays. Physical blocks are mostly composed of the mineral titanium dioxide and zinc oxide. [31] Physical sunscreen is typically:

- Less irritant and more suited to delicate skin.
- Extra moisturizing, which might make the skin feel heavy.
- It is difficult to completely integrate with the skin. Newer products, on the other hand, provide matte and tinted versions that have less of a

white cast and can give the skin a smooth, even appearance.

Chemical Sunscreens: Chemical sunscreens work by absorbing UV radiation and converting it into heat, which is then released from the skin. These sunscreens contain organic compounds, such as avobenzone or oxybenzone, that absorb UV rays. They tend to be easier to apply, leave less white residue on the skin, and are often preferred by people with darker skin tones. However, they may cause skin irritation or allergic reactions in some people. Chemical sunscreen seeps into the skin, absorbing UV photons, converting them to heat, and then releasing them from the body. Chemical sunscreens contain active chemicals such as avobenzone, octinoxate, and oxybenzone. [31]

- If you are swimming and require a water-resistant formulation, chemical sunscreen is a preferable choice.
- Participate in sports or sweat a lot during the day.
- Choose a sunscreen that quickly penetrates into the skin.

Organic (carbon-based) molecules in chemical sunscreens, such as oxybenzone, octinoxate, octisalate, and avobenzone, cause a chemical reaction and function by converting UV radiation into heat and then releasing that heat from the skin. They are also known as chemical or organic absorbers. There are four types of chemical agents that are typically employed as sunscreens. Chemical absorbers provide the most comprehensive protection. The chart below outlines the benefits and drawbacks of chemical sunscreens. It's worth noting that many sunscreens on the market today are a combination of chemical and physical ingredients. In general, it's a good idea to choose a broad-spectrum sunscreen that protects against both UVA and UVB rays, and to use a sunscreen with at least SPF 30 or higher. It's also important to reapply sunscreen every two hours or more frequently if swimming or sweating.

○ **Derivatives of Aminobenzoic Acid:**

- PABA (para-amino benzoic acid): Only absorbs UVA light. Padimate O: Broad UVB protection.
- Methylantranilite: Provides excellent UVB protection but only limited UVA protection.

○ **Benzophenones**

- Avobenzone: Broad UVA protection with low UVB protection.
- Dioxybenzone and oxybenzone: UVA protection that is only partial.
- Sulisonbenzone: Absorbs the majority of UVB and some UVA light.

○ **Cinnamates**

- Cinoxate provides limited UVA protection but extensive UVB coverage.
- Octocryline and Octyl methoxycinnamate: UVB and UVA protection.

○ **Salicylates**

- Homosalate and Octyl salicylate only absorb UVB.
- Trolamine salicylate: Provides excellent UVB protection. A sunscreen that contains both physical blockers and broad-spectrum protection [33]

CLASSIFICATION BASED ON SPF



SUNSCREENS FOR OILY AND SENSITIVE SKIN

If you have acne-prone or sensitive skin, the correct sunscreen will not cause breakouts and may even enhance the appearance of your skin. Search for a

product that is designated for sensitive or blemished skin. "Some sunscreens help lessen the appearance of blemishes and discoloration because they include niacinamide, a vitamin B3 family member," "Get a couple different samples from your physician or drugstore if you're not sure which sunscreen is suitable for you," he advises. "Apply a dab on your wrist for several days in a row. If you don't get a response, it's generally safe to apply on your face. Sunscreen does not provide flawless protection against the damaging effects of UV radiation.

Even while applying sunscreen, it is possible to get burnt, suffer skin damage, or acquire skin cancer, especially if it is not applied properly or reapplied frequently enough. Inconvenience: Applying sunscreen can be time-consuming and can leave the skin feeling oily or unpleasant. Also, it might be tough to remember to reapply sunscreen every two hours, especially if you are swimming or exercising. It is critical to consider these possible drawbacks against the benefits of using sunscreen and to select a sunscreen that is appropriate for your skin type and lifestyle. If you are concerned about the potential hazards of sunscreen, you should consult a physician.

The interest in developing new sunscreens is increasing due to the harmful effects of UV radiations on the skin, such as erythema, accelerated skin ageing (photoaging) and the induction of skin cancer. However, many molecular sunscreens penetrate into the pores and skin inflicting photoallergies phototoxic reactions and pores and skin irritation. To triumph over the deficiencies of sunscreen agent blends that are speedy detachable upon touch with sparkling or salt water, polymeric suncreening sellers have been proposed in which the suncreening agent is chemically sure withinside the polymeric spine of the compound, for that reason making the compound extra pores and skin substantive.



BENEFITS OF SUNSCREEN

Your skin is your biggest organ and serves important duties such as protecting your body from viruses and regulating your body's temperature. While your skin protects your body from the sun's rays, that doesn't imply you should go outside without also protecting your skin. Your skin is exposed to a variety of diseases if you do not use sunscreen. These are five reasons why you should apply sunscreen every day. [31][32]

- **Minimize Aging Symptoms:** - Make sunscreen your buddy if you want to decrease the signs of ageing. Stepping out in the sun without protection can harm your skin's collagen and connective fibers, causing it to lose suppleness and wrinkle.
- **Limit the Appearance of Sunspots:** - Sunspots (also known as "age spots" or "liver spots") are caused by UV radiation from the sun and contribute to the appearance of ageing. Sunspots are flat areas of discolored skin that can be different shades of brown caused by hyperpigmentation of the skin. Sunspots can appear in the following body parts:
 - **Avoid becoming sunburned:** - Without protection, excessive sun exposure or UV radiation exposure (such as tanning beds) can result in a severe burn. More sunspots and skin damage may result from repeated sun exposure without protection. Sunburn can also raise your chances of getting skin cancer.
 1. Face
 2. Shoulders
 3. Arms
 4. Back
 5. Back of the hands
- **Protect the Skin from Sunburn:** - Without protection, excessive sun exposure or UV radiation exposure (such as tanning beds) can result in a severe burn. Sunburn also can improve your possibilities of having pores and skin cancer. A sunburn typically takes a few days or longer to heal, so it's critical to always wear sunscreen, even on cooler, cloudy days.
- **Reduce the Risk of Skin Cancer:** - One of the best ways to reduce the risk of skin cancer is to wear sunscreen. The Centers for Disease Control (CDC) recommends the use of a broadspectrum sunscreen with at the least an SPF of 15, however the better the number, the higher the UV

protection.

• **For all-day protection, it's also necessary to reapply sunscreen:** - After you have been out in the sun for more than 2 hours, after swimming or sweating, and after toweling off, you should avoid broken blood vessels. UV radiation, also known as telangiectasias, can cause the skin's blood vessel walls to shrink. The appearance of bruises or bleeding is caused by blood vessel weakening.

ADVANTAGES OF SUNSCREEN

Prevents premature ageing: UV radiation exposure can promote early ageing of the skin, resulting in wrinkles, fine lines, and age spots. Sunscreen can help prevent this damage, allowing your skin to seem younger and healthier.

- Reduces the danger of sunburn: Not only is sunburn uncomfortable and ugly, but it can also raise your risk of skin cancer. Sunscreen protects against sunburn by absorbing the UV energy that causes it.
- Year-round protection: UV radiation may enter the skin and cause harm even on gloomy or rainy days. Sunscreen offers all-year protection against this risk.
- Helps to prevent hyperpigmentation: UV radiation can cause hyperpigmentation, or skin darkening. Sunscreen can help prevent this by preventing the UV light that causes excess melanin formation. Ultimately, sunscreen is an important tool for protecting your skin from the damaging effects of UV radiation from the sun, and it should be part of your regular skincare regimen. Sunscreen can help prevent sunburn by absorbing or reflecting the sun's damaging UV energy.
- Skin cancer prevention: Long-term exposure to UV radiation can raise the risk of skin cancer. By shielding the skin from damaging UV rays, sunscreen can help lower this risk.
- Anti-aging benefits: One of the primary causes of premature ageing is sun damage. Sunscreen can help prevent wrinkles, fine lines, and other ageing indications produced by UV radiation exposure.

Sunscreen can help prevent the production of dark spots and hyperpigmentation, which can assist to level out skin tone. Several sunscreens contain moisturizing agents, which can help keep skin moisturized and healthy. Ultimately, using sunscreen is an important element of preserving and protecting healthy skin.[34][37]



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 no longer 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 sunblocks have also been gaining popularity among consumers due to their decreased chance of having negative side effects compared to synthetic sunscreens. Natural sunblocks 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 sunblocks 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.

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 foolproof 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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