INTRODUCTION
Sunburn results from too much sun exposure and almost everyone has been sunburned or will become sunburned at some time. People visiting a beach, athletes or simply working in direct sun can get sunburned. Sunburn may occur at any time of the year, but is common in the summer months when the sun’s rays are strongest. Sunburn is a burn on the skin caused from exposure to ultraviolet (UV) radiation. Ultra Violet A and Ultra Violet B refer to different wavelengths in the light spectrum. UVB is extraordinarily harmful to the skin, especially for risk of skin cancer. Both are responsible for photoaging (premature aging of the skin leading to wrinkles) and sunburn. Tanning beds used for sunbath and artificial tanning produce both UVA and UVB radiations. Some individuals experience a sun rash (sun poisoning) due to a condition called polymorphous light eruption (PMLE). Symptoms of PMLE are a mild to severe skin rash, which may appear within 30 minutes to several hours of sun exposure.

Prevention is the most important step to avoid short-term consequences of sun exposure (redness, rashes, pain, blistering) and the long-term risks for skin damage and skin cancer. Photoprotection is a group of mechanisms that nature has developed to minimize the damage that the human body suffers when exposed to UV radiation. The damage mostly occurs in the skin; nevertheless the rest of the body can be affected by the oxidative stress caused by UV light. Photoprotection of the skin is accomplished by proficient internal conversion of DNA, proteins and melanin. A photochemical process that converts the energy of the UV photon into small, harmless amounts of heat is known as internal conversion. If this transformation of energy of the UV photon into heat does not occur, it would lead to the generation of free radicals or other harmful reactive chemical species. When the skin is stimulated by ultraviolet radiation, the skin’s self protection mechanism is 2-fold. First the swelling of epidermis by UVB and UVA increases protection by 3 to 4 times and after that an increase in the synthesis of melanin induced by UVB and UVA radiation, gives the skin more protection.

Photoprotection

Generally two types of sunscreen agents are used: physical and chemical. Physical agents (Cloths, umbrella, Zinc oxide and titanium dioxide etc.) reflects the sunrays and thereby protect the skin from damage while chemicals reduces the effect of UV rays by absorbing there rays. It is quite difficult to generate a broad spectrum formulation to protect the skin from sunburn without side effects. So it is the need of the day to formulate the herbal sunscreens with broad spectrum effect by exploring their antioxidant asset. Photoprotectants are the physical barrier...

ABSTRACT
Enormous UV-protective artificially synthesized compounds are present in the modern world, out of which 98% give protection against UV-B range and the remaining 2% are potent against far UV-A range only. The necessity of the time is to develop the sunscreen agents with broad spectrum protection against harmful UV range as it may cause sunburns, wrinkles, vulnerability against infections, premature aging, and cancer. Ozone depletion by CFC’s and green house gases has increased the atmospheric transmission of solar UVA and UVB radiations. Herbs have been used in medicines and cosmetics from centuries especially the herbal preparations have a high prospective due to their antioxidant activity. Antioxidants such as vitamins (vitamin C, vitamin E), flavonoids, and phenolic acids play the main role in fighting against free radical species that are the main cause of numerous negative skin changes. Their potential to treat different skin diseases and improve the skin appearance is well known. A lot of plants and plant extracts like Aloe vera, Acacia catechu, Asparagus racemosus, Ficus benghalensis, Berberis aristata Green tea, Hemp Seed Oil, Sesame oil, Coconut Oil, Alfalfa Oil, Almond Oil, Tropical Ferns, Ballnut and a lot of lichens are used traditionally as photoprotectants. Sesame oil resists 30% of UV rays, while coconut, peanut, olive, and cottonseed oils block out about 20%. Traditional use of plant in medication of skin damage provides the interest and basis for researchers in the aforementioned field.

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between the Sun and the skin; hence most of the Photoprotectants exert their protective effect when used topically. However, a new trend is emerging, consisting of increasing the basal antioxidant threshold of the body to improve the response to oxidative damage, including that due to exposure to the skin. Some of the medicinal plants and herbs are used as sun-protectants. The use of agents that can inhibit, reverse, or retard the process of these harmful events in the UV-exposed skin is known as chemoprevention. Antioxidants such as vitamins (vitamin C, vitamin E), flavonoids, and phenolic acids play the main role in fighting against free radical species that are the main cause of numerous negative skin changes. A wide variety of phytochemicals, mostly the dietary supplements, have been reported to acquire considerable skin photoprotective effects.

Some of them are:- Alfalfa Oil/ Almond Oil/ Alexandrian Laurel: Alfalfa is also known as lucerne and it can be used as a pretreatment along with other sunscreens. It reduces the damage caused by sunburn and is also a rich source of antioxidants. Although almond oil does not provide a high SPF level, it does reduce the aging effect that UV light causes on the skin, preventing skin damage and aging. More commonly this plant is known as the Ballnut tree, contains elements that are believed to regenerate skin tissue.

*Acacia catechu* is highly precious for its powerful astringent and antioxidant activities. The bark, wood, fruits, Gum and flowering tops of *Acacia catechu* are used for medicinal purpose. Used externally as a powder, it seals the bleeding in gums. The decoction is an effective gargle in sore throat, cough and diarrhea. Applied externally to ulcer, boils and skin eruptions and is used extensively in Ayurvedic formulations.

*Berberis aristata* belongs to genus Berberis of family Berberidaceae. The root and wood are rich in a yellow alkaloid berberine, a bitter substance, which dissolves in acids and forms salts of the alkaloid. The plant contains barbierine, oxyberberine, berberamine, aromoline, karachine, palmatine, oxyacanthine and taxilamine. *Berberis aristata* contains protoberberine and bis isoquinoline type of alkaloid. Root of plant *Berberis aristata* contains alkaloid which are berberine, Berberine, oxyacanthine, ephiberpine, palmatine, dehydrocaroline, jatrorhizine and columbamine, karachine, dihyrokarachine, taxilamine, oxyberberine, aromoline. Rasaut a preparation of *Berberis aristata* mixed with honey is useful in the treatment of aphthous sores abrasions and ulcerations of the skin. *Berberis aristata* root bark decoction is externally used as a wash in painful eye affections, ulcers and haemorrhoids. In the Unani system of medicine, it is used for the treatment of leprosy. Decoction of roots of *Berberis aristata* is used for skin troubles and in blood purification.

*Ficus benghalensis* (Moraceae) is commonly known as Bargad, Vatvriksh, Badh, and banyan. The banyan tree is well known all over India. The tree has what is known as the ‘aerial roots’, its branches drop to the ground, take roots again, and send out more twisting and trailing branches, thus extending the growth of the tree indefinitely. It has smooth, shining, rather stiff and leathery leaves, broadly oval in shape. The name Banyan tree in English seems to have been given by Europeans in the Persian Gulf to a particular tree of this species under which Baniyas or members of the Indian merchant class used to congregate for worship and business. The leaves of the banyan tree yield ficusin and bergaptene. The latex of the tree is very toxic. A hot poultice of the leaves can be applied with beneficial results to abscesses to promote suppuration and to hasten their breaking. The milky juice from the fresh green leaves is useful in destroying warts. The latex is commonly used locally for sores, ulcers and bruises. *Hibiscus rosa sinensis* L. a perennial herbaceous bush of family malvaceae is native to China, grown as ornamental plant in tropical regions and has several forms with varying colours of flowers. However, the red colour flower is preferred for medicinal purpose. The buds have cooling and astringent effect and it removes burning sensation of body. The flower have been reported in the ancient Indian medicinal literature to have beneficial effects in heart diseases, mainly in ischemic disease. Traditionally it widely employed by user of natural health for contraception, controlling uterine bleeding, menorrhagia, venereal diseases, demulcent, emollient, aphrodisiac, brain tonic and cardiotoxic.

*Asparagus racemosus* is a traditional medicine for the prevention and treatment of gastric ulcers, dyspepsia, diarrhea, nervous disorders. It also possess the antioxidant, immunostimulant and chemoprevention along with other sunscreens. It reduces the damage caused by sunburn and is also a rich source of antioxidants. Although almond oil does not provide a high SPF level, it does reduce the aging effect that UV light causes on the skin, preventing skin damage and aging. More commonly this plant is known as the Ballnut tree, contains elements that are believed to regenerate skin tissue.

**A. racemosus** is a succulent plant with a large subterranean tuber and has been reported to acquire considerable skin photoprotective effects. It is commonly used locally for sores, ulcers and bruises. *Hibiscus rosa sinensis* L. a perennial herbaceous bush of family malvaceae is native to China, grown as ornamental plant in tropical regions and has several forms with varying colours of flowers. However, the red colour flower is preferred for medicinal purpose. The buds have cooling and astringent effect and it removes burning sensation of body. The flower have been reported in the ancient Indian medicinal literature to have beneficial effects in heart diseases, mainly in ischemic disease. Traditionally it widely employed by user of natural health for contraception, controlling uterine bleeding, menorrhagia, venereal diseases, demulcent, emollient, aphrodisiac, brain tonic and cardiotoxic.

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*Acacia catechu* is highly precious for its powerful astringent and antioxidant activities. The bark, wood, fruits, Gum and flowering tops of *Acacia catechu* are used for medicinal purpose. Used externally as a powder, it seals the bleeding in gums. The decoction is an effective gargle in sore throat, cough and hoarseness of voice. In dental caries and cavities, stomatitis, halitosis, it is used with great benefit. The word Khadiria (*A. catechu* in sanskrit) literally means that which alleviates the diseases and stabilizes the body. Acharya Vagbhata has highly praised it as the drug of choice for the treatment of numerous skin diseases. The bath of its decoction is effective for various skin infections. It has been described as a plant to be effective as an anti obesity herb by Sushruta. *Acacia catechu* is broadly used in Ayurveda for many diseases, especially for skin diseases. Seeds of *A. catechu* contain water-soluble mucilage (6.8%); a good protein source. The concentrated aqueous extract known as Khair gum or cutch is an astringent, cooling and digestive, beneficial in cough and diarrhea. Applied externally to ulcer, boils and skin eruptions and is used extensively in Ayurvedic formulations.

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in herbal medicine since the beginning of the first century AD. Extracts from Aloe vera, called kathali in ayurvedic medicine, is used as a multipurpose skin treatment. The polysaccharides, mannose-6-phosphate, and complex anthraquinones all contribute to the benefits of Aloe extract.\(^{29}\) The natural chemical constituents found in Aloe vera are amino acids, enzymes, anthraquinones, lignin, mono- and polysaccharides, salicyclic acid, saponins, sterols, and vitamins. Aloe vera is a uniquely effective moisturizer and healing agent for the skin.\(^{29}\) A. vera are widely used in the cosmetics and alternative medicine industries, being marketed as variously having rejuvenating, healing, or soothing properties. However, there is a little scientific proof of the effectiveness of Aloe vera extracts for any cosmetic or medicinal purposes, and whatever positive evidences are existing are frequently challenged by other studies.\(^{30-35}\) Triticum vulgare (wheat germ) oil is rich in vitamin E and offers excellent antioxidant promise in topical antiaging formulations. Also, it nourishes and prevents loss of moisture from the skin.\(^{34}\) Extra virgin Corylus avellana (hazelnut) oil has good levels of tocopherols, as do Helianthus annuus (sunflower) and Sesamum indicum (sesame) oils.\(^{35}\)

Tea (Camellia sinensis) is commonly used as a home remedy for sunburn. The compounds in tea called catechin help to prevent and repair skin damage and may even help prevent chemical- and radiation- induced skin cancers.\(^{36}\) The polyphenolic compounds present in tea provide the protective effect for the skin as well as for the internal organs. These compounds modulate biochemical pathways that are important in cell proliferation, inflammatory responses, and responses of tumor promoters. Green tea has been shown to have anti-inflammatory and antioxidant effects in both human and animal skin.\(^{37}\) Animal studies provide evidence that tea polyphenols, when applied orally or topically, ameliorate adverse skin reactions following UV exposure, including skin damage, erythema, and lipid peroxidation.\(^{38}\) The growing awareness of common people about the sunscreen agents, their effects, ill effects and their efficiency has greatly influenced the cosmetic industry as well as the researchers for designing broad spectrum herbal drugs with a little or no side effect on health to protect the human skin from injurious UV radiations. The development of novel preventive and therapeutic strategies depends on our understanding of the molecular mechanism of UV-damage. Many herbal sunscreens are available in market in the form of creams, lotion, and gel having labeled SPF and PF values.

The ability of Plants to defend themselves from UV radiation of sun make them of great interest and draw the attention of researchers towards their sun protective capability. The potential of secondary metabolites present in plants is still undefined. More research trials and clinical evidences are needed to prove and formulate herbal drugs for photoprotection. It was evident that using one natural constituent is not enough for skin protection. So a combination of different natural substances may prove a potent solution for this. It is also concluded that every protectant (physical, chemical or herbal) have different mechanism of photoprotection. So the researchers are working to design a remedy with broad spectrum effect to provide the overall protection from sunrays induced damage to the skin. An initial exploration of phytochemicals present in the bark extract of Ficus benghalensis and rhizome extract of Berberis aristata revealed the presence of tannins, flavonoids, phenols, terpenoids\(^{39}\) etc. in these plants which indicate that these extracts may be beneficial in treatment of damage caused by UV rays and act as photoprotectants.

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