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A brief review on herbal sunscreen lotion

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Abstract
Sunscreen is a chemical compound that helps protect you from UV rays sunburn is caused by ultraviolet B radiation but ultraviolet a may be more damaging to the skin. Sunscreen should ideally block both wavebands. The aim of this study was to develop a topical sunscreen formulation based on some fixed oils, in combination with some medicinal plants. Regular use of sunscreen reduces the development of actinic keratosis, squamous cell carcinoma and melanoma. Sunscreen may be organic or inorganic chemicals. Sunscreen is also known as sunblock lotion. The product absorbs or reflects the sun's ultraviolet radiation and protects the skin. The increasing incidence of skin cancers and photo-damaging effects caused by ultraviolet radiation has increased the use of screening agents, which have shown beneficial effects in reducing the symptoms. Sunscreen agents should be safe chemically inert, non-irritating, non, photostable an ability to provide complete protection to the skin against damage from solar radiation.

Keywords: Sunscreen, polyphenols, SPF, sunburns

Introduction
A substance that helps protect the skin from the sun's harmful rays. Sunscreens reflect, absorb, and scatter both ultraviolet A and B radiation to provide protection against both types of radiation. Using lotions, creams, or gels that contain sunscreens can help protect the skin from premature aging and damage that may lead to skin cancer. Herbal sunscreen (also known as herbal sunblock, suntan lotion) is a lotion, spray or topical product containing herbal ingredients which helps to protect from the UV radiations of the sun and hence lowering the risk of skin cancer [1].

Classification of sunscreen
Sunscreens can be classified as follows
Based on the mode of action they can be classified as

a) **Physical sunscreen:** Reflect harmful rays away from the skin.
e.g.: zinc oxide and titanium dioxide.

b) **Chemical sunscreen:** Absorbs UV rays e.g.: microfine titanium dioxide, avobenzone and oxybenzone. The combination of both physical and chemical active ingredients is considered to be a good sunblock. Physical sun blocks are having a scattering effect thereby results in a whitening phenomenon while majority of organic chemicals used in sunscreen formulations have not been established as safe.

2. Based on application

a) **Topical:** They either absorb or reflect radiation to protect from harmful radiation

b) **Oral:** These are consumed orally to avoid skin damage. e.g.: Carotenoids

Topical sunscreens are divided into two classes based on their mechanism of protection

- Organic sunscreen
- Inorganic sunscreen
- **Organic Sunscreen:** Organic sunscreen works by absorbing into skin and converting UV rays into heat. It is thin and ideal for everyday use allow for skincare ingredients to be added easily. Organic sunscreen actives chemical carbon-based compound. It contains a non-mineral active ingredient.

- **Inorganic sunscreen:** These are particles that scatter and reflect UV rays back to the environment they act as a physical barrier to indent ultraviolet and UV light. They are considered broad spectrum as they cover the entire ultraviolet spectrum. The Inorganic sunscreen is also referred to as sunblock [2].

Selection of sunscreen based on skin types

Wash your face with the help of a gentle cleanser. This will ensure that the makeup, pollutants and other dirt are removed. Your skin should return to its natural state which will help determine the type of your skin. Take a tissue paper and dab your face. The area consisting of your forehead and nose must be the place where you concentrate. This is where you should wipe with the help of a tissue. So, what's your skin type?

There are 4 types of skin explained below

Normal Skin

If your skin shows no oil or no flaking and it feels smooth and supple, then hooray! You have a normal skin type.

Oily Skin

If there is lots of grease on the tissue paper, then you have an oily skin type. It is common that you might have a shine and large pores.

Dry Skin

If the tissue paper is accompanied by lots of flakes and dead skin, then your skin is dry. You need to consider moisturizing your skin.

Combination

Any combination of the above mentioned skin types is a combination skin type. This is very common and most of you might as well have this skin type. Your skin is generally oily in the forehead and nose area and dry elsewhere [21].

Ideal Properties of Sunscreen

1. Must absorb a broad range of UV rays causing sunburn.
2. Must be stable in the presence of sunlight.
3. Should be able to provide complete protection for skin.
4. Should be safe, effective, and chemically inert, at low concentration.
5. Should not cause irritation, sensitization and toxicity [3].

Importance of Sunscreen

UV radiation is essential to human health such that it helps in the intestinal absorption of calcium, phosphorous and for the production of vitamin D3. On the other hand, these radiations also harm our health by directly interacting with DNA, RNA, proteins, lipids and thereby causing potential carcinogenic effects. The most efficient way to protect skin from harmful UV radiation is the topical application of any active molecule which has UV absorbing or reflecting properties. This is why the sunscreen has gained importance in the current scenario [4].

Why We Use Sunscreen?

- Too much-unprotected sun exposure leads to
- Premature skin ageing
- Sun burns
- Skin cancer

Mechanism of Photoprotection

UV rays mediated photo oxidative damage reaches the dermal capillaries via epidermis and dermis and cause depletion of enzymatic and non-enzymatic antioxidants in Stratum corneum, epidermis and dermis. Photo oxidation of pre-existing melanin and its precursors will occur which result in immediate and persistent pigment darkening. Sunscreen act by preventing and minimizing the damaging effects of the ultraviolet sunrays. Following exposure to the sunscreen have been demonstrated to increase the tolerance of the skin to UV exposure.

They work on two mechanisms

Scattering and reflection of UV energy from the skin surface mineral based on inorganic sunscreen works on this mechanism they provide a coating that blocks sun rays from penetrating through the skin [5].

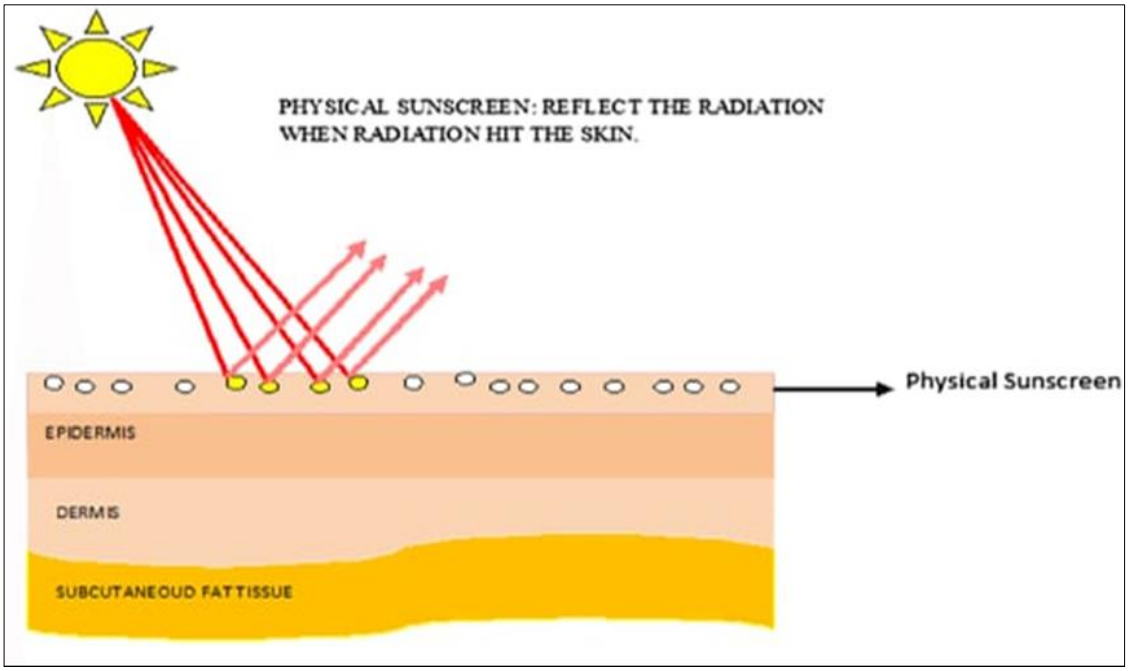

Fig 1: Mechanism of Photoprotection

Materials

Shea Butter (*Vitellaria paradoxa*)
It is obtained from the fat of the shea nut. The shea tree originates from the savannas of Africa. It is used as an antioxidant and it contains vitamins like A and E, both of which enhance skin cell regeneration and circulate blood below the skin's surface [6].

Beeswax (*Cera alba*)
It is derived from honeybees of the genus Apis and it is a natural wax. Mainly Beeswax foundation is used as an emulsifier and thickener and can also be used for emulsion stabilization [7].

Rose Water (*Rosa damascena*)
One of the most important factors is that they have a good source of antioxidant activities and also be used for beautifying purposes for their sterling sunscreen [8].

Gelatin
It is a novel source of components that have potential in skin anti-aging products and is also used as an emulsifying agent [9].

Raspberry
Use it to moisturize your face without blocking pores, so it is also non-comedogenic [10].

Olive oil (*Olea europaea*)
It is a fat derived from the olive fruit. Olive oil is made up of triglyceride esters of oleic acid and palmitic acid along with traces of squalene, sterols, (phytosterols, and tocosterols) [11].

Coconut Oil (*Cocos nucifera*)
It contains fatty acids and is reported to possess antioxidant properties photoprotection, and other medicinal activities like anti-bacterial, skin barrier repair, anti-aging, wound healing, and moisturizing in atopic dermatitis treatment [12].

Grape Seed Oil (*Vitis vinifera*)
It acts as an antioxidant with strongest-ant inflammatory and antiproliferative activity [13].

Almond Oil
It is the richest source of polyphenolic compounds, especially flavonoids and phenolic acids [14].

Sesame Oil (*Sesamum indicum*)
Sesame Oil has inhibited the growth of malignant melanoma (a skin cancer) prostaglandin and leukotrienes in *In-vitro* conditions [16].

Tea Tree Oil (*Melaleuca alternifolia*)
It acts as an effective antiseptic, fungicide, and germicide

Carrot Seed Oil (*Daucus carota*)
It is an essential oil and it renders a significant role of antioxidant, antiseptic, antifungal, and fragrant properties with high levels of vitamin A [6].

Development of Formulation
1. Step 1: Melt beeswax and Shea Butter in a china dish after that add Almond Oil, Coconut oil, Rosehip Seed Oil, Carrot Seed Oil, and Olive Oil in measured quantities and heat up to 75 ℃.

2. Step 2: Add Rose Water and Gelatin in another china dish in measured quantity. Heat the mixture up to 75℃.

3. Step 3: Mix both the mixture and stir gently until a smooth cream is formed at room temperature.

Determination of pH
To determine the pH, you can use pH strips, meters, or indicators. pH measures the acidity or basicity of a solution on a scale of 0 to 14, with 7 being neutral.

Determination of Viscosity
The Brookfield viscometer was used to test viscosity, with the proper number of spindles selected [17].

Spread ability
Spread ability was defined as the amount of time it took to separate two slides in less time.

The formula for calculating it is: $S = M \times L / t$
Where, M = weight tied to the upper slide
L = length of glass slide
T = time taken to separate the slides [19].

Irritancy Test:
The lotion was applied to the specified area and time was noted. Irritancy, erythema, edema was checked if any for regular interval up to 24 hrs and reported [18].

Determination of SPF

SPF = CF∑EE (λ) × I(λ) × A(λ) 320 290 (3)

Whereas,
CF= Correction factor;
EE= Erythemogenic effect;
I= Intensity of solar light of wavelength [20];

Conclusion

UV radiation causes various precarious and damaging effects on the skin. It causes skin cancer, hyper pigmentation, photo-aging, sunburn and skin irritation. Herbal cosmetics possess property to protect skin from the damaging effects of sun rays with no comedogenic and side effects. The present review focuses on the scientific account of herbals in cosmetics. Active constituents extracted from herbals have a potent UV shielding effect. Herbs are eco-friendly, compatible, and widespread compared to synthetic ones.

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References

1. Sharma PP. Cosmetics – formulation, manufacturing and quality control. 4th edition. Delhi: Vandan Publication Pvt. Ltd.; Pg 189.
2. Baby AR, Maciel CPM, Kaneko TM, Velasco MVR. UV spectrophotometric determination of bioflavonoids from a semisolid pharmaceutical dosage form containing *Trichilia catigua* Adr. Juss (and) *Ptychopetalum olacoides* Bentham standardized extract: analytical method validation and statistical procedure. J AOAC Int. 2006;89(6):1532-1537.
3. Bambal V, Wyawahare N, Turaskar A, Mishra M. Study of sunscreen activity of herbal cream containing flower extract of *Nyctanthes Arbortristis* and *Tagetes erectal*. 2011;11(1):142-147.
4. Butler H. Poucher's perfumes, cosmetics, and soap. quality, stability, and safety assurance. Dordrecht: Kluwer Academic Publishers; c2000. p. 507-621. Absorbance.
5. COLIPA. COLIPA Guidelines: International Sun Protection Factor (SPF) Test Method. Rev. Efficacy Evaluation Guidelines; c2006-2008 May.
6. Natural sunscreen. Available from: http://wakeup-world.com/2012/05/14/natural-sunscreen/
7. Emsley J. Better Looking, Better Living, Better Loving: How Chemistry can Help You Achieve Life's Goals. Weinheim: WILEY-VCH; c2007.
8. Balakrishnan KP, Aswamy NN. Botanicals as sunscreens: Their role in the prevention of photoaging and skin cancer. Int. J Res. Cosmet. Sci. 2011;1(1):1-12.
9. Sun L, Zhang Y, Zhuang Y. Antiphotoaging Effect and Purification of an Antioxidant Peptide from Tilapia (*Oreochromis niloticus*) Gelatin Peptides. J Funct. Foods. 2013;5(1):154-162.
10. Ryan AS, Goldsmith LA. Nutrition and the skin. Clin. Dermatol. 1996;14:389-406.
11. Kole P, Jadhav H, Thakur P. Cosmetics Potential of Herbal Extracts. Nat. Prod. Radiance. 2005;4(4):315-321.
12. Nevin KG, Rajamohan T. Effect of topical application of virgin coconut oil on skin components and antioxidant status during dermal wound healing in young rats. Skin Pharmacol Physiol. 2010;23(6):290-297.
13. Deore SL, Kombade S, Baviskar BA, Khadabadi SS. Photoprotective antioxidant phytochemicals. International Journal of Phytopharmacy. 2012;2(3):72-
14. Kim YH, Yang HE, Park BK, Heo MY, Jo BK, Kim HP. The extract of the flowers of Prunuspersica, a new cosmetic ingredient protects against solar ultraviolet–induced skin damage *in vivo*. Journal of Cosmetic Science. 2002;53(1):27-34.
15. Larsen E, Kharazmi A, Christensen LP, Christensen SB. An anti-inflammatory galactolipid from rose hip (*Rosa canina*) that inhibits chemotaxis of human peripheral blood neutrophils *in vitro*. J Nat Prod. 2003;66(7):994-995.
16. Anitha T. Medicinal Plants used in Skin Protection. Asian Journal of Pharmaceutical and Clinical Research. 2012;5(3):35-38.76
17. Shanbhag S, Nayak A, Narayan R, Nayak UY. Anti-aging and Sunscreens: Paradigm Shift in Cosmetics. Adv Pharm Bull. 2019;9(3):348-59.
18. Ahmady A, Amini MH, Zhakfar AM, Babak G, Sediqi MN. Sun Protective Potential and Physical Stability of Herbal Sunscreen Developed from Afghan Medicinal Plants. Turk J Pharm Sci. 2020;17(3):285-92. DOI: 10.4274/tjps.galenos.2019.15428
19. Government of Indian Ministry of Health and Family Welfare. The Ayurvedic Pharmacopoeia of India, Part 1, Volume 1, 1st edition. New Delhi: The Controller of publications; c2001.
20. Donglikar MM, Deore SL. Development and Evaluation of Herbal Sunscreen. Pharmacognosy Journal. 2017;9(1):83-97.
21. Lahari PR, Ratnamala KV. Formulation Development and Evaluation of Sunscreen. IJIRT; c2021;8(1). ISSN 2349-6002.