WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 14, Issue 9, 251-260. Review Article ISSN 2277–7105

FORMULATION AND EVALUATION OF HERBAL SUNSCREEN CREAM

Akshay Solanke*

India.

Article Received on
09 March 2025,

Revised on 30 March 2025,
Accepted on 19 April 2025

DOI: 10.20959/wjpr20259-36384

***Corresponding Author**
Akshay Solanke
India.

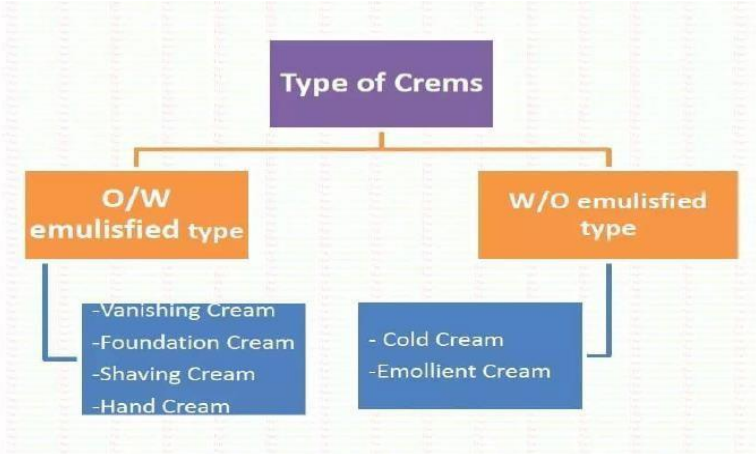
ABSTRACT

The increasing awareness of the side effects of synthetic sunscreens has driven the demand for herbal alternatives. This study focuses on formulating and evaluating a herbal sunscreen cream using natural ingredients known for their UV-protective properties. Active ingredients such as aloe vera, turmeric extract, and zinc oxide were selected for their efficacy and safety. The cream was evaluated based on its SPF value, stability, and user acceptability. The results demonstrate that the herbal sunscreen cream offers significant protection against UV rays while being safe and environmentally friendly.

INTRODUCTION

WHAT IS MEAN BY CREAM

Creams are defines as “a semisolid dosage form containing one or more drug substances dissolved or dispersed in a suitable base” Creams are semi-solid emulsions of oil and water. They are of a softer consistency & lighter body than true ointment. Semisolid emulsions of either O/W or W/O type.



WHAT IS MEAN BY SUNSCREEN CREAM

Herbal Sunscreen(also known as Herbal sunblock, Herbal suntan lotion)is a cream, lotion, spray or other topical product that helps protect the skin from the sun's ultraviolet (UV)radiation, and which reduces sunburn and other skin damage, with the goal of lowering the risk of skin cancer with the help of herbs.

However, in the United States, the term suntan lotion usually means the opposite of sunscreen, and instead refers to lotion designed to moisturize and maximize UV exposure and tanning rather than block it. These are commonly called indoor tanning lotions when designed for use with tanning beds or justs suntan lotion if designed for out door use and may or may not have SPF protection in them.

UV protection is befitting very popular because of sunscreen‟s properties as a photo protecting agent. Sunscreen preparation is applied topically, and its purpose is to heal, prevent or resist skin from painful or harmful effects of sunburn, suntan, sun cancer, and premature skin aging and to escalate the level of Sun Protection Factor (SPF). Sunscreens are a natural defense mechanism to defend against precarious UV radiation from the skin, which is the outer covering layer of the body. Its ability to absorb, reflect or scatter some of the sun‟s UV radiation on the skin from extravagant exposure to ultraviolet radiation. Skin melanoma, sunburn, photoaging, skin pigmentation, and various painful or precarious effects are caused by UVA and UVB rays. Anti-oxidant, wound healing, antifungal, premature

WHAT IS MEAN BY SUNSCREEN CREAM

Herbal Sunscreen(also known as Herbal sunblock, Herbal suntan lotion)is a cream, lotion, spray or other topical product that helps protect the skin from the sun's ultraviolet (UV)radiation, and which reduces sunburn and other skin damage, with the goal of lowering the risk of skin cancer with the help of herbs.

However, in the United States, the term suntan lotion usually means the opposite of sunscreen, and instead refers to lotion designed to moisturize and maximize UV exposure and tanning rather than block it. These are commonly called indoor tanning lotions when designed for use with tanning beds or justs suntan lotion if designed for out door use and may or may not have SPF protection in them.

UV protection is befitting very popular because of sunscreen‟s properties as a photo protecting agent. Sunscreen preparation is applied topically, and its purpose is to heal, prevent or resist skin from painful or harmful effects of sunburn, suntan, sun cancer, and premature skin aging and to escalate the level of Sun Protection Factor (SPF). Sunscreens are a natural defense mechanism to defend against precarious UV radiation from the skin, which is the outer covering layer of the body. Its ability to absorb, reflect or scatter some of the sun‟s UV radiation on the skin from extravagant exposure to ultraviolet radiation. Skin melanoma, sunburn, photoaging, skin pigmentation, and various painful or precarious effects are caused by UVA and UVB rays. Anti-oxidant, wound healing, antifungal, premature agents are for external use only the use of sunscreen as photo protecting agents for uvprotection. The sunscreen formulationis which when applied topically protect the treated area from sunburn sunscreen depends on ability to protect against uv induced sunburn and their chemo preventive activity. Excessive solar ultraviolet radiation are responsible for various skin damages such as sunburn, skin pigmentation premature aging and photo carcinogenesis .The main mechanism of skin damage by uv radiations is formation of Reactive Oxygen, Species(ROS) that interact with proteins lipids and subsequently alter them. UVB and to a lesser extent UVA are responsible for inducing skin damages . Sunscreen should contain antioxidant agent in addition to sunblock agent to be effective in prevention of photoaging and skin cancer. Plants due to their antioxidant potential are known as attractive option to be used in Sunscreen formulation for prevention of skin damage due to solar radiation. Sunscreen is topical product that protects the skin against harmful effects of the sun.

Classification of sunscreen and the mechanism of photoprotection sunscreen are classified as either topical or systemic based on the route of administration topical sunscreen are divided into two classes on their mechanism of protection.

1]Organic sunscreen

2]Inorganic sunscreen

Advantages of Herbal Sunscreen over Synthetic Sunscreen Cream The most often used sunscreens are chemical ones. There is a concern since chemical sunscreens have the ability to damage skin biology by slowly penetrating the epidermis of the skin. Herbal sunscreens have less or no adverse effects and more photo protective power than manmade ones.

Formulas for herbal sunscreen are the safest and offer UV protection that is on par with

synthetic sunscreens. By scavenging for free radicals, antioxidants found in sunscreen formulas also provide efficient UV defense. It has more medical and cosmetic uses, and it offers higher UV protection

List Of the drug use in the formulation

Names of the drug

Sr.No	Name of the drug
1]	Aloevera
2]	Grapes juice
3]	Orange peel extract
4]	Green tea extract

REVIEW LITERATURE

Laxmikant Kantilal Banswal*1, Dhanashri Santosh Mane*2, Mohammad Sadat Khan*et,al; (2023)

Sunscreen is a chemical compound that help 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 herbal topical sunscreen formulation based on some fixed oils, in combination with some medical plants. The objective of this work is to formulate and evaluate a cosmetic (Herbal sunscreen) for protection of skin from the natural ingredients which have different properties such as emollient, moisturizer, base, antiacne, anti sweatning in the ingredients such as Aloe vera, Butterfly pea flower, Coconut oil, Rose water, Vitamin E Capsule etc. A modest investment in prevention produced substantial savings in illness-related costs. The FDA recently released its final orders concerning the labelling of sunscreen. The final monograph updates the tentative final monograph regarding over the counter (OTC) sunscreen products. Among the labelling standards are removals of the term "sun block" inclusion of a statement detailing the importance of sunscreen to prevent harmful effects of the sun, three sun protection categories: minimum, moderate, high, a new SPF category of 30+ or products with SPF values greater than 30, uniform, and streamlined labelling for all sunscreens.

Geeta vaman bhople, Sanap.A.S.,and Dr.Prachi Udapurkar,et.al(2019)

The sunlight consists of harmful radiations which affects the skin. The Ultraviolet radiations are of 3 types Ultraviolet A, Ultraviolet B and Ultraviolet C. This article gives a detailed review on different types of Ultraviolet radiation.To protect our skin from Ultraviolet radiation sunscreen formulations are used which either absorbs scatters or reflects the radiation. The harmful effects on skin like photo aging, skin cancer, DNA damage are explained. The present review explains the various types of sunscreen formulations and the agents used for the purpose of sun screening.

The agents are of two type‟s physical and chemical sun screening agents. The physical agents which block the sun light and the chemical agents which absorb the sunlight are listed and explained. To know the efficacy of the formulation sun protection factor calculation is done. The equation used to calculate the Sun Protection Factor value is explained in detail. The ultraviolet spectroscopic method is employed to calculate the Sun Protection Factor.

The proposed method is found to be easy and rapid for the calculation of Sun Protection Factor values in the in vitro studies.

Miss. Waghmode Monika Vasant Prof.Khade. P.Dr. HINGANE L.D et,al: (2014)

Sunscreen is a chemical compound that help 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 herbal topical sunscreen formulation based on some fixed oils, in combination with some medical 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 that absorb or reflect the suns ultraviolet radiation and protect the skin. The increasing incidence of skin cancers and photo damaging effects caused by ultraviolet radiation has increased the use of sunsreening agents, which have shown beneficial effects in reducing the symptoms. Sunsreening agents should be safe chemically inert, non irritating non toxic, photo stable an able to provide complete protection to the skin against damage from solar radiation.

Ruchi Tiwari1, Indu Singh1, Monisha Gupta1,Laliteshwar Pratap Singh2, Gaurav Tiwari1*et,al(2019)

Sunscreen lotion is a sort of product that protects against the sun's harmful rays by containing

ultraviolet radiation (UV rays), which is divided into two types: ultraviolet radiation A (UVA) and ultraviolet radiation B (UVB). The incorporation of herbal materials into sunscreen is one of the most effective and natural ways to protect against the sun, as measured by the sun protection factor (SPF), as well as the detrimental side effects of toxic chemicals. The present study aime to develop herbal sunscreens containing turmeric (strong antiseptic property which protects skin from bacteria caused by excess sweat), coconut oil (used as a sun-block agent and helps to protect skin from sun damage), aloe vera (give a cooling effect to the skin and work as skin barrier), lemon (used to protect skin for sunburn) which will be effective for skin and protect skin against harmful sun rays, sunburn, and skin cancer.

Prepared herbal sunscreens were evaluated for physicochemical characteristics, SPF, thermal stability, antioxidant activity, in vitro mutagenicity, and stability. Results showed that the F5 and F6 herbal sunscreens were of good consistency and viscosity with excellent antioxidant, nonmutagenic, nonirritant, stability activity and possessed 33.50 SPF for normal skin. In comparison to F1 through F4, formulations with a coconut oil base and carrot seed extract (F5 and F6) were shown to be stable and effective, with a high SPF.

P. R. Deepthi Swapna*, B. A. Vishwanath, K. Bharathi, Mithun Kumar and Bibek Agri et,al:(2017)

The sunlight includes dangerous radiations which influence the skin health. Herbal sunscreens resource the body's protection mechanisms to shield against harmful UV radiation from the sun. In the present study, sunscreen creams were formulated with Turmeric extract and Aloe vera extract. Physico-chemical evaluations and in-vitroevaluation was done and of Sun Protection Factor (SPF) were also performed for the formulations. The SPF calculation of prepared cream was done using Mansur equation and was compared with a marketed herbal product. The formulated cream was having good physicochemical characteristics. The SPF evaluation results (SPF-24.888) indicated that the prepared herbal sunscreen has promising sun protection activity.

Ashitha Saffrin M*1, Raman Sureshkumar 2 et,al; (2022)

The objective of present work was to develop novel sunscreen creams containing polymeric nanoparticles (NPs) of morin. Polymeric NPs containing morin were prepared and optimized. The creams containing morin NPs were also prepared and evaluated. Optimized NPs exhibited particle size of 90.6 nm and zeta potential of −31 mV. The entrapment efficiency of

morin, within the polymeric NPs, was found to be low (12.27%). Fourier transformed infrared spectroscopy and differential scanning calorimetry studies revealed no interaction between morin and excipients. Transmission electron microscopy and atomic force microscopy revealed that the NPs were spherical in shape with approximately 100 nm diameter. Optimized NPs showed excellent in vitro free radical scavenging activity. Skin permeation and deposition of morin from its NPs was higher than its plain form. Different sunscreen creams (SC1–SC8) were formulatedby incorporating morin NPs along with nano zinc oxide and nano titanium dioxide. SC5 and SC8 creams showed excellent sun protection factor values (≈40).

Yamini Shah1, Rajvee Mewad et,al; (2023)

Presently herbal sunscreens are widely used by almost everyone on this planet to prevent from harmful effects of UV radiation from sunlight. Herbals are preferable because of fewer side effects and abetter safety profile. This study is about the preparation and evaluation of herbal sunscreen creamspossessing anti-UV radiation effectiveness and anti-inflammatory properties. Creams were preparedfrom the extract of plant materials, such as Glycyrrhiza glabra and Tinospora cordifolia, Terminalia arjuna respectively. Glycyrrhiza glabra, Tinospora cordifolia and Terminalia arjuna, total polyphenol andflavonoid content. Evaluation of prepared herbal sunscreen creams was performed on parameters such asorganoleptic properties, pH, rancidity, spreadability and drug content. The effectiveness of the productswas evaluated by measuring Sun Protection Factor (SPF). These products showed good spreadability, consistency, homogeneity, appearance, desired pH, ease of removal and no evidence of phase separation. Our formulation of sunscreen creams is considered to be effective sunscreen in healing, softening and rejuvenating the skin.

Sreelesh Brinda *1, Dhingra Gitika 2and Vaze Varsha 3 et,al: (2017)

Sunscreens aid the body's natural defense mechanisms protect against harmful UV radiation from the sun. The present study involves the formulation of sunscreen cream with herbal active ingredients and evaluation for its effectiveness. Naturally occurring traditional substances are gradually replacing synthetic counterparts due to their effectiveness and absence of adverse effects. The herbal drugs selected for the study were roots of Glycyrrhiza glabra Linn.(Yashtimadhu), Hemidesmus indicus R.Br. (Anantmul) and heartwood of Santalum album Linn. (Chandana). Creams were prepared with each individual herb and combination of all three herbs with varying concentration of herbal extracts. The evaluation

included determination of Sun Protection Factor for all the formulated creams. The SPF was calculated using the spectrophotometric method and then applying the Mansur equation. The results of the study indicated that the 25% combination cream showed maximum sun screeening activity.

EVALUATION TEST FOR THE HERBAL SUNSCREEN CREAM

1. Physical parameter

- Colour: The formulated cream was tested for color by visual inspection. They were checked against white background.
- Odour: The Odour of formulated cream was checked by smelling it
- Consistency: The consistency was checked by applying on skin.
- Homogeneity: Developed cream was tested for homogeneity by visual inspection. They were checked for their appearance and presence of any aggregates.

2) Washability

The formulations were applied on skin; the ease and extent of washing with water were checked manual.

3) pH Determination

The cream in general has a pH of 6 to 9. The pH of the cream is measured by making 10% dilution of the cream and the pH is measured by the pH meter. The electrode must be washed and free from any residue of acid and alkali to ensure an accurate reading.

CONCLUSION

- The purpose of this study was to develop herbal Sunscreen Cream. The formulated aloe vera extract, Orange Peel, Tea tree Extract and Grapes juice containing Sunscreen cream was evaluated for several physiochemical tests and The various quality control parameters were checked.
- All parameter gives favorable result. Aloe Vera extract, Orange Peel, Tea tree Extract and Grapes juice are natural ingredients with considered medicinal values.
- Throughout the study period, the developed formulations shown high consistency, no
- sign of phase separation, and good spread-ability.
- There was no evidence of change in the visual appearance, texture, or fragrance of the formulation during the period of study.

- This herbal Sunscreen cream is one of the good alternatives in place of synthetic cream.

REFERANCE

1. Shalini Malviya, Arvind, AlokJha, et al. Antioxidant and antibacterial potential of pomegranate peel extracts. AFSTI. 2014; 51(12): 4132-4137.
2. G. Karthikeyan and A.K. Vidya. Phytochemical analysis, antioxidant and antibacterial activity of Pomegranate peel. RJLBPCS. 2019; 5(1): 218-231.
3. Hany M. Yehia, Manal F. Elkhadragy and Ahmed E. Abdel Moneim. Antimicrobial activity ofpomegranate rind peel extracts. African journal of microbiology research. 2011; 4(22): 3664- 36668.
4. Arshad Husain Rahmani, Mohamed Ali Alsahli, Saleh AbdulrahmanAlmatroodi. Active Constituentsof Pomegranates (Punicagranatum) as Potential Candidates in the Management of Health throughModulation of Biological Activities. Pharmacogn J. 2017; 9(5): 689-695.
5. Priyanka Kesur, MayurGahlout, Poonam B. Chauhan, et al. Evaluation of Antimicrobial Properties of Peels and Juice Extract of Punicagranatum(POMEGRANATE). IJRSI. 2016; 3(5): 11-20.
6. lessandra Masci, Andrea Coccia, Eugenio Lendaro, et al. Evaluation of different extraction methodsfrom pomegranate whole fruit or peels and the antioxidant and antiproliferative activity of thepolyphenolic fraction. Food Chemistry 202.2016; 59 -69.
7. Entessar H.A. Al-Mosawe and Iman. I. Al- Saadi. The Extraction and Purification Of Gallic Acid from the Pomegranate Rind. Al-Mustansiriyah J. Sci., 2012; 23(6): 53-60.
8. Awatef M Hasan, Ali AliRedha and QaherMandeel. Phytochemical Investigations of Pomegranate(Punicagranatum) Rind and Aril Extracts and their Antioxidant, Antidiabetic and AntibacterialActivity. Nat Prod Chem Res., 2018; 6(4): 1-10.
9. Radwan S. Farag, Mohamed S. Abdel-Latif, Sekina, S. Emam, et al. Phytochemical screening and polyphenol constituents of pomegranate peels and leave juices. LRJASS. 2014; 1(6): 086-
10. Sheng Wu and Li Tian. Diverse Phytochemicals and Bioactivities in the Ancient Fruit and ModernFunctional Food Pomegranate (Punicagranatum). Molecules. 2017; 1 -17.
11. K. Subashini. Review of Phytochemical Screening for Pomegranate Peel Extract Using Crude,Aqueous, Ethanol and Chloroform. IJESC. 2016; 6(4): 3329-3332.
12. Jang-Gi Choi, Ok-Hwa Kang, Young-Soeb Lee, et al. In Vitro and In Vivo Antibacterial Activity oFPunicagranatum Peel Ethanol Extract against Salmonella. Hindawi Publishing

Corporation Evidence-Based Complementary and Alternative Medicine. 2009; 2011: 1-8.

13. C Couteau, E Paparis, LJM Coiffard., Influence on SPF the quantity of sunscreen product applied. InternationalJournal of Pharmaceutics. 2012; 437(12): 250-2.
14. C. Malsawmtluangi, Deepak Kumar Nath, Italiniai., Determination of Sun Protection Factor (SPF) number of ome aqueous herbal extracts. Journal of Applied Pharmaceutical Scheme. 2013; 3(09): 150-15.
15. O‟ Neill JJ. Effects of film irregularities on sunscreen efficacy. Journal of Pharmaceutical Science. 1984; 73(7): 888-891.
16. Klein K. Sunscreen products: formulation and regulatory considerations. 2nd edition. New York: Marcel Dekker; 1997.
17. Reena Rai, C.R. Srinivas. Photo Protection. 2007; 1-6.
18. Lowe NJ. An overview of ultraviolet radiation, sunscreen and photo-induced dermatology Clin., 2006; 2-11.
19. Serpne N, Dondi D, Albini, A. Inorganic and organic UV filters: their role and efficacy in sunscreens and suncare products. Inorg, Chim. Acta., 2007; 360: 794–802.
20. Wood, C. Murphy,E. Sunscreen efficacy. Global Cosmetics India. Duluth, ver. 167, 38-44.
21. Azevedo J.S, Viana Junior N.S. Soares C.D.V. UVA/UVB sunscreen determination by second order derivative ultraviolet spectrometry. Farmaco, Pavia, ver.54, 73-78.
22. MansurJ.S, BrederM.N.R. Mansur M.C.A. Azulay, R.D. Determination of sun protection factor, An Bras. Dermatol., Rio de Janerior, 1986 ver.61, 121-124.
23. Sayre.R.M, Agin P P, Levee, G.J, MarloweE. Comparison of in vitro testing of sun screening formulas. Photochemical Photobiological. Oxford. 1979; ver.29, 559-566.
24. Juchou, Ted J.Robinson, Hui Doan. Rapid comparison of UVB absorption effectiveness of various sunscreens by UV-Vis Spectroscopy. J Anal Bioanal Tech, 8: 35524.
25. Elizangela Abreu Dutra, Daniella AlmancaGoncalves da Cost e Oliveira, Erika Rosa Maria Kedor Hackman, Maria Ines Rocha Miritello Santoro. Determination of sun protection factor (SPF) of sunscreen by ultraviolet spectrophotometry. Brazilian Journal of Pharmaceutical Sciences. 2004; 40. 3, 38.
26. Bernard P.Binks, Paul DI Fletcher, Andrew J.Johnson, LoannisMarinopoulos., How the sun protection actor(SPF) of sunscreen films change during solar irradiation. Journal of Photochemistry and Photobiology A: Chemistry. 2017; 333: 186-199.