WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

FORMULATION AND EVALUATION OF HERBAL SUNSCREEN CREAM

Mr. Abhijit Ajinath Sasemahal[1*], Mr. Vaibhav Asaram Rathod[2], Mr. Kishor Bhimrao Dawane[2], Ms. Surbhi S. Rawka[3], Mr. Aniket Narayan Tompe[4]

[1*] Student of Bachelor in Pharmacy, Dr. Babasaheb Ambedkar Technological University, Lonere, Raigad.
[2] Student of Bachelor in Pharmacy, Dr. Babasaheb Ambedkar Technological University, Lonere, Raigad.
[3] Department of Quality Assurance, Faculty of Quality Assurance, Dr. Babasaheb Ambedkar Technological University, Lonere, Raigad.
[4] Department of Quality Assurance, Rajarshi Shahu College of Pharmacy, Buldhana, Dist-Buldana.

ABSTRACT :

In recent years, the demand for herbal cosmetics has increased due to growing concerns about the side effects of synthetic products. This project aims to formulate and evaluate a herbal sunscreen using natural, skin-friendly ingredients with photoprotective and antioxidant properties. The key herbal and natural ingredients selected for this formulation include Aloe vera (skin soothing and hydrating),

Butterfly pea flower extract (rich in antioxidants and anthocyanins), Coconut oil (natural moisturizer and UV barrier), Rose water (cooling and anti-inflammatory), and Vitamin E capsules (powerful antioxidant that protects skin from UV-induced damage).

The formulation was prepared in the form of an oil-in-water (O/W) emulsion, ensuring proper blending of the aqueous and oil phases. The created herbal sunscreen was assessed using a number of criteria, such as: physical appearance Ph spreadability washability, and tability at different storage conditions. [The Sun Protection Factor (SPF) was assessed using in vitro UV spectrophotometric analysis following the Mansur method] The product also underwent skin irritation testing and microbial load analysis to ensure safety and quality.

The results showed that the herbal sunscreen had an aesthetically acceptable appearance, good stability, adequate SPF value, and was safe for topical application. Thus, the study concludes that a combination of herbal and natural ingredients can effectively provide sun protection and be a safe alternative to synthetic sunscreens

KEYWORD: Herbs, Herbal Sunscreen Cream

INTRODUCTION

Another name for herbal sunscreen is herbal sunblock. A topical treatment such as a lotion or spray that helps shield the skin from UV radiation from the sun is called herbal suntan lotion.

Chemical sunscreen

[Those that absorb the uv light] , Sunscreen products should only be applied externally.the application of sunscreen as a UV protection photoprotectant.When applied topically, the sunscreen composition prevents sunburn in the treated area.

For sunscreen to be effective in preventing photoaging and skin cancer, it should also contain antioxidants.Plants are a popular choice for sunscreen formulation because of their antioxidant activity, which helps prevent skin damage from sunlight.A topical substance called sunscreen shields the skin from the sun's damaging rays.

Organic Sunscreen Inorganic Sunscreen

1. Organic Sunscreen

An organic sunscreen works by absorbing UV rays and converting them into heat.
Chemicals based on carbon are the active ingredients in organic sunscreen. Its active ingredient is not a mineral.

2. Inorganic sunscreen

These particles serve as a physical barrier against infrared and ultraviolet light by scattering and reflecting UV rays back to the surrounding environment. Since they cover the whole UV spectrum, they are regarded as wide spectrum. Inorganic sunscreen is also known as sunscreen.

1) Mechanism of photoprotection

It has been shown that applying sunscreen increases the skin's resistance to ultraviolet radiation by guarding against and reducing the harmful effects of UV radiation. They work on two mechanisms Using this technique, organic sunscreen reduces the harmful effects of UV rays and the depth to which they can penetrate the skin by absorbing the energy and converting it into thermal energy.

1: Understanding Herbal Sunscreen

Sun protection has become a vital part of modern skincare due to the increasing awareness about the harmful effects of ultraviolet (UV) radiation. Prolonged exposure the sun's UV rays can lead to various skin problems such as sunburn, premature aging, hyperpigmentation, and even skin cancer. Sunscreens aretopical products formulated to protect the skin by absorbing or reflecting harmful UV rays. However, most commercially available sunscreens are made usingsynthetic chemicals that may cause irritation, allergies, or environmental concerns.

In response to these concerns, the demand for herbal or natural sunscreens has significantly increased. Herbal sunscreens, also known as Natura l or plant-based sunblocks, are formulated using ingredients derived from plants that possess natural UV protective, antioxidant, and healing properties. These formulations not only provide sun protection but also nourish and improve the overall health of the skin.

Herbal ingredients like Aloe Vera, Butterfly Pea Flower,
Coconut Oil, Rose Water, and Vitamin E are commonly used in such products. These natural ingredients have minimal side effects, are biodegradable, and offer therapeutic benefits beyond sun protection.
Formulating and evaluating such a herbal sunscreen not only promotes natural skincare solutions but also opens doors to eco-friendly and sustainable cosmetic innovations.

Importances of Herbal Sunscreens

Herbal sunscreens are typically designed to block or absorb harmful UVA UVB rays.

Importance Of Herbal Sunscreens

Safety: Natural ingredients are gentle on the skin and suitable for sensitive skin types.

1. Minimal Side Effects: Unlike synthetic ingredients, herbs are less likely to cause irritation, redness, or allergic reactions.
2. Environment Friendly: Herbal ingredients decompose easily and do not harm marine ecosystems, unlike some synthetic sunscreens.
3. Additional Skin Benefits: Many herbal ingredients have anti-aging, moisturizing, anti-inflammatory, and soothing properties.

The increasing shift toward green cosmetics and the rise of Ayurvedic and herbal beauty industries have made such products more acceptable and desirable. By formulating a herbal sunscreen, we combine traditional knowledge with modern scientific methods to create a product that is both effective and eco-conscious.

Literature Review

1. Surjushe, A., Vasani, R., & Saple, D. G. (2008). Aloe Vera: A Short Review. Indian Journal Of Dermatology, 53(4), 163–166.Discusses Aloe Vera's Skin-Healing And Uv Protective Properties
2. Chusak, C., et al. (2018). Protective effects of Clitoria ternatea flower extract against oxidative stress in human dermal fibroblasts. Journalof Medicinal Plants Research, 12(8), 111–117.
3. Agero, A. L., & Verallo-Rowell, V. M. (2004). A randomized double-blind controlled experiment contrasting mineral oil and extra virgin coconut oil as a moisturizer for mild to moderate xerosis. Dermatitis, 15(3), 109–116.
4. Shows coconut oil's moisturizing and protective effects on skin.
5. Andersen, F. A. (1999). Final report on Tocopher Aloe Vera's safety evaluation (Aloe barbadensis miller)

2) Aim And Objectives

Aim

To formulate and evaluate a herbal sunscreen using natural ingredients such as Aloe Vera, Butterfly Pea Flower, Coconut Oil, Rose Water, and Vitamin E for effective protection against harmful UV radiation.

Objectives:

1. To collect and authenticate herbal ingredients (Aloe Vera Butterfly Pea Flower, etc.) used in the sunscreen formulation.
2. To prepare a stable herbal sunscreen formulation using natural extracts and oils.
3. To evaluate the physicochemical properties of the prepared formulation (such as pH, consistency, spreadability, etc.).
4. To assess the sun protection factor (SPF) of the herbal sunscreen using appropriate in vitro methods.
5. To compare the effectiveness of the herbal sunscreen with commercial sunscreen formulations.
6. To study the stability of the formulation under different environmental conditions.

3) Plan of Work:

1. **Literature Survey:**

* Study previous research and standard formulations.

2. **Procurement and Authentication of Raw Materials:**

* Collect Aloe Vera, Butterfly Pea Flower, Coconut Oil, Rose Water, and Vitamin E.
* Authenticate the plant materials and ensure purity of oils and extracts.

3. **Preparation of Extracts:**

* Prepare or obtain suitable extracts of Aloe Vera and Butterfly Pea Flower using standard methods (e.g., drying, grinding, solvent extraction).

4. **Formulation of Herbal Sunscreen:**

* Combine all ingredients in appropriate ratios.

5. **Evaluation of Formulation:**

Check Ph, Spreadability, Viscosity, Ppearance, And Homogeneity. Determine SPF Value Using.5 . Herbs Profile -Main Role Of Ingredients Used In Formulation

1. ALOE VERA

Barbadensisare The Source Of Aloe Vera Gel .Aloe Vera Gel Is Used In Cosmetics Lotion For Its Moisturizing And Revitalizinaction

.It Blocks UVA And UVB Rays And Maintain Skin Natural Moisture Balance.It Stop The Sunburn And Stimulate Immune System Intervention.Aloe Vera Gel Can Be Used To Help Withthe Healing Process Of Sunburn It Help Relieve Pain And Redness By Reducing Inflammation The Gel Also Stimulate The Production Of Collagen Healingprocess.

3. Butterfly Pea Flower:

Packed with antioxidant

Butterfly pea flowers are rich in antioxidants, including polyphenols, flavonoids, and authocyanins.Antioxidants are necessary for your skin's overall health and suppleness.Antioxidants aid to improve your skin's look and reduce fine lines.

Butterfly pea flower contain

Soluble minerals	**8.94mg**
Ash.	**0.9mg**
Crude protein.	**41.27mg**
Soluble carbohydrates.	**29.18mg**

Butterfly pea flower it helped calm itching and general irritation.The flower used for use in rejuvenating

Reduce redness

The capacity of butterfly pea flowers to calm sensitive skin also reduces acne-related redness, dryness, and general irritation. When paired with additional nutrients that promote skin health, these nourishing qualities are further amplified.

Improve the skin barrier

Butterfly pea flowers help improve the skin barrier since they include antioxidants derived from plants and vitamins.

Suitable for all skin type

One of the unsung heroes of skin care is the butterfly pea flower. It is gentle enough for use on all skin types, matter what time of year it is.

4. Coconut oil:

Coconut oil not only maintains skin smooth and silky but also stops premature skin ageing. Apply coconut oil on your epidermis. Coconut oil prevents premature ageing while maintaining the skin's suppleness and smoothness.To moisturise and exfoliate dead skin cells, use coconut oil.Even those with dry skin, such as those with eczema or other skin disorders, benefit from using coconut oil.It helps heal wounds because of its antibacterial qualities. Because coconut oil has anti-inflammatory qualities, it may aid with dry and oily skin issues by lowering skin irritation.

5. Rose water

Vitamin B, which is found in rose water, is frequently utilised in sunscreen and other sun products.It enhances the efficacy of sunscreen.The pigmentation of the skin can be lightened by using rose water.

It helps maintain pH level of your skin .It is hydrating and nourishing agent for skin and protect skin against harmful environmental aggressors,gulabjal has antioxidantlevels that tackle free radicals and keep skin healthy and glowing.

6. Vitamin E Capsule

Vitamin E It Provides Extra Protection Against Acute UVB Damage And Protect Against Cell Mutation Caused By Sun And Pollution Exposure.Vitamin E It Help Cleanse Your Skin And Removing The Impurities From And Help Improve Skin Elasticity .Vitamin E Combination With Lemon Juice It Help To Whiten The Skin.It Is Most Commonly Known For Its Benefits Of Skin Health And Appearance.It Has Antioxidant And Anti-Inflammatory Properties.

FORMULATION & EVALUATION

Formulation Of Butterfly Pea Flower Extract

Strain the liquid and throw away the leaves after 15 minutes or so. At that point, the deep blue water is prepared for use in sunscreen cream.

Formulation Of Sunscreen Cream Was Prepared By Following Procedure -

 # Procedure Of Herbal Sunscreen Cream

1. **Collected Butterfly Pea Flower Extract** – Used For Its Antioxidant And Uv-Protective Properties.
2. **Added Aloe Vera Gel** – Known To Treat And Prevent Burns Soothe Skin,And Provide Hydration.
3. **Added Rose Water –** Provides A Cooling And Refreshing Effect To The Skin.
4. **Gradually Added Coconut Oil –** Acts As A Natural Moisturizer And Gives Mild Sun Protection.
5. **Added Vitamin E Capsules –** Serves As A Strong Antioxidant,Protects Skin From Uv Damage.
6. **All Ingredients Were Mixed Together** Using A Clean Spatula.
7. **Mixture Stirred Vigorously For 20–30 Minutes** To Achieve A Uniform Cream-Like Consistency.
8. **Final Product Store** In A Clean, Air-Tight Container For Further Evaluation.

- **Final Product**

- **Evaluation of sunscreen cream for sunscreening activity**

Sunscreen effectiveness:

Sunscreen protection factor (SPF), which is the ratio of UV energy needed to create a minimal erthemal dose in protected skin to unprotected skin, is typically used to express how effective a sunscreen is.A straightforward, quick, and accurate in vitro technique for determining the spf is to test the product's absorbance between 290 and 320 nm at 5-nm intervals.SPF can be computed using the Mansur equation, which is as follows.

• CF×€EF(wavelength)×I(wavelength)×Abs(wavelength) is the SPF spectrophotometric formula.
The EE×I constants' value.

• PH of the cream: A standard buffer solution was used to calibrate the pH meter.The pH of the cream was determined after 0.5 of it was weighed and dissolved in 50.0 milliliters of pure water.25

Appearance: The cream's color, pearl sheen, and roughness were evaluated and graded.
• Removal: Using tap water to wash the area where the cream was applied, the cream's ease of removal was assessed.
• To test for irritation, the cream was administered to the designated region, and the time was recordedAt regular intervals for up to 24 hours, any erythema, oedema, or irritation was evaluated and reported.

Types of skin and SPF

Types.	Description	SPF.	Character
1	**Always burn easily. And never tans**	**More than 8.**	**Sensitive**
2	**Always burn and tan. Minimally**	**6-7.**	**Sensitive**
3	Burn moderator and. Tan gradually	**4-5**	Normal
4	Burn minimal and. Always tan well	**2-3**	Normal
5	Barely burn and tan. Profusely	**2**	Insensitive
6	Never burn and. Become deeply Pigmented	None	Insensitive

OBSERVATION

Sr.No.	Parameters	Observation
1	**Colour**	**Light Blue**
2	**Odour**	**Characteristics**
3	**Spreadability**	**Good And Uniform**
4	**PH**	**6.5**
5	**Test For Lrritancy**	**No.Irritation Reation**

Result & Discusion

A broad range of absorbance is necessary for a sunscreen product to be effective in preventing sunburn and other skin damage.The main factors influencing the acceptability of cosmetic formulations during storage and handling are spreadability and viscosity.The Formulated Cream Exhibited No Redness, Inflammation And Irritation .When Formulation Were Kept For Long Time ,It Found That No Change In Colour Of Cream .The Cream Was Easily Removed By Washing With Tap Water .

Conclusion

The research tested the effectiveness of a natural sunscreen lotion made with butterfly pea flower extract in avoiding sunburn.

REFERENCE :

1) Boyd AS, Naylor M, Cameron GS, et al. The effects of chronic sunscreen use on the histologic changes of dermatoheliosis. J Am Acad Dermatol. Dec 1995; 33(6):941-6
2) DeBuys HV, Levy SB, Murray JC, et al. Modern approaches to photo protection. Dermatol Clin. Oct 2000; 18(4):577-90.
3) Diffey BL and Grice J. The influence of sunscreen type on photo protection. Br J Dermatol. Jul 1997; 137(1):103-5.

4) Dromgoole SH and Maibach HI. Sunscreening agent intolerance: contact and photo contact sensitization and contact urticaria. J Am Acad Dermatol. Jun 1990; 22(6):1068-78.
5) Fotiades J, Soter NA and Lim HW. Results of evaluation of 203 patients for photosensitivity in a 7.3- year period. J Am Acad Dermatol. Oct 1995; 33(4):597-602.
6) Mithal BM and Saha RNA. Hand book of cosmetics, first edition, reprint-2007, Vallabh Prakashan, Delhi 122-124. 7) Gasparro FP, Mitchnick M and Nash JF. A review of sunscreen safety and efficacy. Photochem Photobiol. Sep 1998; 68(3):243-56.
7) Kaidbey KH. The photo protective potential of the new super potent sunscreens. J Am Acad Dermatol. Mar 1990; 22(3):449-52.
8) Kullavanijaya P and Lim HW. Photo protection. J Am Acad Dermatol. Jun 2005; 52(6):937-58; quiz 959-62.
9) Levy SB. How high the SPF? Arch Dermatol. Dec 1995; 131(12):1463-4.
10) Moloney FJ, Collins S and Murphy GM. Sunscreens: safety, efficacy and appropriate use. Am J Clin Dermatol. 2002; 3(3):185-91.
11) Naylor MF and Farmer KC. The case for sunscreens. A review of their use in preventing actinic damage and neoplasia. Arch Dermatol. Sep 1997; 133(9):1146-54.
12) RK, Roy A, Kushwah P, Sahu A. Formulation and development of face cream containing natural products. Research Journal of Topical and Cosmetic Science. 2012: 3(1): 16-19. Roy A, Sahu RK, Mutlam M, Deshmukh VK, Dwivedi J, Jha AK. In vitro Techniques to Assess the Proficiency of Skin Care Cosmetic Formulations. Pharmacognosy Review. 2013: 7(14): 97-106.
13) Sahu RK, Roy A, Kushwah P, Khare M, Mudotiya R. Formulation and development of whitening polyherbal face cream. Research Journal of Topical and Cosmetic Science. 2012: 3(1): 23-27.
14) Sahu RK, Roy A, Jha AK, Dwivedi J. Promotion and computation of inhibitory effect on tyrosinase activity of herbal cream by incorporating indigenous medicinal plants. Pakistan Journal of Biological Sciences. 2014: 17(1): 146-150.
15) Shahriar M, Akhter S, Hossa MI, Haque MA, Bhuiyan MA. Evaluation of in vitro antioxidant activity of bark extracts of Terminalia arjuna. Journal of Medicinal Plants Research. 2012; 6(39): 5286-529