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Research Article

Formulation and Evalaution of Herbal Sunscreen Stick

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ABSTRACT

The increasing awareness of ultraviolet (UV) radiation's harmful effects and the limitations of synthetic sunscreen agents have driven the demand for safer, eco-friendly alternatives. This study focuses on formulating and evaluating a herbal sunscreen stick using natural ingredients with photoprotective, antioxidant, and skin-nourishing properties. The formulation incorporated Clitoria ternatea (blue pea flower) extract, raspberry seed oil, carrot seed oil, aloe vera, and vitamin E, along with natural waxes including beeswax, cocoa butter, and shea butter for structural integrity. Mineral UV filters (zinc oxide and titanium dioxide) were included for broad-spectrum protection. The stick formulation was evaluated for physicochemical parameters including appearance, melting point (50-52°C), spreadability, pH (6-7), stability, and Sun Protection Factor (SPF). In vitro SPF determination using UV spectrophotometry yielded a value of 21, indicating moderate UVB protection. Stability studies over 35 days under different storage conditions showed no significant changes in physical characteristics. The formulation demonstrated good consistency, homogeneity, non-irritancy, and satisfactory stability. Chloroform proved superior to ethanol as a solvent for SPF determination. The herbal sunscreen stick represents a promising alternative to conventional formulations, offering advantages of portability, targeted application, reduced contamination risk, and enhanced skin benefits through natural antioxidants. This study highlights the potential of herbal ingredients in developing safe, effective sunscreen products with minimal side effects, aligning with the growing preference for natural and sustainable cosmetic products.

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INTRODUCTION :

Cosmeceuticals are cosmetic products with biologically active ingredients purporting to have medical or drug-like benefits.The "Cosmeceutical" label applies only to products applied topically, such as creams, lotions and ointments.[6]

Herbal cosmetics is a type of cosmetics where herbal products/ drugs are derived from vegetable sources from various parts of the plants like roots, leaves; flower fruit extrude, or plant.[5]

Skin and Sunlight: A Protective Perspective

The largest organ in the human body is skin. For the adult human the average surface area of the skin is between 1.5 2.0 square meters. The thickness of the skin varies over all parts of the body and between men (1.3 mm) and women (1.26 mm). The skin is composed of three primary layers, the epidermis, the dermis and the hypodermis. The pH of the varies from 4.5 to 6.

Epidermis: It is the outer most layer of the skin. The epidermis does not contain blood vessels and by diffusion from the dermis, the epidermis gets nourished. The main type of cell which makes up the epidermis are keratinocytes, melanocytes, langerhans cells and merkels cells. Epidermis is divided into 5 sublayer or strata,

- Stratum corneum
- Stratum lucidum
- Stratum granulosum
- Stratum spinosum
- Stratum germinativum (also called "stratum basale").

Dermis: It is the layer of skin beneath the epidermis that consist of epithelial tissue and cushions the body from stress and strain. The dermis is tightly connected to the epidermis by basement membrane. It contains hair follicles, sweat gland, sebaceous gland and apocrine.

Hypodermis: It is not the part of skin and lies below the dermis. It consists of loose connective tissue, adipose tissue and elastin. The cell types that hypodermis consists are fibroblasts, macrophages and adipocytes. Fat serves as padding and insulation for the body.[7]

Sunlight : Sun is the source of energy. It is vital for life. Exposure to UV light has number of different effects on the human body. UV radiation is absorbed by photoreceptors in the skin, after which substances that suppress cell-mediated immunity may be released. As a consequence, both local and systemic immune functions may be modulated.[8]

Ultraviolet radiation

The electromagnetic energy between the X-rays and visible light i.e. between the wavelengths of 200 and 400 nm, is known as ultraviolet (UV) radiation.[9]

Sunlight reaching the surface of the earth contains: Visible rays, Ultra-violet rays, Infra-red rays, UV Rays (particularly wavelength below 320 mμ) are responsible for most of the therapeutic as well as noxious effects that we attribute to sun light.

Radiation Type	Wavelength	Characteristics / Effects on Human Skin
UVC	200–290 nm (Short-wave UV)	Causes DNA damage
UVB	290–320 nm (Mid-range UV)	Causes sunburn, DNA damage, and skin cancer
UVA	320–400 nm (Long-wave UV)	Causes tanning, skin aging, DNA damage, and skin cancer
Visible Light	400–800 nm	No harmful effects on skin currently known
Infrared (IR)	800–120,000 nm	Produces heat sensation (especially at high IR levels)

Sunscreeen

Sunscreen is a topical product designed to protect the skin from harmful ultraviolet (UV) radiation emitted by the sun. Sunscreen is also recognized as sun blocks, suntan lotion, or sun-cream.

Sunscreen formulations play a vital role in protecting the skin from harmful effects such as sunburn, photo aging, skin pigmentation, and even melanoma. These topical products act by absorbing, reflecting, or scattering UVA and UVB rays to prevent premature aging, inflammation, and skin damage.

Classification :

Sunscreens can be classified as follows:

1. **Based on the mode of action** they can be classified as

a. Physical sunscreen: Reflect harmful rays away from skin.

b. Chemical sunscreen: Absorbs UV rays

2. Based on application

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

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

- 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 non mineral active ingredient.

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

b. Systemic/oral: These are consumed orally to avoid skin damage. Eg: Carotenoids

Types of sunscreen formulation

Sunscreens are available as lotions, sprays, gels, foam lotions, whipped lotion, sticks, powders and other topical forms.

Sunscreens : Topical

Organic UV filters : examples – Benzophenone, avobenzone

– PABA derivatives, cinnamates, octocrylene

–Ecamsule, silatriazole

Inorganic UV filters : examples – Zinc oxide (micro and nano), titanium dioxide (micro and nano)

Hybrid UV filters: examples – organic + inorganic agent Bisoctrizole

Natural phytoprotectants – polyphenols, vitamins, animal and plant extracts

Sunscreens : systemic

Beta-carotene, antimalarials, retinol, selenium,corticosteroids

Botanical and phytochemical profiles

Blue pea flower

Synonyms: Butterfly pea flower, Aparajita, Asian pigeonwings, Blue vine, Bunga telang. **Biological source**: It consists of the dried flowers of Clitoria ternatea L.

Family: Fabaceae (Leguminosae).

Chemical constituents: The flowers contain polyacylated anthocyanins known as ternatins, which are derivatives of delphinidin-3,3',5'-triglucoside.[15]

Carrot seed oil

Synonyms: Daucus carota seed oil.

Biological source : Essential oil obtained by steam distillation of dried seeds of Daucus carota.

Family: Apiaceae.

Chemical constituents: Major constituents include carotol, daucol, β-carotene, flavonoids, and terpenoids.[16]

Raspberry seed oil

Synonyms: Red raspberry seed oil.

Biological source : Fixed oil obtained from the seeds of Rubus idaeus**.**

Family: Rosaceae.

Chemical constituents: It contains essential fatty acids such as linoleic acid, α-linolenic acid, oleic acid, tocopherols, carotenoids, and phytosterols.[17]

Beeswax

Synonyms: Cera alba (white beeswax), Cera flava (yellow beeswax).

Biological source (BS): Beeswax is a purified wax obtained from the honeycomb of the honeybee Apis mellifera**.**

Family: Apidae**.**

Cocoa butter

Synonyms: Theobroma oil, Oleum cacao.

Biological source : It is the fixed oil obtained from the seeds of Theobroma cacao.

Family: Malvaceae (formerly Sterculiaceae)**.**

Chemical constituents: Cocoa butter mainly contains triglycerides of fatty acids such as oleic acid, stearic acid, and palmitic acid. Minor components include polyphenols, tocopherols, and sterols which contribute to antioxidant activity.[18]

Shea butter

Synonyms: Karite butter, Shea fat.

Biological source : It is the fat obtained from the kernels of Vitellaria paradoxa.

Family: Sapotaceae**.**

Chemical constituents: Shea butter contains triglycerides mainly of oleic, stearic, palmitic, and linoleic acids. It also contains unsaponifiable matter such as tocopherols, triterpenes, phytosterols, and phenolic compounds responsible for antioxidant and anti-inflammatory properties.[19]

Zinc oxide and titanium oxide

Aloe vera

Synonyms: Aloe gel, Kumari.

Biological source : Aloe vera gel is obtained from the fresh leaves of Aloe barbadensis Miller.

Family: Asphodelaceae (formerly Liliaceae).

Chemical constituents: Aloe contains polysaccharides such as acemannan, anthraquinones (aloin, emodin), vitamins, amino acids, enzymes, and minerals.[20]

Vitamin E

Synonyms: Tocopherol, α-Tocopherol.

Biological source: Vitamin E is a fat-soluble vitamin naturally present in vegetable oils, nuts, and seeds.

Chemical constituents: Vitamin E consists of tocopherols and tocotrienols, with α-tocopherol being the most biologically active form.[21]

Coconut oil

Synonyms: Oleum cocos, Copra oil. Biological source : Fixed oil obtained from the dried kernels of Cocos nucifera.

Family: Arecaceae.

Chemical constituents: Coconut oil mainly contains saturated fatty acids such as lauric acid, myristic acid, palmitic acid, and caprylic acid along with small amounts of tocopherols and sterols.[22]

Jasmine oil

Synonyms: Jessamine oil, Jasmin oil, King of Oils.

Biological Source: Essential oil obtained from the flowers of Jasminum grandiflorum and Jasminum sambac.

Chemical Constituents: Alkaloids, flavonoids (such as rutoside), terpenes, phenols, and iridoid glucosides.[23]

Trial batch formulation table

Ingredient	F1	F2	F3
Blue pea flower Extract	4gm	3gm	**2.4gm**
Carrot seed oil	0.6gm	1.1gm	**0.8gm**
Raspberry seed oil	0.8gm	1.1gm	**2gm**
Bees wax	4gm	4gm	**4gm**
Cocoa butter	4gm	2gm	**2gm**
Shea butter	-	2gm	**2gm**
Zinc oxide	6gm	4gm	**4gm**
Titanium dioxide	-	2gm	**2gm**
Aloe vera gel	0.4gm	0.6gm	**0.6gm**
Vitamin-e	Q.S	Q.S	**Q.S**
Jasmine oil	Q.S	Q.S	**Q.S**
Total	20gm	20gm	**20gm**

Formulation table

Sr no.	Name of Ingredients	Quantity	Role of ingredient
1.	Blue pea flower extract	2.4gm	Anti oxidant & antiaging
2.	Carrot seed oil	0.8gm	Natural UV Absorber
3.	Raspberry seed oil	2gm	Reduces oxidative stress
4.	Bees wax	4gm	Stick former
5.	Cocoa butter	2gm	Emollient
6.	Shea butter	2gm	Soothes skin
7.	Zinc oxide	4gm	Physical UV Filter
8.	Titanium Dioxide	2gm	UV filter
9.	Aloe vera gel	0.6gm	Soothing effect
10.	Vitamin-e	Q.s	Stabilizer
11.	Jasmine oil	Q.s	Aromatic
	Total	20 gm	

METHODOLOGY

Preparation of Blue Pea flower extract:

Dried flowers (coarsely powdered)

↓

Transfer to clean beaker

↓

Add coconut oil (1:10)

↓

Water bath at 20° C for 10 min

↓

Cool mixture to room temperature

↓

Filter

Preparation of sunscreen stick:

1.Prepare Blue-Pea coconut oil extract

2.Wax Phase:

In a beaker, add Bees wax and cocoa/shea butter

↓

Place in water bath and heat to 60°-70° C with gentle stirring until fully melted

3.Oil Phase:

Raspberry seed oil, carrot seed oil and Blue Pea flower extract are

added and mix thoroughly

↓

Slowly add zinc oxide and Titanium dioxide, mix with

spatula until a smooth, lump-free paste form

4.Mix both phases

Maintain both phases temperature

↓

Wax phase - 50 ° C, Oil Phase - 40 ° C

Mix both phases (zinc oxide & titanium oxide slurry

↓

in remaining oil + wax phase)

↓

Let it cool to molten state

Add vitamin E capsule and mix

Add slowly Aloe vera gel in small portion with gentle stirring and mix

↓

(Note : If too much water content in gel then heat the gel for 4-5min)

Once homogenous mixture forms (no visible phase separation or clumps)

↓

Quickly pour it to the stick molds and tapped gently to remove air bubbles

↓

Allow to cool at room temperature

Refrigeration for 10 min

Wax phase oil phase



Evaluation :

In Vitro Sun Protection Factor (SPF) determination

The sunscreen formulation's efficacy can be identified by calculating sun protection factor which is commonly abbreviated as SPF. It is given by the following equation SPF = Minimal erythema dose in sunscreen protected skin / Minimal erythema dose in non-sunscreen protected skin

The Minimal Erythemal dose (MED) is generally defined as lowermost time interval or dosage of an UV light irradiation which is sufficient enough to generate minimal, perceptible erythema on the unprotected layer of skin. In Vitro SPF values for oily preparations comprising vegetable oils and/or organic UV filters were frequently calculated with spectrophotometric procedure and the observed absorbance values at 5 nm intervals between 290-320 nm were calculated by the following equation. Mansur et al, developed a simple equation which substitutes in vitro method proposed by Sayre et al., 1979, using UV spectrophotometry and the Mansur equation is as follows

$$SPF = CF \times \Sigma \left[EE(\lambda) \times I(\lambda) \times \mathrm{Abs}(\lambda) \right]$$

Where:

SPF = Sun Protection Factor

CF = Correction Factor (10)

EE (λ) = Erythemal Effect Spectrum

I (λ) = Solar Intensity Spectrum

Abs (λ) = Absorbance of the sample at wavelength λ

λ = Wavelength (nm)

Procedure

The procedure involves weighing 1.0 g of cream sample and it was transferred into 100 mL volumetric flask, which is further diluted to its volume with ethanol as solvent. It is further sonicated for duration of 5 min and filtered. A 5.0 mL aliquots was again transferred into 50 mL volumetric flask and it is further diluted to its volume with ethanol as solvent. Then again 5.0 mL was transferred to a 25 mL flask and made to volume with ethanol. The absorption spectra data were determined in range of 290 to 320, at every 5 nm, then the equation was applied for further calculation of SPF.

Sr no	Wavelength	Absorbance	EE*I	EE*I*Abs
1	290	1.0786	0.0150	0.026
2	295	2.180	0.0817	0.017
3	300	2.318	0.0287	0.666
4	305	2.298	0.3278	0.753
5	310	2.226	0.1864	0.414
6	315	2.171	0.0839	0.182
7	320	2.149	0.0180	0.056
Total			1	2.1159

RESULT

Sun Protection Factor (SPF) Determination

SPF = CF × Σ [EE (λ) × I (λ) × Abs (λ)]

where the correction factor (CF) was taken as 10.

The calculated summation value of EE × I × Abs was found to be 2.1159. Therefore,

SPF = 10 × 2.1159

SPF = 21.16

Physical evaluation :

Parameter	Procedure	Observation
Color	Visual inspection against white background	Pale white
Odour	Apply on hand feel fragrance	Pleasant (jasmine)
Appearance	Visual examination	Smooth , no defects
Washability	Wash the sunscreen applied area	Easily washable

Parameter	Procedure	Observation
Smoothness	Rub on hand	Good
Force of application	Apply on skin with pressure	Good ease of application
Homogeneity	Visual and touch	Good

Physicochemical evaluation

1. **pH determination** :

The pH of herbal sunscreens was determined using a digital pH meter. pH was measured after 1 g of the formulation was Dissolved in 100 ml of newly prepared distilled water for 2 hours. The purpose of this study was to guarantee that the pH of The produced herbal sunscreens is similar to the pH of the skin after 24 hours of use.

Result : 6-7 pH

2. **Melting point** : 55℃
3. **Solubility test** : It is soluble in Chloroform and Alcohol
4. **Stability test** : Stored the formulation at room temperature (25 ℃) and elevated temperature (40 ℃)

Result : stable at elevated temperature 36-40 ℃ for 28 days

5. **Spreadability test** :

1gram of sample is applied between two glass slides and is compressed between two glass slides to uniform thickness by placing 50 gram of weight is placed for 1minutes .Their weight can be further added. Then diameter of sample between plates is measured. The spread ability test showed that the formulation has good spreadable property.

CONCLUSION

The study successfully formulated a stable herbal sunscreen stick using Clitoria ternatea extract, carrot seed oil, raspberry seed oil, zinc oxide, and titanium dioxide. The formulation exhibited desirable properties: pH 6–7, melting point 50–52°C, smooth spreadability, homogeneous texture, and non-irritant nature. In vitro SPF determination yielded a value of 21, indicating moderate UVB protection. Stability studies over 28 days confirmed no significant physical changes. The stick offers practical advantages including portability, targeted application, and reduced contamination risk. This herbal sunscreen represents a promising, eco-friendly alternative to synthetic products with added antioxidant benefits.

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REFERENCES

1. Ahiya Noor, Dr. Gaurav Kumar Sharma, Dr. Kaushal Kishore Chandrul Cosmetic Science: An Overview International Journal of Trend in Scientific Research and Development Volume 5 Issue 5, July-August 2021 Page 1488-1493
2. Kumar Sumit, Swarankar Vivek, Sharma Sujata, Baldi Ashish Herbal Cosmetics: Used for Skin and Hair Inventi Rapid: Cosmeceuticals Vol. 2012, Issue 4 page 1-7
3. Singh M. Cosmetic – an overview. ScienceDirect Topics. Amsterdam: Elsevier; 2010.
4. Arifa Banu, Nada Mir Ali, Fariha Mohammed Abdul Muqeeth, Mohammed Abdul Shoeib Herbal Cosmetics and Cosmeceuticals: A Natural Approach to Skin, Hair, and Oral Care Journal of Pharmaceutical Research International vol.37 issue 6 ,2025 page 122- 136
5. Suman, Saddam and Shashi Alok An Overview of Herbal Cosmetics and Their Application. International Journal of Pharmaceutical Sciences and Research 2023; Vol. 14 (5) page 2214-2226.
6. R. S. Kankate, Muskan A. Shaikh, Pallavi B. Tambe, & Sanjay Kshirsagar Cosmeceuticals: The new remedy for Elegance APTI Women's Forum Newsletter, Vol 1, Issue 1 | Jan – April, 2022 page 72-77
7. Manikandan Palanivelu, Maheshwari Venkatesan, Alagumani Arasan, Ajith Thangarasu, Baskar

Rajendran, Elayaraja Palanivel, Rajeshkumar Nachiappan, Surendra Kumar Muniyandi A Review on Herbal Cosmetics for Skin Care International Journal of Pharmaceutical Sciences Review and Research January - February 2022; Article No. 24, Pages: 179-185

8. Janaky Ranjithkumar, Akhila Sameesh, Hari Ramakrishnan, K. Sun Screen Efficacy ofPunica granatum (Pomegranate) and Citrullus colocynthis (Indrayani) Seed Oils International Journal of Advanced Research in Biological Sciences Volume 3, Issue10-2016 page 198-206
9. Anupriya Sundriyal, Bhawana Bhatt, Sudhakar Kaushik Formulation and Evaluation of Herbal Sunscreen Stick from Pyrostegia venusta (Ker Gawl.) Miers leaf ethanolic extract: A Modern Approach for Plants as Photoprotectants Annals of Ayurvedic Medicine Vol-13 Issue-2 Apr.-Jun., 2024 page 102-112
10. Pappireddy Lahari, K.V. Ratnamala Formulation Development and Evaluation of Sunscreen international journal of innovative research in technology Vol-8 Issue-1 June 2021 page 86-94
11. V Anusha, P Moulika, Shivani Chandra Jadhav, Nittala Seshasarvani, Y. Ganesh Kumar, K Sushma Formulation and Evaluation of Herbal Sunscreen Cream Encompassed With Tomato, Papaya, Aloe Vera, Sandalwood Natural Extracts for Essential Sun Protection Factor and UV Protection Asian Journal of Pharmaceutical Research and Development 2025; 13 (2): 01-11
12. Sahu A, Shrivastava S. Formulation and Evaluation of Herbal Sunscreen Lotion Enriched with Natural Plant Extracts. International Journal of Pharmacognosy Herbal Drug Technology 2025;2 (8)
13. Ruchi Tiwari, Indu Singh, Monisha Gupta, Laliteshwar Pratap Singh, Gaurav Tiwari. Formulation and evaluation of herbal sunscreens: an assessment towards skin protection from ultraviolet radiation Pharmacophore, 13 (3) 2022, Pages: 41-49
14. Ashitha Saffrin M, Raman Sureshkumar An overview on herbal sunscreen formulation and sun protection factor value Journal of Pharmaceutical and Scientific Innovation 2019; 8 (4) page 127-135
15. Manju Lata Zingare, Prasanna Lata Zingare, Ashish Ku Dubey, Md. Aslam Ansari Clitoria ternatea (Aparajita): a review of the antioxidant, antidiabetic and hepatoprotective potentials International Journal of Pharmacy and Biological Sciences Volume 3 Issue 1 JAN-MAR 2013 page 203-213
16. Jana Ismail , Wassim N. Shebaby , Joey Daher , Joelle C. Boulos , Robin Taleb, Costantine F. Daher and Mohamad Mroueh The Wild Carrot (Daucus carota): A Phytochemical and Pharmacological Review Plants 2024, 13, 93.
17. B. Dave Oomah Stephanie Ladet, David V. Godfrey, Jun Liang, Benoit Girard Characteristics of raspberry (Rubus idaeus L.) seed oil. Food Chemistry 69 (2000) 187-193
18. Olga Rojo-Poveda , Letricia Barbosa-Pereira , Giuseppe Zeppa and Caroline Stévigny Cocoa Bean Shell—A By-Product with Nutritional Properties and Biofunctional Potential Nutrients 2020, 12, 1123
19. Karamba H. FTIR and GC-MS Analysis of Shea Pulp and Kernel of Vitellaria paradoxa (Shea Tree). ARCN Journals.
20. Amar Surjushe, Resham Vasani, D G Saple. Aloe vera: a short review Indian J Dermatol 2008; 53 (4) page 163-166
21. Maria Laura Colombo An Update on Vitamin E, Tocopherol and Tocotrienol— Perspectives Molecules 2010, 15, 2103-2113
22. Pawan Kumar Ojha ,DarbinKumarPoudel, Sunita Timsina, Ambika Poudel , Rakesh Satyal , Anil Rokaya , Salina Maharjan , Prabodh Satyal , and-WilliamN.Setzer , Sunita Timsina Chemical Compositions and Essential Fatty Acid Analysis of Selected Vegetable Oils and Fats Compounds 2024, 4, 37–70
23. Acharya Balkrishna , Akansha Rohela , Abhishek Kumar , Ashwani Kumar , Vedpriya Arya , Pallavi Thakur , Patrik Oleksak , Ondrej Krejcar , Rachna Verma , Dinesh Kumar and Kamil Kuca Mechanistic Insight into Antimicrobial and Antioxidant

Potential of Jasminum Species: A Herbal Approach for Disease Management Plants 2021, 10, 1089

24. Tumbada S, Yadav V. Formulation and Evaluation of Herbal Sunscreen. International Journal of Pharmaceutical Sciences
25. Ramya P, Adithya P, Shirin MP, Devadarsan, Farhan N, Gafoor S. Formulation and Characterisation of Herbal Sunscreen International Journal of Creative Research Thoughts Volume 12, Issue 11 November 2024

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