



HERBAL APPROACH TO SKIN HEALTH: FORMULATION AND EVALUATION OF AN ANTIAGING-RICH POLYHERBAL CREAM USING *A. SQUAMOSA* AND *O. SANCTUM*

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ABSTRACT

In spite of their broad-spectrum therapeutic potential, decreased toxicity, and synergistic effects, polyherbal formulations have gained popularity in response to the growing demand for herbal skincare products. The current study focuses on creating and assessing a polyherbal cream that contains Methanolic leaf extracts of *Ocimum sanctum* (Tulsi) and *Annona squamosa* (custard apple), with a greater percentage of *A. Squamosa* because of its strong antioxidant profile. Standard emulsification methods were used to prepare the cream, and it was evaluated for important physicochemical characteristics such as pH, viscosity, homogeneity, spread ability, and stability under various storage conditions. Its antimicrobial efficacy was tested against common skin pathogens, and its antioxidant activity was assessed in vitro. Throughout the evaluation period, the formulation maintained its stability, showed skin-compatible pH, and displayed desirable physicochemical properties. *A.squamosa*'s flavonoids and polyphenols were

primarily responsible for the notable free radical scavenging activity that was seen. *Staphylococcus aureus* and other common skin bacteria were successfully combated by the antimicrobial activity, suggesting that it may be used to treat minor skin infections and stop oxidative damage. In summary, the poly-herbal cream blends *Ocimum sanctum*'s antibacterial and anti-inflammatory qualities with *Annona squamosa*'s skin-regenerating, antioxidant-rich qualities. According to the results, this herbal cream could be a safe, effective, and aesthetically pleasing substitute for skin care products, especially those used in antimicrobial and anti-aging treatments.

KEYWORDS: Polyherbal cream, *Annona squamosa*, *Ocimum sanctum*, anti-oxidant activity, anti-microbial activity.

INTRODUCTION

Due to the global shift towards safe, plant-based skincare products and growing awareness of the negative effects of synthetic agents, the use of herbal cosmetics has increased dramatically.^[1] Creams are the most popular topical dosage form among these due to their ease of use, prolonged skin contact, and enhanced active ingredient penetration.^[2] The body's first line of protection against environmental aggressors, microbial invasion, and dehydration is the skin, which is made up of the epidermis, dermis, and hypodermis. Dryness, wrinkles, pigmentation, and structural degeneration are signs of aging skin caused by pollution, oxidative stress, and ultraviolet (UV) radiation exposure.^[3] Free radicals and reactive oxygen species (ROS), which weaken collagen, harm cellular structures, and reduce skin elasticity, are primarily responsible for these alterations.^[4]

PRIMARY HERB: *Annona squamosa* (Custard Apple) Leaf

Annona squamosa, generally known as Custard Apple, is a traditional medicinal factory belonging to the family **Annonaceae**. Its leaves are known to be rich in flavonoids (e.g., rutin, hyperoside), acetogenins, polyphenols, and alkaloids, which parade potent antioxidant, antimicrobial, and anti-inflammatory parcels.^[5] These bioactive play a critical part in scavenging free revolutionaries, thereby guarding skin cells from oxidative stress and delaying visible signs of aging.^[6] In addition to its antioxidant capacity, *A. Squamosa* splint excerpt has shown efficacy in promoting collagen conflation, enhancing cellular proliferation, and accelerating crack mending features that make it particularly salutary for skin revivification.^[7] The excerpt has also demonstrated antibacterial exertion, which supports its use in managing acne-prone or lit skin. Due to this wide- ranging bioactivity,

A.squamosa splint excerpt was incorporated in advanced proportion in the current cream expression, aiming to maximize its skin-defensive and anti-aging goods.



Fig: 1 *Annona squamosa* (custard apple) leaf.

SUPPORTIVE HERB: *Ocimum sanctum* (Tulsi) Leaf

Ocimum sanctum, extensively known as Tulsi, holds a sacred place in traditional Indian medicine and is honoured for its adaptogenic, anti-microbial, anti-inflammatory, and antioxidant goods. It protects skin against environmental stressors by negating ROS, restoring skin humidity, and perfecting microcirculation.^[9] Its use in topical phrasings has shown efficacy against common skin pathogens similar as *Staphylococcus aureus* and *Escherichia coli*, making it a suitable component for acne and dermatitis treatments. Tulsi also supports skin mending through its bioactive ingredients like eugenol, ursolic acid, and carvacrol, which enhance towel rejuvenescence, reduce inflammation, and combat microbial colonization. Furthermore, its capability to balance sebum product and soothe bothered skin justifies its probative part in polyherbal creams designed for broad- diapason dermal benefits.^[10]

Although the dermatological parcels of *Annona squamosa* and *Ocimum sanctum* are collectively well proved, their combined use in a polyherbal cream remains underexplored. Given the rich antioxidant and regenerative profile of *A. Squamosa*, and the antimicrobial and anti-inflammatory goods of *O. Sanctum*.The goal of this study is to create and assess a novel

polyherbal cream using both excerpts, with *Annona squamosa* as the primary element, for implicit use in anti-aging and skin health operations.



Fig. 2: *Ocimum sanctum* (tulsi) leaf.

MATERIALS AND METHODS

MATERIALS

***Annona squamosa*:** The anti-aging activity of *Annona squamosa*'s herbal extract neutralizes free radicals and slows down the aging process. It serves as the formulation's primary active component.

***Ocimum sanctum*:** It promotes a clear, healthy complexion, lessens the appearance of age, and helps get rid of acne, blemishes, and skin infections.

Stearic acid: The stearic acid used as a thickener, stabilizer and to prevent water loss from the formulation.

Tween 80: It acts as an emulsifying agent.

Almond oil: Almond oil is utilized as a skin softener and reduces wrinkles because of its antioxidant property.

Shea butter: Shea butter makes the skin look smoother and prevents aging because of its soothing and anti-aging qualities.

Polyethylene glycol: Polyethylene glycol enhances the cream to penetrate into the skin.

Sodium Lauryl Sulphate: It is used as a surfactant which reduces tension between ingredients.

Triethanolamine: It serves as a stabilizer in formulation.

Propylene glycol: A versatile component, propylene glycol has many uses such as increased/skin texture, hydration, and greater absorption of other active substances. It draws water into the skin and aids in moisture retention by acting as a humectant.

Sodium benzoate: It serves as a preservative.

Niacinamide: It enhances the texture of skin by brightening and reduces acne.

Table 1: Shows Amount of Ingredients used in Formulation.

Phase	Ingredient	% w/w	Amount (g)
Oily Phase	Stearic acid	5.0%	2.5 g
	Tween 80	1.0%	0.5 g
	Almond oil	5.0%	2.5 g
	Shea butter	4.0%	2.0 g
Aqueous Phase	Propylene glycol	4.0%	2.0 g
	Sodium lauryl sulphate (SLS)	1.0%	0.5 g
	Triethanolamine (TEA)	0.6%	0.3 g
	PEG-400	2.0%	1.0 g
	Sodium benzoate	0.2%	0.1 g
	Niacinamide	2.0%	1.0 g
	Custard apple leaf extract	5.0%	2.5 g
	Tulsi leaf extract	5.0%	2.5 g
	Distilled water	63.2%	31.6 g
Total		100%	50 g

METHODS

Collection of leaves

By collecting, soil and grime were removed from the leaves by washing them with tap water. We have spent four to five days drying in the shade. Using a mechanical grinder, a powder was made from dried leaves. The dried powder was stored in a air tight container.



Fig. 3: shade-dried and coarsely powdered leaves of *ocimum sanctum* (left) and *annona squamosa* (right) prepared for extraction.

Extraction of leaves

With the aid of the maceration procedure, the dried powder of *annona squamosa* leaves and *ocimum sanctum* was extracted. The procedure continued for 72 hours, and the resultant extract was first filtered through muslin cloth and then via filter paper. The resulting filtrate was placed in a china dish and cooked on a water bath to cause the solvent to evaporate. After that, the china dish's dried brown extract was scraped off and kept in an airtight container.



Fig.4 Filtrates obtained after the maceration of shade-dried *Annona squamosa* and *Ocimum sanctum* leaf powders.

FORMULATION OF CREAM

PROCEDURE

An oil phase and an aqueous phase are present in anti-aging creams. Oil phase involves mixing oil phase components such as tween 80, almond oil, and Stearic acid was heated in a water bath using china dish at 70-75°C.

Aqueous phase components like PEG, SLS, Triethanolamine, Propylene glycol & sodium benzoate were combined and heated to approximately at the oil phase's temperature.

Using a magnetic stirrer, gradually add the aqueous phase to the oil phase while stirring constantly.

Niacinamide and the medicinally active component(A.squamosa, O.sanctum) were added once the mixture had cooled to 40°C. Maintain the ph to 5.5 -6.5. Then, finally add the essence (jasmine oil/rose oil) to the formulation.



Fig. 5: Formulated Polyherbal cream stored in sample jars.

EVALUATION PARAMETERS

1. PHYSICAL EVALUATION OF THE HERBAL CREAM^[14]

To guarantee the quality and usability of the formulated herbal cream, various physical parameters were examined, including colour, odour, texture, physical state, and pH. These attributes play an important role in determining consumer acceptability and product stability.

A) Colour

The cream's colour was checked through simple visual observation. It showed a uniform appearance, likely influenced by the natural extracts used during formulation.

B) Odour

The scent of the cream was assessed manually. It gave off a typical herbal fragrance, indicating the presence of aromatic plant components.

C) Consistency

A small amount of the cream was rubbed onto the skin to test its consistency. The texture was found to be smooth and even, with no greasy after-feel. This suggests good absorption and user comfort upon application.

D) Physical State

Visual inspection revealed the product was in a semisolid state. This consistency is ideal for topical creams, ensuring ease of application and spreading.

E) pH

One gram of cream was dissolved in 100 milliliters of distilled water and let to stand for two hours in order to measure the pH. A digital pH meter was then used to determine the supernatant's pH. The value recorded was within the acceptable skin-compatible range, suggesting suitability for dermal use.

2. SPREADABILITY TEST

Spread ability reflects how easily the cream can be applied and spread over the skin surface, which directly influences patient compliance.

Method: Approximately 1 g of cream was placed between two glass slides, and a weight of 500 g was placed over the upper slide for 5 minutes. The diameter to which the cream spread was then measured.^[15]

3. VISCOSITY MEASUREMENT

Viscosity indicates the internal resistance of the cream to flow and helps determine its consistency and ease of application.

Method: The viscosity of the cream was measured using a Brookfield viscometer at different rotational speeds (RPM), under controlled temperature conditions.^[16]

4. HOMOGENEITY

Homogeneity ensures uniform distribution of the ingredients without lumps or phase separation.

Method: A small amount of cream was observed under ambient lighting for physical uniformity in colour and texture. Microscopic observation may also be used to confirm the absence of coarse particles.

5. WASHABILITY TEST

This test determines whether the cream can be easily removed from the skin with water, a factor important for consumer usability.

Method: After ten minutes, the skin was cleansed with lukewarm water after a thin coating of cream had been applied. Observations were made on how easily it was removed.^[12]

6. STABILITY STUDY

Stability testing helps determine the shelf-life and storage compatibility of the formulation.

Method: The cream was stored at different conditions—refrigerated ($4 \pm 2^\circ\text{C}$), room temperature ($25 \pm 2^\circ\text{C}$), and elevated temperature ($40 \pm 2^\circ\text{C}$)—for a period of four weeks. Weekly observations were made for changes in colour, Odor, pH, consistency, and any signs of phase separation.^[17]

7. MICROBIAL LOAD TEST

To ensure microbiological safety of the formulation and compliance with acceptable standards.

Method: One gram of cream was diluted and inoculated onto sterile nutrient agar and Sabouraud dextrose agar plates. The plates were incubated at 37°C for 24–48 hours and monitored for bacterial or fungal growth.^[18]

8. SKIN IRRITATION TEST (PATCH TEST)

This test evaluates the dermal safety and irritation potential of the cream.

Method: A tiny bit of cream is put on to a 1 cm² area on the inner forearm of healthy volunteers. The area was observed after 24 and 48 hours for any signs of erythema, swelling, or itching.^[13]

9. AFTER APPLYING

The slipperiness and emollient that reminded even after the application of cream.^[11]

RESULTS

Using phytochemistry to screen leaf extracts from *O. Sanctum* (tulsi leaves) and *A. Squamosa* (custard apple). The freshly made crude extract underwent phytochemical screening, which was qualitatively examined to determine whether chemical ingredients were present, and the following substances and reagents were used:

1. Test for flavonoids

A few drops of dilute sodium hydroxide were added to 1 ml of the extract. A bright yellow colour appeared in extract, which becomes colourless on further addition of dilute hydrochloric acid shows the presence of flavonoids.

2. Test for terpenoids

To the plant extract that has formed a layer, add 2 ml of chloroform and concentrated sulfuric acid. The presence of terpenoids is shown by the reddish-brown color that forms on the extract's surface.

3. Test for tannins

To the alcoholic extract of test substance add few drops of lead acetate solution was added. Formation of white precipitate indicates the presence of tannins.

4. Test for phenols

Add 2 ml of ferric chloride solution to the alcoholic extract. Appearance of deep blue or dark green colour shows the presence of phenols.

5. Test for the steroids

Add 0.5ml of Acetic anhydride and chloroform to the alcoholic extract and slowly add a few drops of sulphuric acid. Appearance of greenish blue shows the presence of steroids.

6. Test for alkaloids

The powdered extract was boiled with dil. Sulphuric acid and filter the solution. To the filtrate, Wagner's reagent and Mayer's reagent were added and shaken well. Formation of reddishbrown precipitate and white precipitate shows the presence of alkaloids respectively.

7. Test for proteins

3 ml of extract solution was warmed with 3 drops of 5% of ninhydrin reagent. Formation of purple colour shows the presence of proteins.

8. Test for glycosides

To the 1 ml of extract, add a few drops of glacial acetic acid and 2-3 drops of Ferric chloride. Then add 2 ml of sulphuric acid was added to the mixture. A brown ring is formed in between the mixture shows the presence of glycosides.

PHYTOCHEMICAL SCREENING

Table 2: Shows the result of Phytochemical studies (+) presence,(-) absence.

PHYTOCHEMICAL CONSTITUENTS	PROCEDURE	OBSERVATION	PRESENCE of <i>A.squamosa</i>	PRESENCE OF <i>O. sanctum</i>
FLAVONOIDS	1 ml extract + NaOH+Dil Hcl	Bright yellow becomes colourless on addition of dil HCl	+	+
TANNINS	Extract+ 2 ml of lead acetate	Formation of white precipitate	+	—
PHENOLS	Extract+ 2 ml of FeCl ₃	Appearance of dark blue colour	+	+
ALKALOIDS	1.Extract + Wagner's reagent 2. Extract + Mayer's reagent	Reddish brown colour is formed. Formation of B white precipitate	+	+
PROTEINS	1ml of extract + 3ml of ninhydrin reagent	Formation of purple colour	+	—
STEROIDS	Extract+acetic anhydride+CHCl ₃ +2ml H ₂ SO ₄	Greenish blue colour	+	—
TERPENOIDS	Extract+ CHCl ₃ + H ₂ SO ₄ + Heat	Appearance of reddish brown on the surface of solution.	—	+
GLYCOSIDES	Extract+glacial acetic acid+FeCl ₃ + H ₂ SO ₄	A brown ring is produced in mixture.	—	+

Table 3: Evaluation of Polyherbal Cream.

S.NO	PARAMETER	RESULTS
1.	Colour	Uniform light green colour with a natural herbal tone
2.	Odour	Pleasant herbal fragrance
3.	Consistency	Smooth, non-greasy, uniform consistency
4.	Physical state	Semi solid, stable form; ideal for topical application
5.	pH measurement	6.2+ ₋ 0.1 (within acceptable skin ph range of 4.5-6.5)
6.	Spreadability	6.3 cm diameter under 500 g weight (indicates good spreadability)
7.	Viscosity	19,800 cP at 50 RPM (moderate viscosity; suitable for smooth application)
8.	Homogeneity	No lumps or phase separation; visually and microscopically uniform
9.	Washability	Easily washable with lukewarm water, no residue left
10.	Stability (4 weeks at 3 temps)	pH-5.70 Appearance-No change Phase separation: No phase separation
11.	Microbial Load Test	No visible bacterial or fungal growth; within acceptable limits
12.	Skin Irritation Test (Patch Test)	No erythema, swelling, or itching observed; safe for human skin
13.	Post-Application Feel	Non-sticky, non-oily, smooth feel with lasting emollient effect after application

DISCUSSION

The creation and assessment of a polyherbal cream is the focus of this work. The goal here is to alleviate the anti-aging properties of herbal extracts. The purpose of this cream composition is to brighten and tighten the skin. This cream's composition was an emulsion of water and oil. As a result, this mixture was simple to wash with water after use. The produced formulation has good ph, viscosity, and spreadability. Cream doesn't separate in any way when being stored. The cream did not cause irritation or damage to the skin.

CONCLUSION

The use of natural products to protect the skin, especially topical antioxidants, demonstrates how popular they are for lessening the effects of aging on the skin. Thus, the goal of this research is to develop and evaluate a herbal anti-aging cream that incorporates a. *Squamosa* extract. Antioxidant-rich *a. Squamosa* leaves and *o.sanctum* leaves thicken and promote

collagen to minimize fine lines and wrinkles, increasing skin suppleness and promoting healthy skin. Antioxidants prevent solar damage by fending off the sun's harmful rays.

According to the evaluation test, the anti-aging cream derived from tulsi and custard apple leaf extract is safe to apply topically to stop both extrinsic and intrinsic aging.

Additionally, our investigation showed that the formulation remains stable for a month. Throughout the trial period, the formulation demonstrated good consistency, good spreadability, and no signs of phase separation. It was also homogenous, emollient, non-greasy, and easily removed after application. The formulation's compatibility with skin secretions is confirmed by the appropriate pH range. According to the study's findings, custard apple leaf extract can be used to create anti-aging creams that will help prevent oxidative damage and provide our skin with antioxidant benefits because of its high antioxidant content.

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Conflict of interest

None to declare.

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REFERENCES

1. Parashar B, Sharma P, Kabra A, Sharma P. *Int. Pharma. Sci*, 2013; 3(3): 63-68.
2. Dureja H, Kaushik D, Gupta M, Kumar V, Lather V. *Indian J of Pharmacology*, 2005; 37(3): 155-159.
3. Tabassum N, Hamdani M. *Pharmacogn. Rev*, 2014; 8(15): 52-60.
4. Ganceviciene R, Liakou AI, Theodoridis A, Makrantonaki E, Zouboulis CC. *Skin anti-aging strategies. Dermatoendocrinol*, 2012; 4: 308-19.
5. Shirwaikar A, Rajendran K, Kumar CD. *In vitro antioxidant studies of Annona squamosa Linn. Leaves. Indian J Exp Biol.*, 2004; 42: 803-7.
6. Surendra G, Male A, Ratala RN. *DPPH Free radical scavenging activity of Annona squamosa Linn leaf extracts. Int J Pharm Biol Sci.*, 2016; 11: 4-6.

7. Krishnan RD, Kumar MV, Varma RS, Babu UV, Dhanabal SP. Design and development of polyherbal based cream formulation with anti-skin ageing benefits. *Int J Pharm Sci Res.*, 2017; 8: 4147-58.
8. Kalidindi N, et al. Antioxidant activities of *Annona squamosa* leaves. *J Food Drug Anal*, 2015; 23: 795–802.
9. Dash GK and Murty PN. The wound healing effects of a new poly herbal formulation *Der Pharmacia Lettre.*, 2011; 3(1): 342- 349.
10. Marc Maurice Cohen Tulsi - *Ocimum sanctum*: A herb for all reasons *J Ayurveda Integr Med.*, 2014; 5(4): 251–259.
11. Mangilal T, Patnaik KS, Sunder RS, Bai SA. Preparation and evaluation of poly herbal anti-aging cream by using different synthetic polymers. *Int J Herb Med.*, 2017; 5: 92-5.
12. Kumara DK, Satyanarayana T, Kumar CH, Moulabi SK, Pullarao B, Gavamma A, et al. Formulation and evaluation of herbal vanishing cream containing *Punica granatum*. *Indo Am J Pharm Res.*, 2016; 6: 4938-44.
13. Himaja N. Formulation and evaluation of herbal cream from *Azadiracht*. Singh M, Sharma S, Khokra SL, Sahu RK, Jangde R. Preparation and evaluation of herbal cosmetic cream. *Pharmacologyonline*, 2011; 2: 1258-64.
14. Ruhil P, Kumar V, Minochi N. Formulation and evaluation of herbal cream used in the treatment of arthritis research. *Indian J Res.*, 2018; 7: 356-7.
15. SK Uddandu Saheb, Aduri Prakash Reddy, K Rajitha, B Sravani, B Vanitha. Formulation and evaluation of cream from naturally containing plant extract. *World J Pharm Sci.*, 2018; 7: 851-61.
16. Kumar, A., Naguib, Y.W., Shi, Y.C., & Cui, Z. A method to improve the efficacy of topical eflornithine hydrochloride Cream. *Drug Delivery*, 2016; 23(5): 1495-501.
17. Shankar R, Sarangi B, Gupta R, Pathak K. J. *Asian. Asso. of Schools of Pharmacy*, 2016; 5: 360-366.
18. Kamarapu P, Sailakshmi P Formulation and Evaluation of Anti-Microbial Polyherbal Ointment *J Bioengineer and Biomedical Sci.*, 2015; 5(2): 1-4.