



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Research Article

Ecofriendly Skin Hygiene: Formulation and Evaluation of Sustainable *Ficus racemosa* Herbal Face Serum and Paper Soap

A. Pravallika*, Ch. Amrutha, D. Hema Bramarambika, K. Kusuma, M. Pranathi Krishna, Dr. I. V. Rama Rao, Dr. Y. Ankamma Chowdary

NRI College of Pharmacy, Pothavrapadu, Agiripalli, Eluru, 521212.

ARTICLE INFO

Published: 9 Mar 2026

Keywords:

Ficus racemosa, Herbal face serum, Paper soap, Antioxidant activity, Antimicrobial activity

DOI:

10.5281/zenodo.18925111

ABSTRACT

The present study aimed to formulate and evaluate herbal face serum and paper soap incorporating *Ficus racemosa* fruit extract, known for its antioxidant and antimicrobial properties. The face serum was developed and tested for key quality parameters, including organoleptic properties (appearance, colour, and odour), pH, spreadability, viscosity, washability, and antioxidant activity. The paper soap was similarly evaluated, with additional assessments for physicochemical properties, pH, foam height, foam retention, and antimicrobial efficacy. Results demonstrated that both formulations met acceptable criteria across all evaluation parameters, confirming their stability and usability for topical application. The antioxidant activity of the face serum showed moderate efficacy, slightly below that of the standard antioxidant agent, ascorbic acid, suggesting it offers mild protective benefits for skin health. The antimicrobial activity of the paper soap, measured through the zone of inhibition, reached 22 mm, which closely approached the efficacy of the standard antimicrobial agent, Griseofulvin. This level of activity suggests effective microbial inhibition, which is crucial for skin hygiene. In conclusion, the *Ficus racemosa*-based face serum and paper soap present promising options for skincare and personal hygiene, combining antioxidant and antimicrobial benefits with overall safety and effectiveness. The study supports the potential of these herbal formulations as natural, safe alternatives for routine skincare and hygiene applications, meriting further exploration in larger-scale studies and potential commercialization.

INTRODUCTION

The cosmetic industry is rapidly shifting toward herbal and phyto-pharmaceutical products as

consumers increasingly prefer natural, safe, and skin-friendly formulations. Growing concerns about irritation, toxicity, and possible hormonal disruption caused by synthetic ingredients have

***Corresponding Author:** A. Pravallika

Address: NRI College of Pharmacy, Pothavrapadu, Agiripalli, Eluru, 521212.

Email ✉: pravallikaaddanki1504@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



encouraged researchers to explore plant-based alternatives. In this direction, the present study highlights the skincare potential of *Ficus racemosa* (cluster fig), a medicinal plant widely used in traditional systems for its therapeutic benefits. Rich in flavonoids, phenols, tannins, saponins, and alkaloids, the fruit extract possesses antioxidant, antimicrobial, astringent, and anti-inflammatory properties that support healthy skin.¹

This research involved the formulation and evaluation of two innovative herbal products: a deep-penetrating face serum and a portable herbal paper soap. Both were prepared using an alcoholic extract of *Ficus racemosa* fruit to address common skin concerns such as oxidative stress, premature aging, microbial contamination, and weakened skin barriers. By combining traditional botanical knowledge with modern cosmetic technology, the study aimed to develop effective, eco-friendly skincare solutions.²

FACE SERUM

Face serum is a highly concentrated emulsion available in water based and oil based. Serums contain approximately ten times more of biologically active ingredients than creams, therefore allows better treatment for skin problems. Incorporating a few drops of face serum with daily skin care routine will deliver noticeable results within a month or less. This is because face serums are made of very small molecules that help it to penetrate deep into the skin quickly.³

Types of face serums

1. The oil serum

Oil serum is easiest to prepare, using fast-absorbing carrier oils rich in polyphenols and essential fatty acids that repair the skin barrier and provide deep moisturization.

2. The gel serum

Gel serums create a temporary tightening sensation and lifted appearance, while their water-based formula allows incorporation of hydrophilic plant extracts for lightweight, refreshing skin benefits.

3. The Water based serum

Water-based serums contain minimal thickeners and deliver hydrophilic extracts, layered under creams and oils to enhance penetration, while oils create an occlusive barrier improving absorption.

4. The emulsion serum

An emulsion-based serum delivers active ingredients while strengthening the skin barrier. It combines water and oil phases stabilized by emulsifiers to maintain a uniform, stable formulation.

5. The pressed balm serum

Balm serums contain lipophilic actives blended with plant oils, butters, and waxes, forming an occlusive barrier that deeply nourishes, moisturizes, and enhances ingredient performance.⁴

USES OF HERBAL FACE SERUM

1. Deep Hydration and Skin Barrier Support
2. Antioxidant Protection and Anti-Aging Effects
3. Anti-Inflammatory and Soothing Properties
4. Brightening and Even Skin Tone
5. Acne Management and Sebum Regulation⁵

Disadvantages of face serums

- Individuals with sensitive skin might experience irritation, redness, or breakout.



- For these people, serum may penetrate too quickly, causing irritation.⁶

PAPER SOAP

Paper soap is a thin soap sheet. It is an anionic surfactant that is used in combination with water for washing and cleaning. The soap includes a substrate, a cleaning composition, and a holder⁷. Since the substrate is dry, the cleaning composition is impregnated into it to create a dry cleanser. The impregnated substrate is then placed on top of the cleaning composition to hold it in place and prevent exposure and evaporation.⁸



Figure 1 Paper Soap

Benefits of Paper Soap

- Convenience
- Hygiene
- Eco-friendly
- Single-use Convenience

Advantages of Herbal Paper Soap

- Antibacterial.
- Mild and Gentle
- Cleansing and Detoxifying⁹

AIM AND OBJECTIVE

The main objective of the work is to formulate and evaluate the herbal face serum and paper soap for skin care therapy.

Objectives

1. Formulation of herbal face serum by using alcoholic extract of *Ficus racemosa* fruit extract.
2. Formulation of paper soap by using alcoholic extract of *Ficus racemosa* fruit extract.
3. Extract of *Ficus racemosa* fruit purchased.

MATERIALS AND METHODOLOGY

FICUS RACEMOSA LINN

The Ficus genus is a prominent group of trees with a variety of chemical components with potential therapeutic benefits. The fruit vessels are 2-5 cm. Diameter, pyriform, in big clusters, originating from the main trunk or big branches. The fruit resemble figs are green when raw changing to orange, dull reddish or dark crimson when ripe. The seeds are small, numerous and grain like for Ex. the barks exterior surface is composed of readily detachable transparent flakes, greyish to rusty brown consistently hard and not fragile. The various parts of *F. racemosa* Linn. has been widely used for the treatment of various diseases like leprosy, diarrhoea, diabetes, stomach ache, boils, toothache, vaginal disorders, inflammatory, skin diseases and also used as natural antioxidants etc. The nutrients and variety of active phytochemicals found in *F. Racemosa* various plant parts, including Flavonoids, glycosides, alkaloids, phenolic acids, steroids, saponins, coumarins, tannins and triterpenoids including oleanolic acid, ursolic acid, hydroxy ursolic acid, protocatechuic acid and malonic acid. In which it is found that certain phytochemicals are responsible for hydrating, nourishing and preventing your skin form harm¹⁰.



Figure 2 *Ficus Rosemosa* Linn

Ficus racemosa Linn

Taxonomy of *F. racemosa*:

- **Synonyms:** Gular, audumbara, Umbar, Cluster fig, Atti mara, Redwood fig.
- **Biological Source:** Obtained from dried fruit of *Ficus racemosa* Linn.
- **Biological name:** *Ficus racemosa* Linn.
- **Kingdom:** Plantae
- **Class:** Magnolipsida
- **Order:** Rosales
- **Division:** Magnoliophyta
- **Genus:** *Ficus* L.
- **Species:** *F. racemosa*
- **Family:** Moraceae

Olive oil

Olive oil deeply hydrates, protects against oxidative damage, soothes inflammation, locks moisture, and nourishes dry, sensitive skin effectively

Rose water:

Rose water is a gentle hydrosol that balances pH, tightens pores, soothes irritation, provides antioxidants, lightweight hydration, and refreshes sensitive or sun-exposed skin.

Glycerine:

Glycerine is a humectant that attracts moisture, hydrates skin, strengthens barrier function, improves elasticity, and soothes dryness and sensitivity.

Vitamin E:

Vitamin E is a potent antioxidant that protects skin, reduces aging, moisturizes deeply, and brightens complexion.

Neem powder:

Azadirachta indica is commonly known as Neem tree. It is one of the most important medicinal plants in the Ayurveda, mostly grow in tropical and semi-tropical regions. The bark, leaves and seeds are used to make medicines. It has an anti-inflammatory, antioxidant, antimalarial, antibacterial, antifungal etc.

Soap base:

Soap base is a pre-saponified melt-and-pour foundation for customizing gentle, moisturizing soaps.¹¹

FORMULATION DEVELOPMENT

1. Formulation of herbal face serum

Method of Preparation

The herbal face serum was prepared following a standard method. First, to create the serum base, Carbopol 934 was dispersed in 80% water along with EDTA and left to hydrate overnight. The next day, triethanolamine was added to this hydrated mixture to achieve the desired consistency. Following this, glycerine, Tween 80, olive oil, Vitamin E, and fragrance were incorporated, along with *Ficus racemosa* extract powder. Finally, sodium benzoate was added as a preservative. The

completed formulation was stored at 4°C for further evaluation.



Figure 3 formulation of herbal face serum

Table 1: Formulation of herbal face serum

Sr. No	Ingredients	Formulation	
		F1	F2
1.	<i>Ficus racemosa</i> fruit extract	6 ml	8 ml
2.	Carbopol 934	0.3 gm	0.3 gm
3.	Triethanolamine	0.1 ml	0.1 ml
4.	Glycerine	7 ml	7 ml
5.	Disodium EDTA	0.1 gm	0.1 gm
6.	Tween 80	4 ml	4 ml
7.	Olive oil	8ml	8 ml
8.	Vitamin E	1ml	1 ml
9.	Sodium Benzoate	0.1gm	0.1 gm
10.	Perfume	1 ml	1ml
11.	Water	72.4 ml	70.4 ml

Preparation of paper soap:

The soap base was melted using either a double boiler or heating mantle method. Once melted, herbal extracts and glycerine were added to enhance moisturizing properties. The mixture was stirred continuously until it reached a uniform consistency. The liquid soap formulation was then poured onto a sheet of butter paper and allowed to dry at room temperature.



Figure 4 preparation of paper soap

TABLE 2: Formulation of paper soap

Sr. No	Ingredients	Formulations	
		F1	F2
1.	<i>Ficus racemosa</i> fruit Extract	5 ml	4 ml
2.	Neem	5ml	4 ml
3.	Soap base	70 gm	72 gm
4.	Glycerine	5 ml	5 ml
5.	Distilled water	15 ml	15 ml

RESULTS

The study aimed to develop a herbal face serum and paper soap incorporating *Ficus racemosa* fruit extract. The primary focus was on formulating and evaluating these products to provide comprehensive skincare therapy.

Phytochemical screening:

The obtained fruit extract powder of *Ficus racemosa* was subjected to various tests like test for flavonoids, test for alkaloids, test for tannins and phenolic acids etc. The tests were carried out using standard methods for which the results are showed in Table 7. The findings from this investigation confirmed the presence of all targeted constituents in the extract.

Table 3: Results of Phytochemical screening

Constituents	Qualitative Tests	Results
Solubility	Alcohol + Extract	+
	Water + Extract	+
Flavonoids	Shinoda test	+
	Sulphuric acid test	+
	Residue + lead acetate	+
	Residue + addition of increasing no of NaOH+ acid	+
Alkaloids	Dragendroff's test	+
	Mayer's test	+
	Hager's test	+
	Wagner's test	+
Tannins and phenolic acids	5 % FeCl ₃ solution	+
	Lead acetate solution	+
	Gelatin solution	+
	Bromine water	+
	Dilute HNO ₃	+

	Dil. Potassium permagnate solution	+
--	------------------------------------	---

Note: + indicates present

EVALUATION OF HERBAL FACE SERUM:

Organoleptic test:

The formulated herbal face serums were evaluated for colour, appearance, Odour, consistency, homogeneity, and texture, as shown in Table 8. All formulations exhibited a reddish-brown colour attributed to the *F. racemosa* extract, along with a smooth texture, excellent consistency, and pleasant aroma.

Table 4: Evaluation of organoleptic parameters of herbal face serum

Properties	Formulations	
	F1	F2
Colour and appearance	Reddish brown	Reddish brown
Odour	Aromatic	Aromatic
Consistency	Excellent/ Flow able	Excellent/ Flow able
Homogeneity	Excellent	Excellent
Texture	Smooth and shiny	Smooth and shiny

1. Determination of pH

The pH of formulations F1 and F2 was found to be 4.2 and 4.5, respectively. These values fall within the normal skin pH range, indicating suitability for topical application without causing irritation.

2. Washability

The formulations were easily removed with tap water and left no residue on the skin. This confirms good washability and user convenience for regular application.

3. Viscosity

The viscosity of F1 and F2 was 2,562 cPs and 2,422 cPs, respectively, indicating a moderately fluid consistency. This ensures smooth spreading and optimal application without being too runny or excessively thick.

4. Determination of Spreadability

The formulations showed spreadability values of 7 cm and 7.1 cm. These results indicate easy and uniform spreading with minimal effort, enhancing application efficiency and absorption.

5. In vitro DPPH assay:

The in vitro DPPH assay was performed to evaluate the antioxidant activity of *F. racemosa* extract powder and formulations F1 and F2, using ascorbic acid as the standard. The extract exhibited 59.11% radical scavenging activity, while F1 and F2 showed 35.48% and 44.58% inhibition, respectively. In comparison, ascorbic acid demonstrated 83.33% inhibition at 517 nm. The results indicate moderate antioxidant potential of the extract and formulations, though lower than the standard.

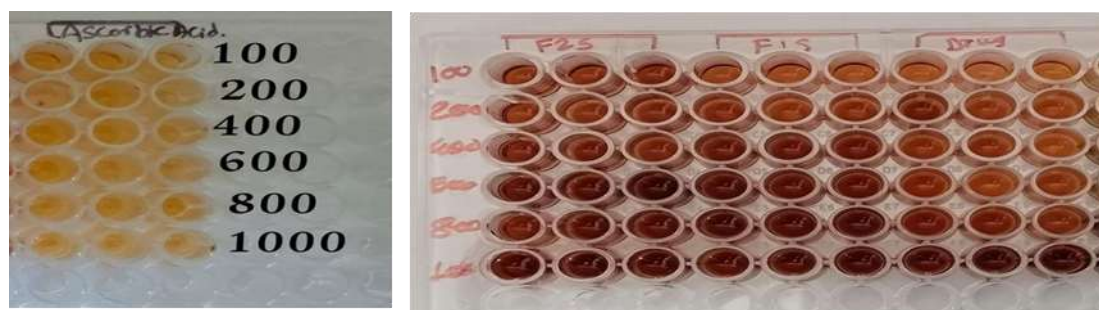


Figure 5 antioxidant activity of F.racemosa

6. Stability Studies

Stability studies were performed to evaluate physical and chemical changes under different storage conditions. The serum remained stable at room temperature with no significant changes in appearance or consistency. However, refrigerated storage resulted in increased thickness and higher consistency. These findings suggest that room temperature is more suitable for maintaining formulation stability.

EVALUATION OF PAPER SOAP:

1) Physicochemical parameters:

The physicochemical properties evaluated for the paper soap include its colour, odour, and texture. The results, summarized in the accompanying table 11.

Table 5: Result of physicochemical properties of paper soap

Sr No.	Test	Results
1.	Colour	Yellowish brown
2.	Odour	Aromatic
3.	Texture	Smooth

2) Determination of pH

The pH of the developed paper soap was found to be 7.2, indicating good skin compatibility. This near-neutral pH ensures safety for topical application without causing irritation or disrupting the skin barrier.

3) Foam Height

The foam height was measured at 3 cm, demonstrating satisfactory foaming ability. This indicates effective surfactant performance and good cleansing potential.

4) Foam Retention

The formulation showed a foam retention time of 4 minutes, reflecting stable and long-lasting lather. This prolonged foam stability enhances cleansing efficiency and user satisfaction.

5) Antimicrobial Test

The paper soap exhibited a 22 mm zone of inhibition, comparable to the standard gentamycin. These results confirm strong antimicrobial activity and its potential effectiveness in hygiene applications.

Table 6: Antimicrobial activity of herbal paper soap

Sr. No.	Organism	Control	Standard Gentamycin	F1
1.	<i>Staphylococcus aureus</i>	--	36 mm	22 mm



Figure 5 Antibacterial activity of paper Soap

CONCLUSION

The present research successfully formulated and evaluated two innovative herbal skincare products

a herbal face serum and a herbal paper soap incorporating the bioactive fruit extract of *Ficus racemosa*. The study effectively combines traditional herbal knowledge with modern cosmetic formulation techniques, providing scientific support for the development of safe, natural, and eco-friendly skincare and hygiene products. The herbal face serum was prepared in two formulations (F1 and F2) and evaluated for important parameters such as organoleptic properties, pH, viscosity, spreadability, washability, stability, and antioxidant activity. Both formulations showed desirable physical characteristics, including smooth texture, homogeneity, and good aesthetic appeal. The pH values ranged between 4.2 and 4.5, indicating compatibility with normal skin physiology and suitability for topical application. Stability studies confirmed that the formulations remained physically stable without significant changes. Although the antioxidant activity was lower compared to standard ascorbic acid, the serum exhibited moderate antioxidant potential, suggesting its ability to help protect the skin against oxidative stress and premature aging. The herbal paper soap was formulated as a thin, lightweight, biodegradable cleansing sheet enriched with the same herbal extract. The product demonstrated satisfactory physicochemical properties, including a skin-friendly pH of 7.2, adequate foam height, good foam retention, and acceptable stability. Notably, antimicrobial evaluation showed a 22 mm zone of inhibition against *Staphylococcus aureus*, indicating significant antibacterial activity. Although slightly lower than the standard antibiotic control, the results confirm the effectiveness of the herbal paper soap in promoting hygiene and reducing microbial contamination.

REFERENCES

1. Joseph, B., & Raj, S. J. (2011). Pharmacognostic and phytochemical properties of *Ficus racemosa* Linn – An overview. *International Journal of Pharmaceutical Sciences Review and Research*, 6(1), 64–71.
2. Kaur, I. P., Agrawal, R., & Nanotechnology in dermatology: A review of drug delivery systems. (2007). Nanotechnology-based drug delivery systems in dermatology. *Journal of Controlled Release*, 123(2), 97–109.
3. Ananthapadmanabhan, K. P., Moore, D. J., Subramanyan, K., Misra, M., & Meyer, F. (2004). Cleansing without compromise: The impact of cleansers on the skin barrier and the technology of mild cleansing. *Dermatologic Therapy*, 17(Suppl. 1), 16–25.
4. Eccleston, G. M. (2013). Functions of mixed emulsifiers and emulsion stabilizers in dermatological lotions and creams. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 123–124, 169–182.
5. Himanshu Sharma et al. *Ficus racemosa* linn. A review on its important medicinal uses, phytochemical and biological activities, *Journal of population therapeutic and clinical pharmacology review article*; 2023; Vol 13: Page no. 214-215.
6. Pullar, J. M., Carr, A. C., & Vissers, M. C. M. (2017). The roles of vitamin C in skin health. *Nutrients*, 9(8), 866.
7. Tejal Shirish Shejul et al. Facial serum: its formulation, usage, special ingredients, various types and benefits, *International journal of pharmaceutical research and applications*; Mar-Apr 2023; Vol 8 (Issue 2): Page no. 2-3.
8. Draelos, Z. D. (2018). Active agents in common skin care products. *Plastic and Reconstructive Surgery*, 142(3S), 20S–24S.



9. Mukherjee, P. K., Maity, N., Nema, N. K., & Sarkar, B. K. (2011). Bioactive compounds from natural resources against skin aging. *Phytomedicine*, 19(1), 64–73.
10. Shreya Talreja et al Formulation and evaluation of herbal soap by using Moringa olifera as main active constituents; 2023: Page no.2122-2123.
11. Kanchan Chande et al. Formulation and evaluation of anti-aging serum, Journal of emerging technologies and innovative research ;2023;Vol 10 (Issue 2): Page no. 296.

HOW TO CITE: A. Pravallika, Ch. Amrutha, D. Hema Bramarambika, K. Kusuma, M. Pranathi Krishna, Dr. I. V. Rama Rao, Dr. Y. Ankamma Chowdary, Ecofriendly Skin Hygiene: Formulation and Evaluation of Sustainable Ficus racemosa Herbal Face Serum and Paper Soap, *Int. J. of Pharm. Sci.*, 2026, Vol 4, Issue 3, 847-855. <https://doi.org/10.5281/zenodo.18925111>

