



Original Research Article

Preparation and evaluation of a polyherbal cream for treatment of acne vulgaris

X. Fathimagrace^{1*}, A. Janani¹, S. Reshma¹¹Faculty of Pharmacy, Dr.M.G.R. Educational and Research Institute, New Delhi, India.

Abstract

The human skin condition known as acne vulgaris, or just acne, is characterised by scaly, red skin (seborrhoea), pimples, big papules (nodules), pinheads (papules), blackheads and whiteheads (*Comedones*), and scars. Skin with dense sebaceous follicles, such as the face, chest, and back, is affected by acne. The natural extracts of guava leaves (*Psidium guajava*), ginger rhizome (*Zingiber officinale*), and lemon (*Citrus limon*), aimed at the effective treatment of acne vulgaris. These herbal ingredients were selected for their well-documented antibacterial, anti-inflammatory, antioxidant, and astringent properties, making them suitable candidates for acne management. The cream was prepared using a suitable w/o emulsion base, ensuring optimal consistency and stability. Comprehensive evaluation parameters were performed, including physical appearance, pH determination, viscosity measurement, spreadability, and stability studies under different storage conditions. Additionally, the formulation was assessed for skin irritancy through patch testing, and washability to ensure user convenience. The results demonstrated that the polyherbal cream exhibited desirable physicochemical properties, excellent spreadability, acceptable pH, and good stability over time, with no signs of phase separation. Importantly, the irritancy studies confirmed the cream to be safe and non-irritant for topical application. The combined therapeutic potential of guava, ginger, and lemon extracts in the cream formulation suggests promising efficacy in managing acne vulgaris, offering a natural, safe, and effective alternative to conventional treatments.

Keywords: Acne vulgaris, Polyherbal cream, *Psidium guajava*, *Zingiber officinale*, *Citrus limon***Received:** 17-04-2025; **Accepted:** 25-06-2025; **Available Online:** 17-09-2025

This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

A cosmetics product can be described as “any substances or preparation intended for contact with any external part of the human body”.¹ Herbal cosmetics are products that contain phytochemicals derived from a variety of botanical sources, which influence skin functions and give nutrients for healthy skin and hair. Herbal cosmetics are natural plants and their products that are utilised in cosmetic preparations for their aromatic value. Creams are homogenous, semi-solid, or viscous formulations with a fluid consistency that are designed for external application to the skin or mucous membranes for protective, medicinal, or preventive purposes, especially where an occlusive effect is not required.²

Cream has several benefits over other preparations including the ability to combine aqueous phase contains (Guava leaves, Ginger rhizome extract, Lemon extract, Tween 80, Glycerin, Methyl paraben, Rose oil, Distilled

water) and oleaginous phase (Coconut oil, Lanolin, Beeswax) a higher release of many incorporated medications, and the ability to adjust their rheological qualities. Acne vulgaris is a common skin condition characterized by blackheads, cysts, and pimples. Using these creams on a regular basis can lead to smoother, more transparent skin.³

Acne vulgaris is a common, chronic, inflammatory disorder of the pilosebaceous unit (comprising the hair follicle and sebaceous gland) caused primarily by increased sebum production, hyperkeratinization of the follicle, bacterial colonization and inflammation.⁴

The skin is the largest human organ. It has three layers: the epidermis, the dermis, and the hypodermis. The stratified, vascular cellular epidermis and the underlying dermis of connective tissue are the two separate layers that make up human skin. The stratum corneum, also known as the horny layer, is the most significant tissue in this complex membrane

*Corresponding author: X. Fathimagrace
Email: reshmareshma16026@gmail.com

with regard to drug absorption. It typically offers the slowest or rate-limiting stage in the penetration process.⁵ Drugs that directly enter the intact stratum corneum may do so through transcellular or intercellular pathways.⁶

1.1. Anatomy of the skin

1.1.1. Skin structure

The human skin is composed of diverse tissues that work together as a single structure to maintain internal body conditions (homeostasis) and that functions equally as a communicator to and a defense against the outside world. Skin is a constantly changing, dynamic organ that is involved in numerous processes vital to our health, e.g., regulation of the body temperature, balance of fluids, sensory reception, synthesis of vitamins and hormones. Human skin is composed of three distinct compartments, epidermis, dermis and hypodermis.⁷

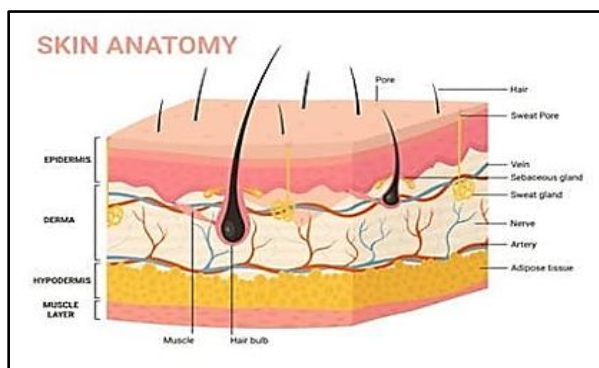


Figure 1: Anatomy of skin

1.2. Advantages:⁸

Avoiding a chemically hostile gastrointestinal environment;
Without gastrointestinal distress or any other physiological conditions that would prevent oral administration

Improving patient compliance;

Avoiding the first-pass effect;

Allowing the effective use of drugs with short biological half-lives;

Permitting medications with a Narrow therapeutic window to be administered

Providing controlled plasma levels of potent drugs;

1.3. Disadvantages:⁹

An ointment is not comparable to stability.

Because they are less hydrophobic than other semi-solid formulations, there is a higher chance of contamination.

Medicine may cause skin irritation or sensitization;

2. Preparations of W/O Emulsion Creams



Figure 2: Polyhedral cream

An aqueous phase and an oil phase make up the formulation. Guava leaf extract, ginger extract, lemon extract, Tween 80, glycerin, and distilled water make up the aqueous phase, while coconut oil, lanolin, and beeswax make up the oil phase. Both phases are heated independently in a water bath to 70°C in order to create the emulsion. The emulsion is then formed by gradually adding the oil phase to the aqueous phase while swirling constantly until a clicking sound is produced. The liquid is then allowed to cool before preservatives and fragrances are added. A water-in-oil (W/O) emulsion cream is the end result.

2.1. Formulation

Table 1:

S. No	Ingredients	Quantity for 15g	Functions
1.	Coconut oil	1.5g	Emollient /moisturizer/oil phase
2.	Lanolin	2.5g	Emollient/ oil phase
3.	beeswax	1g	Solidifying agents / oil phase
4.	Guava leaves extract	2g	Anti-microbial /Antioxidant/ Anti-inflammatory
5.	Ginger rhizome extract	1.5g	Antioxidant/Anti-inflammatory
6.	Lemon extract	1g	Vitamin c supplement and anti-oxidant
7.	Tween 80	2.5 ml	Emulsifying agent
8.	Glycerin	1.5 ml	Humectants
9.	Methyl paraben	0.01g	Preservative
10.	Rose oil	Q.S	Fragrance
11.	Distilled water	1.5 ml	vehicle

2.2. Observation

Table 2:

S. No	Parameters	Observation
1	Color	Pale yellow
2	Odor	Pleasant
3	Texture	Smooth
4	Consistency	Good
5	Gritty particles	Nil
6	pH	5.4
7	Greasiness	Non-Greasy
8	Homogeneity	Homogenous
9	Washability	Water washable
10	Spreadability	Spreadable-10.11 gcm/s
11	Phase separation	No Phase separation
12	Stability	Stable at room temp

2.3. Evaluation of cream:^{10,11}

The common evaluation test involved in cream:

2.4. Physical evaluation

The cream was evaluated in terms of colour, Odor, texture, and condition throughout this test.

2.5. Washability

A small amount of cream was applied on the hand and it is then washed with tap water.

2.6. Irritancy

Mark the area (1 cm²) on the left-hand dorsal surface. Then the cream was applied to that area and the time was noted. Then it is checked for irritancy, erythema, and edema if any for an interval up to 24 h and reported.

2.7. pH

0.5 g cream was taken and dispersed in 50 ml distilled water and then PH was measured by using digital PH meter.

2.8. Viscosity

Viscosity of cream was done by using Brookfield viscometer at a temperature of 25 °C using spindle No. 63 at 2.5 RPM.

2.9. Phase separation

Prepared cream was kept in a closed container at a temperature of 25-100 °C away from light. Then phase separation was checked for 24 h for 30 d. Any change in the phase separation was observed/checked.

3. Spread Ability

The spreadability was expressed in terms of time in seconds taken by two slides to slip off from the cream, placed in between the slides, under a certain load. Lesser the time taken for separation of the two slides better the spreadability. Two sets of glass slides of standard dimension were taken. Then

one slide of suitable dimension was taken and the cream formulation was placed on that slide. Then another slide was placed on the top of the formulation. Then a weight or certain load was placed on the upper slide so that the cream between the two slides was pressed uniformly to form a thin layer. Then the weight was removed and excess of formulation adhering to the slides was scrapped off. The upper slide was allowed to slip off freely by the force of weight tied to it. The time taken by the upper slide to slip off was noted.

Spread ability = $m \times l/t$

Where, m = Standard weight which is tied to or placed over the upper slide (30g)

l = length of a glass slide (5 cm)

t = time taken in seconds.

4. Greasiness

Here the cream was applied on the skin surface in the form of smear and checked if the smear was oily or grease-like.

5. Homogeneity

The formulations were tested for homogeneity by visual appearance and by touch.

6. Stability Studies

To assess the drug and formulation stability, stability studies were done according to ICH guidelines. The cream filled in bottle and kept in humidity chamber maintained at $30 \pm 2^\circ\text{C}/65 \pm 5\% \text{ RH}$ and $40 \pm 2^\circ\text{C}/75 \pm 5\% \text{ RH}$ for one month. At the end of studies, samples were analysed for the physical properties and viscosity.

7. Results

The evaluation of the developed polyherbal cream reveals important details about its physical properties and performance. The cream's beautiful yellow tint and pleasant odor enhance its visual appeal and sensual experience.

Regular usage has the potential to increase user satisfaction and compliance.

The cream's spread ability rating of 10.11 gcm/s indicates that it is easy to apply and distribute on the skin. This means that the cream has a smooth texture and the right consistency for easy application and absorption.

The absence of gritty particles and phase separation indicate a stable formulation with an even distribution of active ingredients. Uniformity is essential for providing consistent therapeutic benefits while reducing the risk of skin irritation.

The cream's washability and lack of greasiness make it easy to remove without leaving a greasy residue, providing greater convenience and comfort for users. These characteristics are essential for maintaining skin cleanliness

and preventing pore blockages, especially for those with oily or acne-prone skin.

The cream's homogeneity highlights the effective integration of herbal components, maximizing the beneficial properties of guava leaves, ginger, and lemon for skin-soothing and rejuvenation.

The polyherbal cream formulation has been carefully tailored to provide a balance of sensory appeal, ease of application, and potential therapeutic benefits for acne vulgaris.

Optimizing these parameters demonstrates commitment to providing a high-quality product that meets functional and user expectations.

7. Conclusion

The use of guava leaves, ginger, and lemon in a polyherbal cream to treat acne vulgaris is a promising natural skincare option. The addition of guava leaf extract, known for its antimicrobial and anti-inflammatory properties, alongside ginger and lemon, which have antioxidant and Astringent properties may help alleviate symptoms associated with acne vulgaris.

Proper formulation techniques, including extraction and compatibility studies, are crucial for preserving bioactive compounds and achieving optimal efficacy. Dermatological testing, microbial analysis, and stability assessments are necessary to ensure the cream's safety and effectiveness in treating acne vulgaris.

8. Acknowledgement

Authors wish to acknowledge the management, Faculty of pharmacy DR. MGR Educational and research Institute, Chennai -77 for providing the necessary facilities required to carry out the research work.

9. Source of Funding

None.

10. Conflict of Interest

None.

References

1. Halla N, Fernandes I, Heleno S, Costa P, Boucherit-Otmani Z, Boucherit K, et al. Cosmetics Preservation: A Review on Present Strategies. *Molecules*. 2018;23(7):1571.
2. Varghese JV, Krishnapriya EP, Megha H, Mubashira PM, Jose R, Shana PK. A review on formulation and evaluation of polyherbal antifungal cream. *Int J Creat Res Thoughts*. 2022;10(4):a795–800
3. Sawant A, Kamath S, KG H, Kulyadi GP. Solid-in-Oil-in-Water Emulsion: An Innovative Paradigm to Improve Drug Stability and Biological Activity. *AAPS PharmSci Tech*. 2021;22(5):199.
4. Leung AK, Barankin B, Lam JM, Leong KF, Hon KL. Dermatology: how to manage acne vulgaris. *Drugs in Context*. 2021;10:2021–86
5. Katz M, Poulsen BJ. Absorption of drugs through the skin, in, Brodie BB, Gillette J, (eds.) *Handbook of Experimental Pharmacology* New York: Springer-Verlag, 1971;28:103.
6. Proksch E, Brandner JM, Jensen JM. The skin: an indispensable barrier. *Experimental Dermatol*. 2008;17(12):1063–7.
7. Bungau AF, Radu AF, Bungau SG, Vesa CM, Tit DM, Purza AL. et al. Emerging Insights into the Applicability of Essential Oils in the Management of Acne Vulgaris. *Molecules*. 2023;28(17):6395.
8. Rousselle, P.; Braye, F.; Dayan, G. Re-epithelialization of adult skin wounds: Cellular mechanisms and therapeutic strategies. *Adv Drug Deliv Rev*. 2019;146:344–65
9. Khan ZJ, Kori A, Patil SM. A review on polyherbal cream. *Int J Novel Res Dev*. 2023 May;8(5):669–76.
10. Uddandu Saheb SK, Reddy AP, Rajitha K, Sravani B, Vanitha B. Formulation and evaluation of cream from naturally containing plant extracts. *World J Pharm Pharm Sci*. 2018;7(9):851-62.
11. Sonalkar MY, Nitave SA. Formulation and evaluation of polyherbal cosmetic cream. *World J Pharm Pharm Sci*. 2016;5(2):772-9.

Cite this article. Fathimagrace X., Janani A., Reshma S. Preparation and evaluation of a polyherbal cream for treatment of acne vulgaris. *Curr Trends Pharm Pharm Chem*. 2025;7(3):107-110.