ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1473

Eco-Friendly Herbal Anti-Acne Gel: Formulation and Evaluation

Sakshi P. Muley[1]; Nilesh D. Rathod[2]; Dr. Pramod M. Bhosale[3]; Dr. Vitthal G. Kuchake[4]

[1,2]Student, Ojas College of Pharmacy, Jalna-431203 (Maharashtra)
[3]Project Guide & Associate Professor, Ojas College of Pharmacy, Jalna-431203 (Maharashtra)
[4]Principal, Ojas College of Pharmacy, Jalna-431203 (Maharashtra)

Publication Date: 2026/05/28

Abstract: Acne vulgaris is one of the most common inflammatory skin disorders affecting mainly adolescents and young adults. It occurs due to excessive sebum production, blockage of hair follicles, bacterial growth and inflammation. Herbal formulations are gaining importance because they are considered safer and produce fewer side effects compared to synthetic preparations. The present study aimed to formulate and evaluate a herbal anti-acne gel using neem extract and Aloe vera as natural active ingredients. Neem possesses antibacterial, anti-inflammatory and antioxidant properties which help in reducing acne-causing microorganisms, while Aloe vera provides soothing, moisturizing and healing effects on the skin. The herbal gel was prepared using Carbopol 940 as a gelling agent along with suitable excipients such as propylene glycol, methyl paraben and triethanolamine. The prepared formulation was evaluated for various parameters including appearance, homogeneity, consistency, pH, spreadability, washability and irritation test. The gel showed good consistency, smooth texture, acceptable pH and satisfactory spreadability without causing irritation to the skin. The study concluded that the formulated herbal anti-acne gel can be used as a safe, effective and economical topical preparation for the management of acne.

How to Cite: Sakshi P. Muley; Nilesh D. Rathod; Dr. Pramod M. Bhosale; Dr. Vitthal G. Kuchake (2026) Eco-Friendly Herbal Anti-Acne Gel: Formulation and Evaluation. *International Journal of Innovative Science and Research Technology*, 11(5), 1941-1945. https://doi.org/10.38124/ijisrt/26may1473

I. INTRODUCTION

Acne vulgaris is one of the most common inflammatory skin disorders affecting adolescents and young adults. It mainly occurs due to excessive secretion of sebum, blockage of pores, bacterial infection and inflammation of sebaceous glands. Microorganisms such as Cutibacterium acnes and Staphylococcus epidermidis are commonly involved in acne formation. Although several synthetic preparations are available for acne treatment, prolonged use may produce side effects such as redness, irritation and dryness of skin.

Herbal medicines are gaining importance because of their safety, effectiveness and fewer side effects. Neem (Azadirachta indica) is well known for its antibacterial and anti-inflammatory properties, while Aloe vera is commonly used for its soothing and moisturizing action. Therefore, the present study was aimed at preparing and evaluating a herbal anti-acne gel using neem extract and Aloe vera.

➢ *Types of Acne:*

- Comedonal acne: Mild acne due to clogged pores (whiteheads & blackheads).
- Papules: Small red inflamed lesions.
- Pustules: Pus-filled inflammatory pimples.
- Nodules: Deep, painful severe lesions.
- Cystic acne: Severe deep pus-filled lesions with risk of scarring.

➢ *Anti-Acne Gel:*

Anti-acne gels are topical semisolid formulations used for the treatment and management of acne vulgaris. These formulations help in reducing bacterial growth, inflammation, excess oil secretion and blockage of pores. Gels are widely preferred for topical application because they are non-greasy, easily washable and provide better drug release on the skin surface. Herbal anti-acne gels containing natural ingredients are considered safer and produce fewer side effects compared to synthetic formulations.

➢ *Benefits of Herbal Anti-Acne Gel:*

- Easy to apply and non-greasy in nature.
- Provides good spreadability and patient compliance.
- Helps in reducing bacterial growth and inflammation.
- Produces fewer side effects compared to synthetic formulations.
- Easily washable and suitable for topical application.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1473

II. MATERIALS

➢ *Neem:*

- Botanical Name: Azadirachta indica
- Biological source: Neem consists of the fresh or dried leaves and seed oil of Azadirachta indica belonging to family Meliaceae.
- Pharmacological uses: Neem shows antiviral, antifungal, anti-inflammatory and antipyretic activities.

➢ *Aloe Vera:*

- Botanical Name: Aloe barbadensis Miller.
- Biological Source: Aloe vera consists of dried juice or fresh gel obtained from leaves of aloe barbadensis Miller belonging to family Liliaceae.
- Pharmacological uses: Aloe vera exhibits anti-inflammatory, soothing, moisturizing and wound healing activities.

➢ *Carbopol 940:*

- Category: Gelling agent
- Properties: White, free-flowing powder; forms clear gel in water
- Use: Used to provide viscosity and gel consistency

➢ *Propylene Glycol:*

- Category: Humectant
- Properties: Colorless, odorless liquid
- Use: Helps retain moisture and improves spreadability

➢ *Methyl Paraben:*

- Category: Preservative
- Properties: Colorless, odorless crystalline compound
- Use: Prevents microbial growth in formulation

➢ *Triethanolamine:*

- Category: pH adjuster
- Properties: Viscous liquid with mild odor
- Use: Neutralizes carbopol and helps in gel formation

➢ *Distilled Water:*

- Properties: Clear, colorless liquid
- Use: Used as solvent and base of formulation

➢ *Formulation Table:*

Table 1 Formulation Table

Sr. No.	Ingredient	F1	F2	F3	Role
1	Neem Extract	0.3g	0.6g	0.43g	Antibacterial anti-acne agent
2	Aloe vera	0.3g	0.6g	0.43g	Soothing Agent
3	Carbopol 940	0.6g	0.6g	0.6g	Gelling Agent
4	Propylene Glycol	0.3g	0.3g	0.3g	Humectant
5	Methyl Paraben	0.03g	0.03g	0.03g	Preservative
6	Triethanolamine	q.s	q.s	q.s	pH Adjuster
7	Distilled Water	q.s to 30g	q.s to 30g	q.s to 30g	Vehicle

III. METHODS

➢ *Preparation of Neem Extract:*

Fresh neem leaves were collected, washed and shade dried. The dried leaves were powdered and stored in airtight container. About 2 g of neem powder was macerated with ethanol for few hours with occasional stirring. The mixture was filtered using Whatman filter paper and the filtrate was concentrated on water bath below 50 °C to obtain semi-solid extract.

➢ *Preparation of Aloe Vera Extract:*

Fresh Aloe vera leaves were washed properly and the outer covering was removed carefully. The inner gel portion was collected and blended to obtain uniform slurry. The slurry was filtered and the obtained extract was used for formulation.

➢ *Preparation of Herbal Gel:*

Carbopol 940 was dispersed slowly in distilled water with continuous stirring. Initially, slight lump formation was observed during carbopol dispersion; however, continuous stirring helped to obtain uniform consistency. The dispersion was kept aside for hydration. Methyl paraben was dissolved separately and mixed with neem extract and Aloe vera extract. The herbal mixture was added slowly to hydrated Carbopol base. Propylene glycol was added and mixed properly. Triethanolamine was added dropwise until smooth gel consistency was obtained.

➢ *Evaluation of Gel:*

The prepared gel was evaluated for various physicochemical parameters.

- *Physical Appearance*

The prepared gel was greenish in colour with characteristic herbal odour and smooth appearance.

- *Homogeneity*

The formulation showed good homogeneity without formation of lumps.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1473

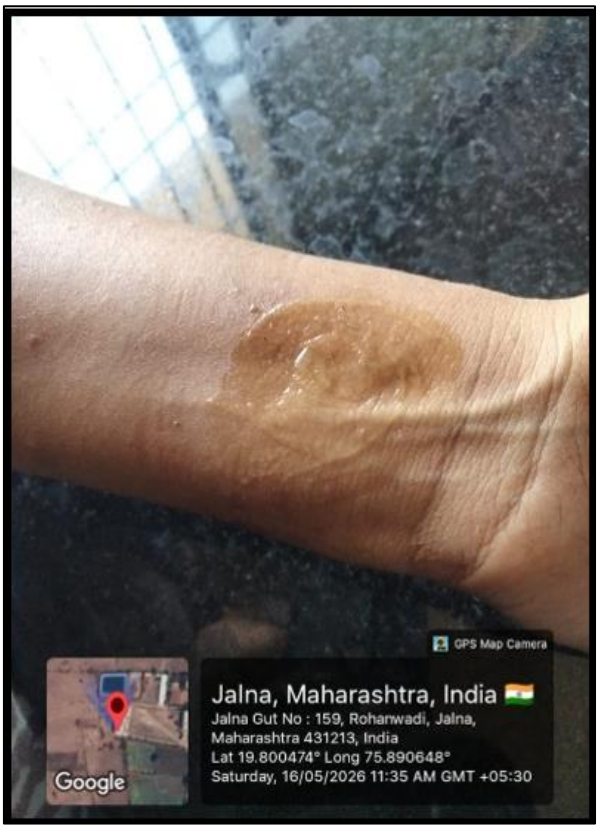

Fig 1 Homogeneity

- *pH Determination*

The pH of the prepared gel was found to be in the range of 5.5 to 6, which is suitable for skin application.

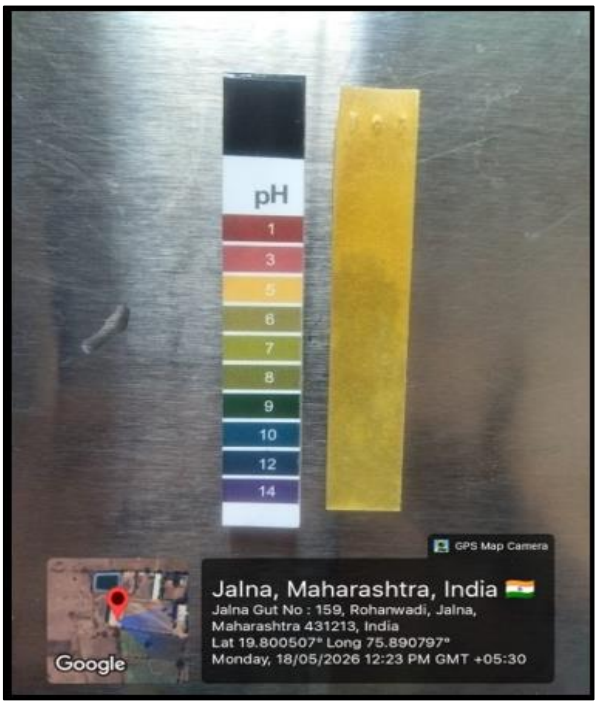

Fig 2 pH Determination

- *Spreadability*

The formulation spread uniformly with slight manual effort and showed satisfactory spreadability.

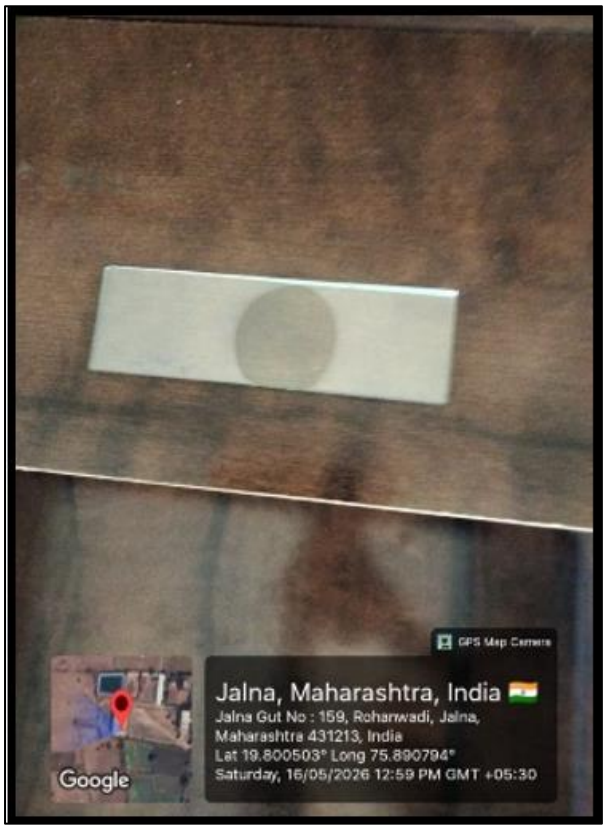

Fig 3 Spreadability

- *Washability*

The prepared formulation was easily washable with water.

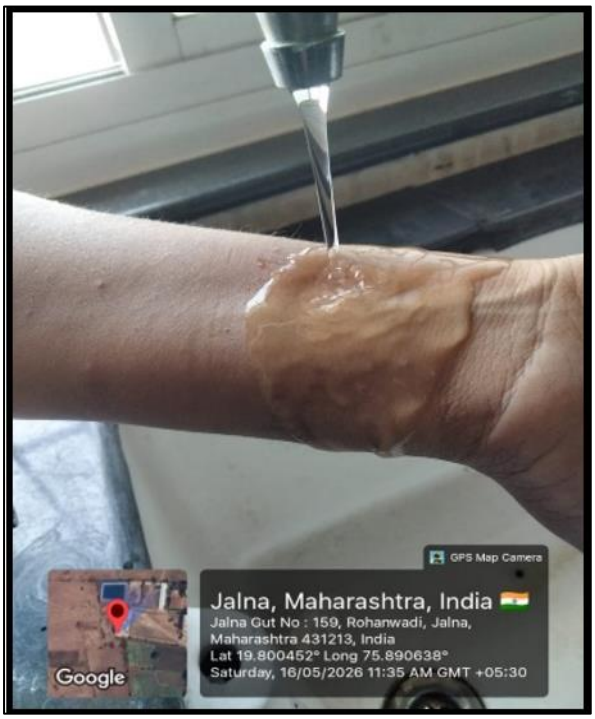

Fig 4 Washability

- *Skin Irritation Test*

No redness, itching or irritation was observed after application of gel.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1473

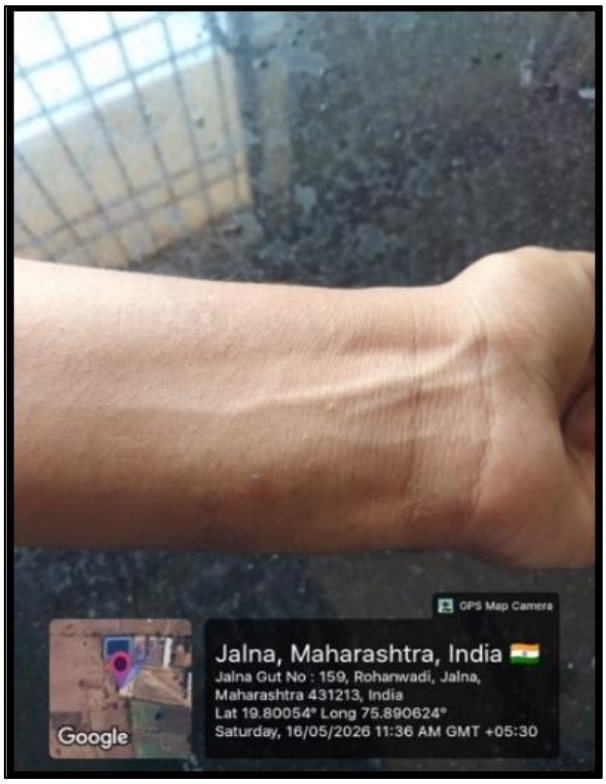

Fig 5 Skin Irritation Test

➢ *Stability Studies:*

The prepared herbal anti-acne gel was stored in a well-closed container in a cool and dry place away from direct sunlight. The prepared formulation showed no changes in color, odor, consistency and phase separation. No significant change was observed during the storage period, the gel remained stable and homogeneous.

IV. RESULT

Table 2 Result Table

Parameter	Observation
Color	Greenish
Odour	Characteristic (herbal)
Texture	Smooth
Consistency	Semi-solid
PH	5.6 to 6
Spreadability	Good
Washability	Easily Washable
Irritation Test	No irritation

The prepared herbal gel showed satisfactory physicochemical properties with good appearance, homogeneity and spreadability.

V. CONCLUSION

The present work was focused on the preparation and evaluation of herbal anti-acne gel using neem extract and Aloe vera as natural ingredients. The formulated gel was found to have good physical appearance with smooth texture, proper consistency and uniform homogeneity. The prepared formulation spread easily on the skin and was washable with water, which makes it convenient for topical use. The pH of the gel was found within the suitable range for skin application and no signs of irritation or redness were observed during evaluation. Neem was used in the formulation because of its antibacterial and anti-inflammatory properties, which may help in reducing acne and preventing microbial growth on the skin. Aloe vera helped in providing soothing, moisturizing and protective effects to the skin. The combination of these herbal ingredients resulted in a stable and satisfactory gel formulation.

Based on the evaluation results, the prepared herbal anti-acne gel can be considered a useful herbal preparation for acne management. The study also indicates that herbal formulations may provide improved safety profile and fewer side effects compared to synthetic anti-acne products used for topical treatment.

REFERENCES

[1]. Choudhury A, Devarajan A. A Text Book of Cosmetic Science: As Per PCI Regulations for Final Year B Pharm Semester VIII. 2nd ed. Pune: Nirali Prakashan; 2024. ISBN: 978-93-5451-960-4.

[2]. Mhaske SB, Walke PA, Abhang DC, Kasar JS. A review article on formulation and evaluation of gels. International Journal of Advanced Research Science, Communication and Technology. 2025 May; 5(6):656. doi:10.48175/568.

[3]. Suryawanshi PA, Azeem MSA, Ramakant SR, Budge PN, Chakurkar PV. A review on the formulation and evaluation of herbal anti-acne gel. Journal of Emerging Technologies and Innovative Research. 2025 Apr;12(4):e293.

[4]. Gunjal A, Hussain F, Pathan M, Mali V, Jadhav A. Formulation and evaluation of poly-herbal anti-acne facewash. International Journal of Pharmaceutical Sciences and Research. 2024;15(1):246-252. https://doi.org/10.13040/IJPSR.0975-8232.

[5]. Ghodke SK, Bagwan LR, Hingne LD. Research of formulation and evaluation of anti-acne gel. International Journal of Creative Research Thoughts. 2021 Dec;9(12):e649. ISSN: 2320-2882.

[6]. Biyyala S, Nayudu T. Formulation and evaluation of anti-acne herbal gel. Innovative Journal of Medical Sciences. 2022;6(1):17-30.

[7]. Borse RR, Premchandani LA, Dhankani AR, Pawar SP. Formulation and evaluation of herbal anti-acne gel containing neem and garlic extract. International Journal of Pharmacy & Pharmaceutical Research. 2020 Jan;17(2).

[8]. Raweh SM, Noman MA, Alburyhi MM, Saif AA. Formulation and evaluation of anti-acne gel of Azadirachta indica extract herbal product. European Journal of Pharmaceutical and Medical Research. 2024;11(2) :427-433.

[9]. Sonkusare S, Yadav P. Formulation of anti-acne gel from Hibiscus, Aloe vera, Neem, Turmeric, Tea tree oil and Rose water. International Journal of Pharmaceutical Sciences. 2026;4(3):2611-2620.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1473

[10]. Fatima Grace X, Joan Vijetha R, Rahul Raj S, Shanthi S, Latha S, Shanmuganathan S. Formulation and evaluation of polyherbal anti-acne gel. Adv J Pharm Life Sci Res. 2015;3(1):5-8.
[11]. Ganjave VP, Nandkumar P, Ghadge RS. Formulation and evaluation of herbal neem face wash. World Journal of Biology Pharmacy and Health Sciences. 2025;24(2):005-010. doi:10.30574/wjbphs.2025.24.2.0956.
[12]. Julia Afrakoma Ansong, Emmanuel Asante, Raphael Johnson, Mariam El Boakye-Gyasi, Noble Kuntworbe, Frederick William Akuffo Owusu, et al. Formulation and evaluation of herbal-based antiacne gel preparations. Scientific World Journal. 2023:1-13. https://doi.org/10.1155/2023/7838299.
[13]. Rowe RC, Sheskey PJ, Quinn ME, editors. Handbook of pharmaceutical excipients. 6th ed. London: Pharmaceutical Press; 2009.