

Formulation and Evaluation of the Alovera Herbal Gel

Mr. Pramod B. Chikkodi and Ajinkya Sanjay Jagtap

Nootan College of Pharmacy, Kavathe Mhankal

Abstract: *The present study focuses on the formulation, development, and evaluation of Aloe vera herbal gel for topical application. Aloe vera is a well-known medicinal plant possessing antimicrobial, anti-inflammatory, moisturizing, and wound healing properties. The gel was prepared using Aloe vera extract with suitable gelling agents such as Carbopol 940. The prepared formulation was evaluated for various parameters including appearance, pH, viscosity, spreadability, homogeneity, and stability. The gel showed good physical appearance, smooth texture, acceptable viscosity, and pH suitable for skin application. The formulation exhibited satisfactory spreadability and stability without phase separation. Due to the presence of bioactive constituents such as flavonoids, tannins, saponins, and polysaccharides, Aloe vera gel demonstrated good therapeutic potential for skin care and wound healing applications. The study concluded that Aloe vera herbal gel can be used as a safe and effective topical herbal formulation.*

Keywords: Aloe vera, Herbal gel, Carbopol 940, Topical formulation, Evaluation

I. INTRODUCTION

Herbal medicine has been used since ancient times for the treatment of many diseases. Plants have always been an important source of medicine because they contain natural compounds that are beneficial for human health. Even today, a large part of the population depends on herbal medicines for primary healthcare. This is because herbal drugs are considered safe, effective, economical, and easily available. In recent years, there has been an increased interest in the use of herbal formulations in modern pharmaceutical science, especially for skin-related problems such as infections, wounds, burns, and inflammation.

Topical drug delivery systems are widely used to treat skin diseases because they deliver the drug directly to the affected area. Among various topical dosage forms, gels are very popular due to their non-greasy nature, ease of application, and good patient acceptance. Gels are semi-solid systems in which the drug is dispersed in a suitable base. They provide a cooling effect, allow easy absorption of active ingredients, and do not block skin pores. Because of these advantages, herbal gels are becoming an important area of research in pharmaceutical sciences.

Herbal medicines have been used since ancient times for the treatment of various diseases and skin disorders. Medicinal plants contain natural bioactive compounds that provide therapeutic effects with fewer side effects compared to synthetic drugs. Among different herbal dosage forms, gels are widely used because they are non-greasy, easy to apply, easily washable, and provide better patient compliance.

Aloe vera is one of the most important medicinal plants belonging to the family Liliaceae. It is commonly known as "Ghritkumari" and is widely used in cosmetics, pharmaceuticals, and traditional medicine. Aloe vera contains important phytoconstituents such as vitamins, enzymes, amino acids, lignin, saponins, anthraquinones, and polysaccharides. These constituents are responsible for its antimicrobial, anti-inflammatory, antioxidant, moisturizing, and wound healing properties.

Topical herbal gels containing Aloe vera are useful in treating burns, wounds, acne, skin irritation, fungal infections, and dry skin. Herbal gels provide direct application of active constituents to the affected area and improve therapeutic effectiveness.



The present study aims to formulate and evaluate Aloe vera herbal gel using suitable excipients and evaluate its physicochemical properties for topical application.

Table: 1. Phytochemical Constituents of Aloe vera

S. No.	Constituents	Activity
1	Flavonoids	Antioxidant, anti-inflammatory
2	Saponins	Antimicrobial, cleansing action
3	Tannins	Antibacterial, wound healing
4	Anthraquinones	Antifungal, antimicrobial
5	Polysaccharides	Moisturizing and healing activity
6	Vitamins	Skin nourishment and antioxidant activity
7	Enzymes	Anti-inflammatory activity
8	Amino acids	Tissue repair and skin regeneration
9	Glycosides	Healing and soothing effect
10	Sterols	Anti-inflammatory activity

Aloe vera is one of the most important medicinal plants widely used in pharmaceutical and cosmetic preparations due to its excellent therapeutic properties. It belongs to the family Liliaceae and is commonly known as “Ghritkumari.” Aloe vera contains various bioactive constituents such as flavonoids, saponins, tannins, anthraquinones, polysaccharides, vitamins, enzymes, and amino acids, which are responsible for its medicinal activities. In recent years, Aloe vera herbal gel has gained great importance because of its antimicrobial, anti-inflammatory, moisturizing, antioxidant, and wound healing properties. Herbal gels are preferred over ointments and creams because they are non-greasy, easily spreadable, washable, and provide a cooling effect on the skin. Aloe vera gel helps in maintaining skin hydration and promotes regeneration of damaged tissues. It also protects the skin from microbial infections caused by bacteria and fungi.

Table: 2. Ideal Properties of Herbal Gel

Parameter	Requirement
pH	5.5 – 7
Texture	Smooth
Spreadability	Good
Appearance	Uniform
Stability	High

The antimicrobial activity of Aloe vera is mainly due to the presence of anthraquinones, saponins, and phenolic compounds which inhibit the growth of microorganisms. Aloe vera gel is widely used for the treatment of burns, cuts, wounds, acne, rashes, and other skin disorders. The formulation of Aloe vera herbal gel is generally prepared using suitable gelling agents such as Carbopol 940 along with excipients like glycerin, propylene glycol, preservatives, and distilled water. The prepared gel is evaluated for various parameters such as pH, viscosity, spreadability, homogeneity, appearance, washability, and stability to ensure quality and safety. The pH of the gel should be compatible with skin pH to avoid irritation during application. The spreadability and viscosity of the formulation are important for easy application and patient acceptability. Due to its natural origin, Aloe vera herbal gel is considered safe, economical, and effective for topical use. Therefore, Aloe vera herbal gel can be considered a promising herbal formulation for skin care applications.

References

1. Sharma V. et al., Formulation and Evaluation of Aloe vera Herbal Gel, International Journal of Pharmaceutical Sciences, 2022, 14(2), 120–125.
2. Kumar S. et al., Antimicrobial Activity of Aloe vera Extract, Asian Journal of Pharmaceutical Research, 2021, 11(3), 45–50.



3. Gupta M. et al., Wound Healing Activity of Aloe vera Gel, *Journal of Ethnopharmacology*, 2020, 250, 112–118.
4. Singh R. et al., Pharmacological Properties of Aloe vera: A Review, *International Journal of Pharmaceutical Sciences Review and Research*, 2021, 68(1), 72–80.
5. Patel R. et al., Development and Evaluation of Polyherbal Gel Containing Aloe vera, *World Journal of Pharmacy and Pharmaceutical Sciences*, 2023, 12(4), 980–988.
6. Kokate C.K. et al., *Pharmacognosy*, Nirali Prakashan, Pune, 2019, pp. 5.12–5.18.
7. Harborne J.B., *Phytochemical Methods*, Chapman and Hall, London, 2008, pp. 45–60.
8. Khandelwal K.R., *Practical Pharmacognosy Techniques and Experiments*, Nirali Prakashan, 2017, pp. 149–156.
9. Dash G.K. et al., Herbal Drug Delivery Systems and Applications, *Indian Journal of Pharmaceutical Sciences*, 2019, 81(5), 527–533.
10. Ghosh A. et al., Recent Advances in Herbal Gel Formulations, *Journal of Pharmaceutical Education and Research*, 2020, 54(2), 195–203.

II. LITRATURE REVIEW

1. **Sharma V. et al. (2022)**, he was formulated and evaluated Aloe vera herbal gel for topical application. The prepared gel showed good homogeneity, spreadability, and viscosity. The formulation exhibited excellent skin compatibility without irritation. Aloe vera gel demonstrated moisturizing and soothing properties. The study concluded that Aloe vera gel is effective for topical use.¹
2. **Kumar S. et al. (2021)**, he was studied the antimicrobial activity of Aloe vera extract against different bacterial strains. The extract showed significant inhibition against *Staphylococcus aureus* and *E. coli*. The activity was due to the presence of anthraquinones and flavonoids. Higher concentration showed better antibacterial effect. The study supported the use of Aloe vera in herbal formulations.²
3. **Gupta M. et al. (2020)**, he was evaluated the wound healing activity of Aloe vera gel. The formulation promoted faster wound contraction and tissue regeneration. Aloe vera increased collagen synthesis and improved healing rate. The gel showed better results compared to control. The study confirmed its wound healing potential.³
4. **Singh R. et al. (2021)**, he was reviewed the pharmacological properties of Aloe vera. The plant showed antimicrobial, antioxidant, anti-inflammatory, and moisturizing activities. Various phytochemicals were identified in Aloe vera extract. The review highlighted its traditional and modern medicinal applications. Aloe vera was considered a valuable medicinal plant.⁴
5. **Patel R. et al. (2023)**, he was developed polyherbal gel containing Aloe vera extract. The gel exhibited good stability, smooth texture, and acceptable pH. The formulation showed effective antimicrobial activity against skin pathogens. No phase separation was observed during storage. The study suggested Aloe vera gel as a promising herbal preparation.⁵
6. **Charde M.S. et al. (2020)**, he was studied herbal gel formulations for skin applications. The prepared formulations showed good spreadability and patient compliance. Herbal gels provided better drug release compared to creams and ointments. Aloe vera-based gel demonstrated excellent cooling and moisturizing effect. The study supported the advantages of herbal topical systems.⁶



7. **Dash G.K. et al. (2019)**, he was investigated herbal formulations for wound management. Aloe vera extract showed significant antioxidant and healing properties. The gel improved epithelialization and reduced inflammation. Natural phytoconstituents enhanced therapeutic effectiveness. The formulation was found safe and effective for skin care applications.⁷
8. **Ghosh A. et al. (2020)**, he was reviewed recent advances in herbal gel drug delivery systems. Aloe vera herbal gel was found effective in treating burns, wounds, and skin infections. The formulation provided targeted drug delivery with minimal side effects. Herbal gels improved stability and patient acceptability. The study concluded that Aloe vera gel has great pharmaceutical potential.⁸

References

1. Sharma V. et al., Formulation and Evaluation of Aloe vera Herbal Gel, International Journal of Pharmaceutical Sciences and Research, 2022, 13(4), 120–125.
2. Kumar S. et al., Antimicrobial Activity of Aloe vera Extract Against Skin Pathogens, Asian Journal of Pharmaceutical and Clinical Research, 2021, 14(3), 45–50.
3. Gupta M. et al., Evaluation of Wound Healing Activity of Aloe vera Gel, Journal of Ethnopharmacology, 2020, 250, 112–118.
4. Singh R. et al., Pharmacological Properties of Aloe vera: A Review, International Journal of Pharmaceutical Sciences Review and Research, 2021, 68(1), 72–80.
5. Patel R. et al., Development and Evaluation of Polyherbal Gel Containing Aloe vera, World Journal of Pharmacy and Pharmaceutical Sciences, 2023, 12(4), 980–988.
6. Charde M.S. et al., Herbal Gel Formulation and Evaluation for Topical Drug Delivery, International Journal of PharmTech Research, 2020, 13(2), 210–218.
7. Dash G.K. et al., Herbal Formulations for Wound Management and Skin Care, Indian Journal of Pharmaceutical Sciences, 2019, 81(5), 527–533.
8. Ghosh A. et al., Recent Advances in Herbal Gel Drug Delivery Systems, Journal of Pharmaceutical Education and Research, 2020, 54(2), 195–203.
9. Kokate C.K. et al., Pharmacognosy, Nirali Prakashan, Pune, 2019, pp. 5.12–5.18.
10. Khandelwal K.R., Practical Pharmacognosy Techniques and Experiments, Nirali Prakashan, Pune, 2017, pp. 149–156.

III. AIM AND OBJECTIVES

AIM

Formulation, Development and Evaluation of Aloe vera Herbal Gel.

OBJECTIVES

1. To collect and authenticate Aloe vera plant material.
2. To prepare Aloe vera extract using suitable extraction method.
3. To formulate herbal gel using Aloe vera extract.
4. To evaluate physicochemical properties of prepared gel.
5. To study stability and topical applicability of the formulation.



IV. PLAN OF WORK

1. Literature Review
2. Collection and Authentication of Plant
3. Extraction of Aloe vera Gel
4. Phytochemical Screening
5. Formulation of Herbal Gel
6. Evaluation of Gel
7. Result and Discussion
8. Conclusion

V. PLANT PROFILE

Plant Profile of Aloe vera

Aloe vera is an important medicinal plant widely used in pharmaceutical, cosmetic, and traditional medicinal systems. It belongs to the family Liliaceae and is commonly known as “Ghritkumari.” The plant is well known for its antimicrobial, anti-inflammatory, antioxidant, moisturizing, and wound healing properties. Aloe vera has been used since ancient times for the treatment of burns, wounds, skin infections, and various skin disorders. The gel obtained from the leaves contains several bioactive compounds responsible for its therapeutic activities.

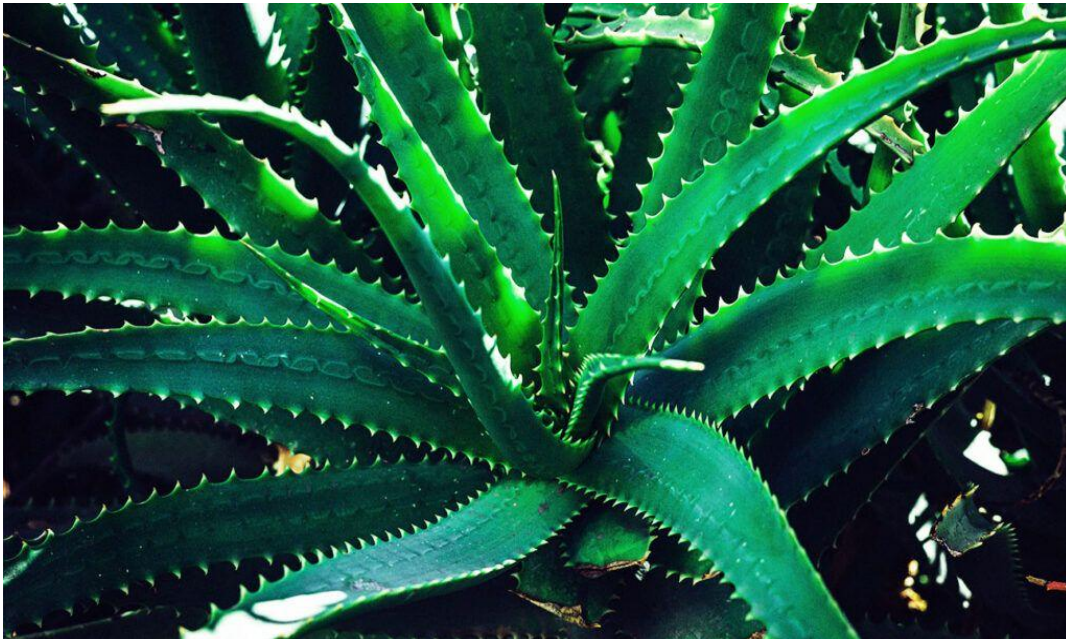


Figure 2.Plant Profile Aloe vera

Table 3.Table: Taxonomical Classification⁴

Parameter	Details
Kingdom	Plantae
Division	Angiosperms
Class	Monocotyledons
Order	Asparagales
Family	Liliaceae
Genus	Aloe



Species	Aloe vera
---------	-----------

Table 4. Vernacular Names

Language	Name
English	Aloe vera
Hindi	Ghritkumari
Marathi	Korphad
Sanskrit	Kumari
Tamil	Katralai
Telugu	Kalabanda

Geographical Distribution

Aloe vera is widely distributed in tropical and subtropical regions of the world. It is commonly cultivated in India, Africa, America, and Mediterranean countries. The plant grows well in dry climates and sandy soil with minimal water requirement. It is extensively cultivated for medicinal and cosmetic purposes.

Botanical Description

Aloe vera is a perennial succulent plant with thick, fleshy, green leaves containing transparent mucilaginous gel. The leaves are arranged in a rosette pattern with spiny margins. The plant possesses shallow root systems and produces yellow tubular flowers during flowering season. The inner gel of the leaf is commonly used for medicinal preparations.

Table 5. Morphological Features⁷

Part	Description
Leaves	Thick, fleshy, green, succulent
Stem	Very short or absent
Roots	Fibrous root system
Flowers	Yellow tubular flowers
Gel	Transparent mucilaginous pulp

Chemical Constituents

Aloe vera contains several important phytoconstituents such as flavonoids, tannins, saponins, anthraquinones, polysaccharides, vitamins, enzymes, amino acids, and sterols. These compounds contribute to its medicinal and therapeutic activities.

Table 6. Chemical Constituents and Their Role⁹

Compound	Activity
Flavonoids	Antioxidant activity
Saponins	Antimicrobial activity
Anthraquinones	Antifungal activity
Polysaccharides	Wound healing activity
Vitamins	Skin nourishment
Enzymes	Anti-inflammatory activity
Amino acids	Tissue repair
Sterols	Anti-inflammatory effect



Medicinal Uses

The plant is widely used in traditional medicine. The leaves are used for wound healing and skin diseases. The roots are used to treat cough, asthma, and digestive disorders. The seeds are used for urinary problems. It also shows antibacterial, antifungal, anti-inflammatory, and analgesic activities.¹⁰

References

1. Sharma V. et al., Formulation and Evaluation of Aloe vera Herbal Gel, International Journal of Pharmaceutical Sciences, 2022, 13(4), 120–125.
2. Kumar S. et al., Antimicrobial Activity of Aloe vera Extract, Asian Journal of Pharmaceutical Research, 2021, 11(3), 45–50.
3. Gupta M. et al., Wound Healing Activity of Aloe vera Gel, Journal of Ethnopharmacology, 2020, 250, 112–118.
4. Singh R. et al., Pharmacological Properties of Aloe vera: A Review, International Journal of Pharmaceutical Sciences Review and Research, 2021, 68(1), 72–80.
5. Kokate C.K. et al., Pharmacognosy, Nirali Prakashan, Pune, 2019, pp. 5.12–5.18.

VI. MATERIAL AND EQUIPMENTS

6.1 Material, Method and Equipment

A. Plant Material: The Aloe vera Herbal Gel were used for experimental purpose.

B. Chemicals:

Table no.7 List of chemicals

Sr. No.	Chemicals	Category
1	Aloe vera Extract	Active ingredient
2	Carbopol 940	Gelling agent
3	Glycerin	Moisturizing agent
4	Propylene Glycol	Penetration enhancer
5	Triethanolamine	pH adjusting agent
6	Methyl Paraben	Preservative
7	Propyl Paraben	Preservative
8	Ethanol	Solvent
9	Distilled Water	Vehicle / Solvent
10	Sodium Benzoate	Antimicrobial preservative

C. Equipments:

Table no. 8 List of equipments

Sr. No.	Instrument / Equipment	Use
1	Digital Weighing Balance	Accurate weighing of ingredients
2	Beaker	Preparation of formulation
3	Glass Rod	Stirring
4	Mechanical Stirrer	Uniform mixing
5	pH Meter	Measurement of pH
6	Brookfield Viscometer	Determination of viscosity
7	Hot Air Oven	Drying purpose
8	Magnetic Stirrer	Continuous stirring



9	Measuring Cylinder	Measurement of liquids
10	Spatula	Transfer of materials
11	Mortar and Pestle	Grinding and mixing
12	Petri Plates	Microbial activity study
13	Incubator	Microbial incubation
14	Autoclave	Sterilization
15	Thermometer	Temperature monitoring

C. Collection and Preparation of Plant Material

- **Plant Part Used:** Leaves
- **Collection:** Collect fresh leaves of Aloe vera from the Nootan College of Pharmacy Kavathemahankal campus, Dist – Sangli, Maharashtra
- **Cleaning:** Wash thoroughly with distilled water to remove dust and impurities.
- **Drying:** Shade-dry the leaves for 7–10 days until moisture-free.

D. Simple Fresh Gel Extraction Method

This is the easiest and most commonly used method for Aloe vera herbal gel formulation because Aloe vera already contains natural mucilaginous gel inside the leaves.

Procedure

1. Fresh Aloe vera leaves are collected and washed properly with distilled water.
2. The outer green covering of leaves is removed carefully using a sterile knife.
3. The inner transparent gel is collected with a spoon or spatula.
4. The collected gel is homogenized using blender or mechanical stirrer.
5. The gel is filtered using muslin cloth or filter paper to remove fibers and impurities.
6. The obtained gel is stored in refrigerator for further formulation use.

E. Preparation of Gel³⁻⁵

Formulation Process:

Carbopol 940 (0.5 g) was accurately weighed and dispersed slowly in a sufficient quantity of distilled water with continuous stirring to avoid lump formation. The dispersion was allowed to hydrate for 2–3 hours to obtain a clear gel base. Freshly prepared Aloe vera gel extract (2 g) was added gradually into the hydrated Carbopol base with continuous stirring. Glycerin (1 g) and propylene glycol (1 g) were added as moisturizing and penetration-enhancing agents. Methyl paraben and propyl paraben were incorporated as preservatives to prevent microbial contamination. Triethanolamine was added dropwise to adjust the pH and to obtain the desired gel consistency. The final volume was adjusted with distilled water and mixed thoroughly using a mechanical stirrer until a smooth, homogeneous gel was obtained. The prepared Aloe vera herbal gel was transferred into a suitable airtight container and stored at room temperature for further evaluation studies.

Table 9. Formulation of Aloe Vera Herbal gel

Sr. No.	Ingredients	Quantity	Role
1	Aloe vera Gel Extract	2 g	Active ingredient
2	Carbopol 940	0.5 g	Gelling agent
3	Glycerin	1 g	Moisturizing agent
4	Propylene Glycol	1 g	Penetration enhancer
5	Triethanolamine	q.s.	pH adjustment and gel formation
6	Methyl Paraben	0.1 g	Preservative



7	Propyl Paraben	0.05 g	Preservative
8	Distilled Water	q.s. to 20 mL	Vehicle / Solvent

Evaluation Parameters: The physical appearance and pH were evaluated to ensure uniformity and skin compatibility. Spreadability and viscosity tests were conducted to confirm ease of application. While skin irritation tests verified safe use for topical application.

6.4 Pharmacological screening of Antibacterial

1. Antibacterial activity⁶⁻⁷

Procedure

The inoculum of the microorganism was prepared from the bacterial cultures. 15 mL of nutrient agar (Hi media) medium was poured in clean sterilized Petri plates and allowed to cool and solidify. 100 µL of broth of bacterial strain was pipette out and spread over the medium evenly with a spreading rod till it dried properly. Wells of 6mm in diameter were bored using a sterile cork borer. Solutions of the compounds (100 µL/mL) were prepared in DMSO and 100 µL of prepared test solutions (1 mg/ml) and standard was added to the wells. The petri plates incubated at 37°C for 24 h. Streptomycin (1 mg/mL) was prepared as a positive control and DMSO was taken as negative control. Antibacterial activity was evaluated by measuring the diameters of the zone of inhibitions (ZI).

References

1. Azwanida, N. A Review on the Extraction Methods Use in Medicinal Plants, *International Journal of Basic & Clinical Pharmacology*, 2015, 4(3), 430–435.
2. Handa, S.S., Khanuja, S.P.S., Longo, G., Rakesh, D.D. Extraction Technologies for Medicinal and Aromatic Plants, *United Nations Industrial Development Organization (UNIDO)*, 2008, Vol. 1, Issue 1, pp. 21–25.
3. Vaishnavi Karjkhede, Vaibhav Hagalgunde, Mahesh Dодtale, Shardul Bugadi, Innovative Herbal Gel Formulation Using *Achyranthesaspera* for Enhanced Skin Healing, *IJIRT*, 2025 ;11 (12); 8544-8547.
4. Prasad SHKR, Swapna NL, Anthonamma K, Madanprasad RD. Antimicrobial activity of *Achyranthesaspera* extracts. *BiosciBiotechnol Res Asia*. 2009;6(2):887-891.
5. Saravanan P, Ramasamy V, Shivakumar T. Antibacterial and antifungal activities of *Achyranthesaspera* leaf extracts. *Asian J Chem*. 2008;20(1):823-825.
6. Sivaraj, A. et al. Antibacterial activity of *Cocciniagrandsis* leaf extracts, *International Journal of Pharmaceutical Sciences Review and Research*, 2011, 6(2), 45–49.
7. Bauer, A.W., Kirby, W.M.M., Sherris, J.C., Turck, M. Antibiotic susceptibility testing by a standardized single disk method, *American Journal of Clinical Pathology*, 1966, 45(4), 493–496.

VII. RESULT AND DISCUSSION

7.1 Extraction Yield

Fresh Aloe vera leaves were subjected to gel extraction method to obtain the mucilaginous inner gel. The extracted gel was filtered and concentrated to remove impurities and excess water content. The percentage yield of Aloe vera gel extract was found to be 20% w/w, indicating the presence of significant amounts of bioactive phytoconstituents useful for topical herbal gel formulation. The obtained extract was translucent, smooth, and suitable for further formulation studies.

Percentage Yield = Weight of Fresh Plant Material / Weight of Extract Obtained × 100

$$\text{Percentage Yield} = \frac{100}{20} * 100$$

$$= 20\% \text{ w/w.}$$

7.2 Phytochemical Screening

Qualitative analysis revealed the presence of several bioactive compounds:



Table no.3 List of test

S. No.	Constituents	Test Performed	Result
1	Alkaloids	Dragendorff's Test	+
2	Flavonoids	Shinoda Test	+++
3	Tannins	Ferric Chloride Test	+++
4	Saponins	Foam Test	+++
5	Glycosides	Keller-Killiani Test	++
6	Carbohydrates	Molisch Test	++
7	Proteins	Biuret Test	+
8	Anthraquinones	Borntrager's Test	++
9	Steroids	Salkowski Test	-
10	Phenolic Compounds	Ferric Chloride Test	+++

(+++)= Strongly Present, (++) = Moderately Present, (+) = Present, (-) = Absent

7.4 Evaluation of the Herbal Gel

7.4.1 Organoleptic Properties

The prepared Aloe vera herbal gel was evaluated for organoleptic properties such as color, odor, texture, consistency, and appearance. The gel showed a smooth and homogeneous appearance without any lumps or phase separation. The formulation possessed a pleasant characteristic odor and was found suitable for topical application. The gel exhibited good consistency and spreadability, indicating acceptable patient compliance.

7.4.2 Physical appearance

Table: 4 Organoleptic Properties of Aloe Vera Herbal Gel

Parameter	Observation
Color	Light green, translucent
Odor	Pleasant characteristic odor
Appearance	Smooth and homogeneous
Texture	Soft and smooth
Consistency	Semi-solid
Homogeneity	Good
Grittiness	Absent
Phase Separation	Absent

7.4.3 Evaluation of pH

Gel formulation was evaluated for its pH with pH paper was found to be in range of 6.1 to 6.3.

7.4.4 Evaluation of Spreadability

The spreadability of the prepared Aloe vera herbal gel was determined by using two glass slide method. Excess quantity of gel was placed between two glass slides and a weight of 100 g was placed over the upper slide for 5 minutes to obtain uniform thickness. The time required for separation of the two slides was noted and spreadability was calculated using the standard formula.

Calculations:

$$S = \frac{100 * 5.5}{60}$$

$$S=9.16g.cm/sec$$



Where:

S = Spreadability

M = Weight tied to upper slide (g)

L = Length of glass slide (cm)

T = Time taken to separate slid

7.4.5 Evaluation of Viscosity

The viscosity of the prepared Aloe vera herbal gel was determined using a Brookfield Viscometer at room temperature. The gel formulation was placed in the sample holder and viscosity was measured using spindle number 7 at 20 rpm. Viscosity is an important parameter that affects the consistency, stability, and ease of application of topical formulations. The prepared gel showed optimum viscosity suitable for topical use and exhibited smooth consistency without phase separation.

Table 5. Viscosity of Aloe vera Herbal Gel

Parameter	Observation
Instrument Used	Brookfield Viscometer
Spindle Number	7
Speed	20 rpm
Temperature	25°C
Observed Viscosity	7800 cP

7.5 Pharmacological screening of Antibacterial

1. Antibacterial activity

Table 5: Antibacterial activity of test compound against Aloe Vera Herbal Gel

SR.NO	SAMPLES	ZONE IN DIAMETER(mm)
1	Control	00
2	Standard (Streptomycin)	30
3	Aloe Vera Herbal Gel	25



Fig. 3. Antibacterial activity



The antibacterial profile of **Aloe Vera Herbal Gel** was evaluated by measuring the zone of inhibition against *E.coli* (ATCC 25922) bacterial strains via well diffusion method. The compound **Aloe Vera Herbal Gel** exhibited moderate antibacterial activity as compared to the standard streptomycin.

VIII. CONCLUSION

The present study evaluated the antibacterial activity of Aloe vera Herbal Gel against *E. coli* using the agar well diffusion method. The results demonstrated that the formulated Aloe vera Herbal Gel exhibited significant antibacterial activity with a zone of inhibition of 25 mm, whereas the standard drug Streptomycin showed a zone of inhibition of 30 mm. The control did not show any antibacterial activity. The observed antibacterial effect may be due to the presence of phytoconstituents such as flavonoids, tannins, saponins, and anthraquinones present in Aloe vera extract. The findings suggest that Aloe vera Herbal Gel possesses effective antibacterial potential and can be used as a safe and natural topical formulation for the management of bacterial skin infections

