

**PHARMACOLOGICAL EVALUATION OF THE WOUND-HEALING EFFICACY OF A
POLYHERBAL EXTRACT DERIVED FROM CHAMAEDOREA SEIFRIZII AND
GIGANTOCHLOA ATROVIOLACEA IN EXPERIMENTAL RATS****Gulshan Kumar Mishra^{*1}, Rahul Dubey², Dr. Bala Subramanian³**¹Student – Millennium College of Pharmacy and Science, Bhopal.²Associate Professor - Millennium College of Pharmacy and Science, Bhopal.³Dean - Millennium College of Pharmacy and Science, Bhopal.***Corresponding Author: Gulshan Kumar Mishra**

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ABSTRACT

The present study was undertaken to evaluate the wound-healing efficacy of a polyherbal extract derived from *Chamaedorea seifrizii* and *Gigantochloa atroviolacea* using an experimental wound model in rats. Methanolic extracts of both plants were prepared and evaluated for percentage yield and preliminary phytochemical composition. The extract yields were 10.34% for *C. seifrizii* and 12.98% for *G. atroviolacea*. Phytochemical screening revealed the presence of several bioactive constituents, including phenolics, flavonoids, alkaloids, tannins, and glycosides. The total phenolic and flavonoid contents were higher in *G. atroviolacea* (51.85 mg/g GAE and 64.15 mg/g RE) than in *C. seifrizii* (26.35 mg/g GAE and 28.65 mg/g RE). Three herbal gel formulations were prepared and evaluated for physicochemical properties, skin irritation, antibacterial activity, and wound-healing activity. All formulations showed acceptable pH, viscosity, spreadability, homogeneity, and skin compatibility. Against *Staphylococcus aureus*, Formulation III containing both extracts in a 1: 1 ratio exhibited the highest zone of inhibition (13.8 mm), compared with Formulation I (7.4 mm) and Formulation II (10.6 mm). In the excision wound model, Formulation III produced 86.90% wound closure on day 21, while the reference standard Gentamicin gel showed 92.45%. The enhanced activity of the polyherbal formulation may be associated with the combined effects of phenolic compounds, flavonoids, alkaloids, and glycosides. The findings suggest that the developed polyherbal gel possesses promising antimicrobial and wound-healing potential and may be further investigated as a topical herbal formulation.

KEYWORDS: *Chamaedorea seifrizii*, *Gigantochloa atroviolacea*, Polyherbal gel, Wound healing, Excision wound model, Antibacterial activity, Flavonoids, Phenolic compounds.**1. INTRODUCTION**

Wound healing is a process of reconstruction of injured skin, coordinated by interaction of various epithelial and mesenchymal cells with cytokines, chemokines and growth factors. Keratinocyte growth factor (KGF) is a paracrine growth factor synthesized by fibroblasts, endothelial cells, smooth muscle cells and dendritic epidermal T-cell (Rodrigues *et al.*, 2018). Natural plant products play major role in proliferation of fibroblasts and keratinocytes. Plant products were reported to contain growth factors, cell signaling molecules and cell adhesion molecules. In our previous studies aqueous extract of *Vitex negundo* L. (VN), *Emblica officinalis*

Gaertn (EO) and *Tridax procumbens* L. (TP) showed rapid regeneration of skin along with collagen turnover (Vitale *et al.*, 2022).

Medicinal plants have emerged as promising alternatives or adjuncts to conventional diabetic wound therapies due to their multifaceted pharmacological activities. Among these, *Curcuma longa* (turmeric) and *Azadirachta indica* (neem) have gained considerable scientific attention because of their anti-inflammatory, antioxidant, antimicrobial, and wound-healing properties (Călina *et al.*, 2025). Curcumin, the principal bioactive constituent of *Curcuma longa*, has been reported to accelerate

diabetic wound repair by enhancing fibroblast proliferation, stimulating angiogenesis, suppressing oxidative stress, and regulating the miR-152-3p/FBN1/TGF- β signaling pathway. Furthermore, curcumin modulates inflammatory mediators through inhibition of NF- κ B activation and promotes collagen deposition and tissue remodeling (Yen *et al.*, 2018).

The concept of polyherbal therapy is based on the use of two or more medicinal plants to obtain complementary biological effects. Combining plant extracts with different phytochemical profiles may provide additive or synergistic effects and may target multiple stages of the wound-healing process simultaneously (Shen *et al.*, 2025). In a wound, antioxidant protection, reduction of excessive inflammation, antimicrobial activity, fibroblast proliferation, collagen deposition, and epithelialization are interconnected processes. A combination of medicinal plants possessing different or overlapping activities may therefore be useful for addressing several of these processes together. However, the efficacy and safety of such combinations need to be established experimentally through systematic pharmacological evaluation (Mukherjee *et al.*, 2021).

Chamaedorea seifrizii, commonly known as the bamboo palm, is an ornamental palm belonging to the family Arecaceae. Like other medicinally investigated plants, its phytochemical composition provides a basis for exploring potential biological activities of its extracts. Plant-derived phenolic and flavonoid constituents are of particular interest because of their reported antioxidant and antimicrobial properties, which can be relevant to wound management. In the context of wound management, the potential biological activities of *C. seifrizii* may be relevant because successful wound repair requires coordinated control of inflammation, oxidative stress, microbial contamination, tissue proliferation, and remodelling (Wang *et al.*, 2025). A plant extract containing multiple bioactive constituents may act through more than one of these mechanisms. Phenolic compounds and flavonoids may contribute to antioxidant protection and modulation of inflammatory responses, whereas other phytoconstituents may contribute to antimicrobial and tissue-repair effects. However, the pharmacological activity of a plant extract depends on its phytochemical composition, extraction conditions, concentration, and formulation characteristics (Schilrreff and Alexiev, 2022).

Gigantochloa atrovioleacea is a bamboo species belonging to the family Poaceae. Bamboo species are recognized as sources of various secondary metabolites, including phenolic compounds and flavonoids, which have attracted attention because of their antioxidant and other biological properties. The phytochemical composition of *G. atrovioleacea* provides a rationale for investigating its extract in relation to wound healing and antimicrobial activity (Khairi *et al.*, 2020). In the present study, the methanolic extract of *G. atrovioleacea* was

evaluated individually and in combination with *C. seifrizii* to determine whether the combined extracts could provide enhanced biological activity. The antimicrobial potential of *G. atrovioleacea* is another important aspect of its pharmacological investigation. Microbial contamination of wounds can prolong the inflammatory phase, increase tissue damage, and delay wound contraction and epithelialization. Plant-derived phenolics, flavonoids, tannins, and other secondary metabolites have been investigated for their ability to inhibit the growth of pathogenic microorganisms. Consequently, an extract possessing both antimicrobial and antioxidant properties may be particularly valuable for topical wound management, where protection of the wound from microbial contamination is closely associated with successful tissue regeneration (Calvo-Gomez *et al.*, 2025).

The wound-healing efficacy of the formulations was evaluated using an excision wound model in experimental rats. Excision wound models are commonly used to assess topical wound-healing activity by monitoring changes in wound size over time. Percentage wound contraction provides an indication of the rate of reduction in wound area, while epithelialization reflects the restoration of the epithelial covering over the injured tissue. Comparison of treated groups with an untreated or vehicle control and a standard reference treatment allows the relative wound-healing response of the test formulations to be determined (Yang *et al.*, 2022).

Thus, the present study was designed to pharmacologically evaluate the wound-healing efficacy of a polyherbal extract derived from *Chamaedorea seifrizii* and *Gigantochloa atrovioleacea* in experimental rats.

2. METHODS AND MATERIALS

2.1 Chemical

Methanol, Carboxymethyl Cellulose (CMC), Propylene Glycol, Nutrient broth, Methyl Paraben, Triethanolamine and Formalin (10%) was procured from Merk. Carbopol-940 was received from Himedia. Tween-80 was acquired from Sigma-Aldrich.

2.2 Extraction of Plant Material by Soxhlation Process

The authenticated whole plants of *Chamaedorea seifrizii* and *Gigantochloa atrovioleacea* were shade-dried and pulverized into coarse powder using a mechanical grinder. Approximately 300–340 g of the powdered plant material was accurately weighed, packed into a cellulose extraction thimble, and placed in the main chamber of a Soxhlet apparatus. Methanol was selected as the extraction solvent and the required quantity was added to the round-bottom flask. Extraction was carried out at a controlled temperature of 60–80°C for 8–12 hours, allowing continuous reflux and siphoning until the solvent became nearly colorless. The obtained methanolic extract was filtered and concentrated under

reduced pressure using a rotary vacuum evaporator. The concentrated extract was then further dried in a desiccator to constant weight for complete removal of residual solvent (Lakshmanan, *et al.*, 2022).

The dried extract was weighed, and the percentage yield was calculated using the following formula.

$$\% \text{ Yield} = \frac{\text{Weight of extract}}{\text{Weight of Plant Material used}} \times 100$$

2.3 Quantitative Estimation of Phytoconstituents

2.3.1 Total phenols content

The total phenolic content (TPC) of *Chamaedorea seifrizii* and *Gigantochloa atrovioleacea* extracts was determined using the Folin–Ciocalteu reagent method, with Gallic acid (GA) as the reference standard. For the assay, 0.2 mL of the plant extract solution was mixed with 5 mL of tenfold-diluted Folin–Ciocalteu reagent and shaken for 4 minutes. Then, 4 mL of 7.5% (w/v) sodium carbonate solution was added, and the final volume was adjusted to 25 mL with deionized distilled water. The reaction mixture was incubated at room temperature for 90 minutes, and absorbance was measured at 760 nm using a UV–Visible spectrophotometer. A calibration curve was prepared using Gallic acid concentrations of 20, 40, 60, 80, and 100 µg/mL. The TPC was expressed as milligrams of Gallic acid equivalents (mg GAE) per gram of dry plant material (Osman *et al.*, 2020).

2.3.2 Total flavonoid content

The total flavonoid content (TFC) of *Chamaedorea seifrizii* and *Gigantochloa atrovioleacea* extracts was determined using a colorimetric method, with rutin as the

reference standard. For the assay, 0.3 mL of the extract solution prepared in 45% methanol was transferred into a test tube, followed by the addition of 8 mL of 10% aluminum chloride (AlCl₃) and 4 mL of 0.2 M sodium acetate solution. The mixture was immediately diluted to 25 mL with deionized distilled water and allowed to stand at room temperature for 30 minutes. The absorbance was measured at 510 nm using a UV–Visible spectrophotometer. A calibration curve was prepared using rutin concentrations of 20, 40, 60, 80, and 100 µg/mL. The total flavonoid content was calculated from the calibration curve and expressed as milligrams of rutin equivalents (mg RE) per gram of dry extract (Saeed *et al.*, 2012).

2.4 Preparation of herbal formulation

Herbal gels containing *Chamaedorea seifrizii* and *Gigantochloa atrovioleacea* extracts were prepared using Carbopol 940 and carboxymethyl cellulose as gelling agents. Carbopol was dispersed in 50 mL of warm water and allowed to swell for 2 hours, while carboxymethyl cellulose and methyl paraben were dissolved in 100 mL of warm water. Both solutions were mixed with continuous stirring at 600 rpm, followed by dropwise addition of triethanolamine for neutralization and gel formation. The respective plant extracts were incorporated with continuous stirring, and propylene glycol was added as a permeation enhancer. Three formulations were prepared: F1 containing 2% *C. seifrizii*, F2 containing 2% *G. atrovioleacea*, and F3 containing 1% of each extract. The formulations were stirred until smooth, homogeneous gels suitable for topical application were obtained (Mochahary *et al.*, 2022).

Table 1: Composition of prepared herbal gel.

Name of Ingredient	Formulation I <i>Chamaedorea seifrizii</i> extract	Formulation II <i>Gigantochloa atrovioleacea</i> extract	Formulation III Poly herbal
Carbopol	1.0 gm	1.0 gm	1.0 gm
Carboxymethyl cellulose	1 gm	1 gm	1 gm
Propylene glycol	0.6 ml	0.6 ml	0.6 ml
Methyl paraben	0.2 ml	0.2 ml	0.2 ml
<i>Chamaedorea seifrizii</i> extract	2%	---	1%
<i>Gigantochloa atrovioleacea</i> extract	---	2%	1%
Triethanolamine	q.s	q.s	q.s
Water	100 ml	100 ml	100 ml

2.5 Quality control parameters of formulation

Quality control of the formulation at different concentrations was carried out to evaluate the pH, spreadability, and extrudability. Acute dermal toxicity for individual methanol extract of *Chamaedorea seifrizii* and *Gigantochloa atrovioleacea* plants was carried out (Baragi *et al.*, 2011).

2.5.1 pH

Using a digital pH meter, the formulations' pH was measured. After dissolving one gram of herbal gel in 100

milliliters of distilled water, it was left for two hours. Three separate measurements of the formulation's pH were made (Jamadar and Shaikh, 2017).

2.5.2 Spreadability

The herbal gel was placed between two slides and subjected to a specific load. The spreadability was then measured by recording the time, in seconds; it took for the two slides to slide apart from the gel (Sultana *et al.*, 2016).

2.5.3 Viscosity

The Brookfield viscometer was used to measure the viscosity of the manufactured herbage. At 100 rpm, the reading was obtained.

2.5.4 Skin irritation studies

Skin irritation studies were conducted using healthy Wistar rats weighing 200–300 g. The dorsal skin was shaved three days before treatment, and the animals were divided into test and control groups. The test groups received the prepared herbal gel formulations containing *Chamaedorea seifrizii* and *Gigantochloa atrovioleacea* extracts, while the control group received plain gel base. The formulations were applied topically once daily for 7 consecutive days, and the treated areas were observed for erythema, edema, itching, inflammation, or other adverse reactions. The absence of significant irritation indicated good skin compatibility and tolerability of the herbal gel formulations (Khan *et al.*, 2022).

2.6 Pharmacological Study

➤ Animals Protocol

IAEC Approval: All animal experiments were approved by Institutional Animal Ethics Committee (IAEC).

➤ Animal used

Weight -255±70 gm

Strain -Wistar rat

Sex—Male

➤ Housing Condition

The study was conducted using male Wistar albino rats aged 2–3 months, with body weights ranging from 255±70 g. Prior to the experiment, the animals were maintained under standard laboratory conditions, including a 12-hour light–dark cycle, with free access to standard rodent chow and water. The animals were acclimatized to the laboratory environment for several days before the start of the study to minimize stress and ensure stable physiological conditions.

2.7 In-vitro Antimicrobial Activity (Basch *et al.*, 2019)

➤ Well Diffusion Assay

2.7.1 Preparation of Dilutions of the Samples

For Formulation I (2% w/w *Chamaedorea seifrizii* extract), Formulation II (2% w/w *Gigantochloa atrovioleacea* extract), and Formulation III (Polyherbal formulation in 1: 1 ratio), stock solutions of the prepared formulations were accurately prepared and subsequently subjected to serial dilution to obtain concentrations of 100 µg/mL, 150 µg/mL, 200 µg/mL, and 250 µg/mL. For each desired concentration, an appropriate volume of the stock solution was measured accurately and diluted to a final volume of 1 mL using distilled water. The solutions were mixed thoroughly after each dilution to ensure uniform distribution of the extract and to obtain homogeneous sample solutions for subsequent antimicrobial and analytical evaluations (Taofiq *et al.*, 2016).

2.7.2 Preparation of Nutrient Agar Media

A total of 28 g of nutrient media was accurately weighed and dissolved in 1 liter of distilled water with thorough mixing to ensure complete solubilization. The pH of the medium was measured prior to sterilization to confirm it was within the desired range. The medium was then sterilized in an autoclave at 121°C under 15 psi pressures for 15 minutes to eliminate any microbial contaminants. After sterilization, the nutrient agar was poured into sterile Petri plates under aseptic conditions in a laminar air flow cabinet and allowed to solidify at room temperature, forming a uniform surface suitable for subsequent microbial inoculation.

2.7.3 Well Diffusion Assay

The antibacterial activity of the herbal gel formulations was evaluated by the agar well diffusion method against *Staphylococcus aureus*. A standardized bacterial suspension (10⁸ CFU/mL) was spread uniformly onto sterile nutrient agar plates. Wells of 6 mm diameter were prepared in the agar, and 100 µL of formulations F1, F2, and F3 were added to the respective wells. The plates were allowed to stand for 30 minutes to facilitate diffusion and were then incubated at 37°C for 18–24 hours. After incubation, the zones of inhibition surrounding each well were measured in millimeters to determine the antibacterial activity of the formulations. This method provided a reliable assessment of the antimicrobial potential of the herbal gels against *S. aureus* (Jawaid *et al.*, 2023).

2.8 Pharmacological Evaluation

➤ In-vivo Wound Healing Activity (Excision Wound Model)

For the excision wound model, the dorsal region of each rat was carefully shaved using a depilatory cream to minimize skin trauma. The animals were anesthetized with ketamine hydrochloride (150 mg/kg body weight), and the wound site was marked on the shaved skin. A full-thickness circular excision wound was then created using surgical instruments, removing the epidermis and dermis. The wounds were kept exposed under clean and aseptic conditions. Treatment was started immediately from day 0, with 500 mg of simple gel base, extract-loaded herbal gel, or standard drug applied topically once daily until complete healing. Wound healing was assessed by measuring wound contraction and epithelialization time at regular intervals, and the results were compared among the control, extract-treated, and standard groups (Murthy *et al.*, 2013).

➤ Experimental design

- **Group I:** Rats treated with gel base only (Control Group).
- **Group II:** Rats treated with Formulation I containing 2% w/w *Chamaedorea seifrizii* extract.
- **Group III:** Rats treated with Formulation II containing 2% w/w *Gigantochloa atrovioleacea* extract.

- **Group IV:** Rats treated with Formulation III, a polyherbal gel formulation containing *Chamaedorea seifrizii* and *Gigantochloa atrovioleacea* extracts in a 1: 1 ratio.
- **Group V:** Rats treated with 1% Gentamicin gel (Standard Group).

The progress of wound healing was monitored by measuring the percentage of wound closure at intervals of 4, 8, 12, 16, and 21 days. This design allows comparison between untreated wounds, standard treatment, and different concentrations of the plant extract gel to evaluate dose-dependent wound healing effects.

3. RESULTS AND DISCUSSION

3.1 Procurement of plant material.

Table 2: Percentage Yield of plant material.

Plant name	Solvent	Theoretical weight	Yield(gm)	% yield
<i>Chamaedorea seifrizii</i>	Methanol	300	31.04	10.34
<i>Gigantochloa atrovioleacea</i>	Methanol	340	44.16	12.98

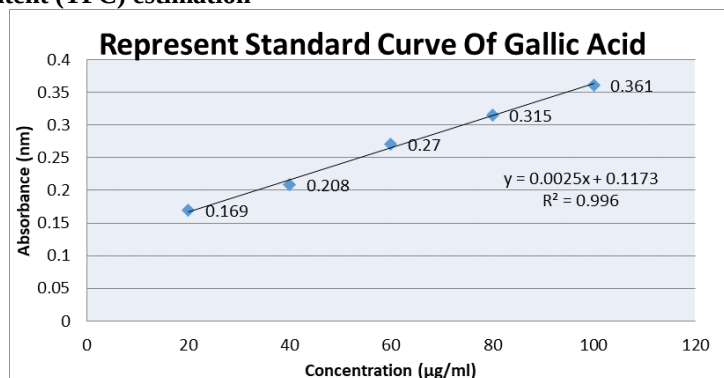
3.2 Phytochemical Test

Table 3: Phytochemical analysis of extracts of *Chamaedorea seifrizii* and *Gigantochloa atrovioleacea*.

Experiment	Presence or absence of phytochemical test Methanolic extract (<i>Chamaedorea seifrizii</i>)	Presence or absence of phytochemical test Methanolic extract (<i>Gigantochloa atrovioleacea</i>)
Carbohydrates		
Molish's test	Present (+ ve)	Present (+ ve)
Fehling's test	Present (+ ve)	Present (+ ve)
Benedict's test	Present (+ ve)	Present (+ ve)
Barfoed's test	Present (+ ve)	Present (+ ve)
Glycoside		
Borntrager test	Present (+ ve)	Present (+ ve)
Legal's test	Present (+ ve)	Present (+ ve)
Killer-Killiani test	Present (+ ve)	Present (+ ve)
Alkaloids		
Dragendroff's test	Present (+ ve)	Present (+ ve)
Mayer's reagent test	Present (+ ve)	Present (+ ve)
Wagner's reagent test	Present (+ ve)	Present (+ ve)
Hager's reagent test	Present (+ ve)	Present (+ ve)
Proteins and Amino Acids		
Biuret test	Absent (- ve)	Present (+ ve)
Ninhydrin test	Absent (- ve)	Present (+ ve)
Test for Triterpenoids and Steroids		
Salkowski's test	Absent (- ve)	Present (+ ve)
Libermann-Burchard's test	Absent (- ve)	Present (+ ve)
Tannin and Phenolic Compounds		
Ferric Chloride test	Present (+ ve)	Present (+ ve)
Saponin		
Foam test	Absent (- ve)	Present (+ ve)
Flavonoids		
Alkaline reagent test	Present (+ ve)	Present (+ ve)
Lead Acetate test	Present (+ ve)	Present (+ ve)

3.3 Quantitative Analysis

3.3.1 Total Phenolic content (TPC) estimation



Graph 1: Represent standard curve of Gallic acid.

3.3.1.1 Total Phenolic Content in extract

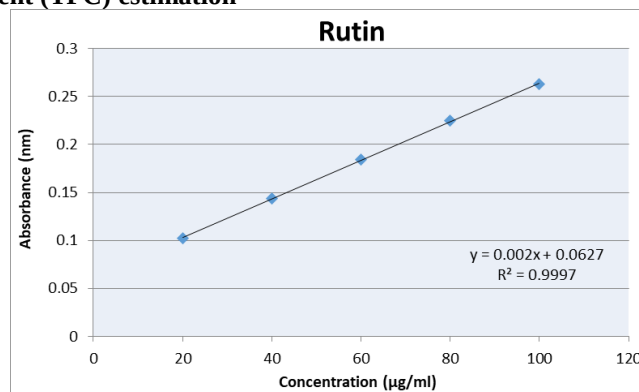
Table 4: Total Phenolic Content in *Chamaedorea seifrizii* extract.

Absorbance	TPC in mg/gm equivalent of Gallic Acid
0.160	26.35 mg/gm
0.170	
0.182	

Table 5: Total Phenolic Content in *Gigantochloa atrovioleacea* extract.

Absorbance	TPC in mg/gm equivalent of Gallic Acid
0.210	51.85 mg/gm
0.223	
0.231	

3.3.2 Total Flavonoids content (TFC) estimation



Graph 2: Represent standard curve of Rutin.

3.3.2.1 Total Flavonoid Content in extract

Table 6: Total Flavonoid Content in *Chamaedorea seifrizii* extract

Absorbance	TPC in mg/gm equivalent of Gallic Acid
0.110	28.65 mg/gm
0.120	
0.130	

Table 7: Total Flavonoid Content in *Gigantochloa atrovioleacea* extract.

Absorbance	TPC in mg/gm equivalent of Gallic Acid
0.180	64.15 mg/gm
0.192	
0.202	

3.4 Evaluation parameter of herbal gel formulation

3.4.1 Organoleptic properties

Table 8: Organoleptic properties.

Parameter	Observation
Appearance	Smooth, transparent to slightly translucent gel with good physical appearance
Colour	Greenish-brown colour due to incorporation of <i>Chamaedorea seifrizii</i> and <i>Gigantochloa atrovioleacea</i> extracts
Homogeneity	Uniform and homogeneous gel without lumps, aggregates, or phase separation

3.4.2 Measurement of pH, Viscosity, Spreadability test and skin irritancy.

Table 9: pH, Viscosity, Spreadability test and skin irritancy.

Formulation	pH	Viscosity (cps)	Spreadability (g·cm/sec)	Skin Irritancy
Formulation I (2% w/w <i>Chamaedorea seifrizii</i> extract gel)	5.72 ± 0.08	3360 ± 15	7.85 ± 0.12	No irritation
Formulation II (2% w/w <i>Gigantochloa atrovioleacea</i> extract gel)	6.28 ± 0.09	3545 ± 18	11.25 ± 0.15	No irritation
Formulation III (Polyherbal gel containing <i>Chamaedorea seifrizii</i> and <i>Gigantochloa atrovioleacea</i> extracts in 1: 1 ratio)	6.68 ± 0.12	4280 ± 22	13.75 ± 0.18	No irritation

3.5 In-vitro antimicrobial activity

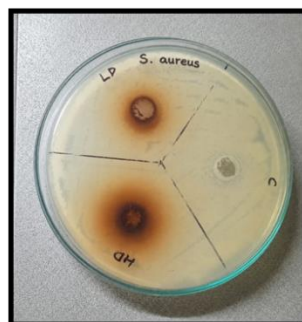
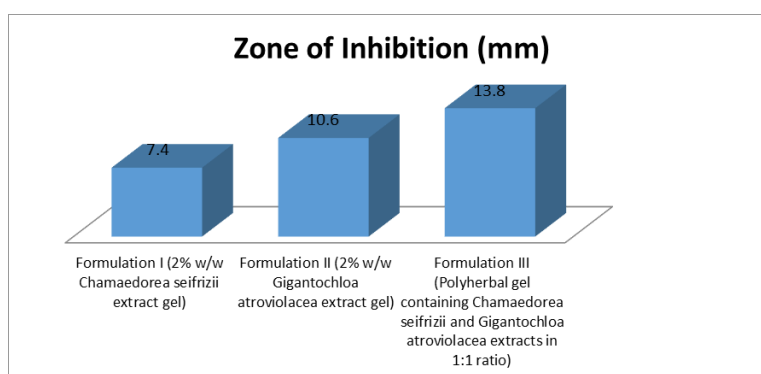


Figure 1: Antimicrobial Activity of Herbal Formulation.

Table 10: Zone of Inhibition of Antimicrobial Activity against *S. aureus*.

Sample Name	Zone of Inhibition (mm)
Formulation I (2% w/w <i>Chamaedorea seifrizii</i> extract gel)	7.4 mm
Formulation II (2% w/w <i>Gigantochloa atrovioleacea</i> extract gel)	10.6 mm
Formulation III (Polyherbal gel containing <i>Chamaedorea seifrizii</i> and <i>Gigantochloa atrovioleacea</i> extracts in 1: 1 ratio)	13.8 mm



Graph 3: Zone of Inhibition of Prepared Herbal Gel Formulations against *Staphylococcus aureus*.

3.6 Wound Healing

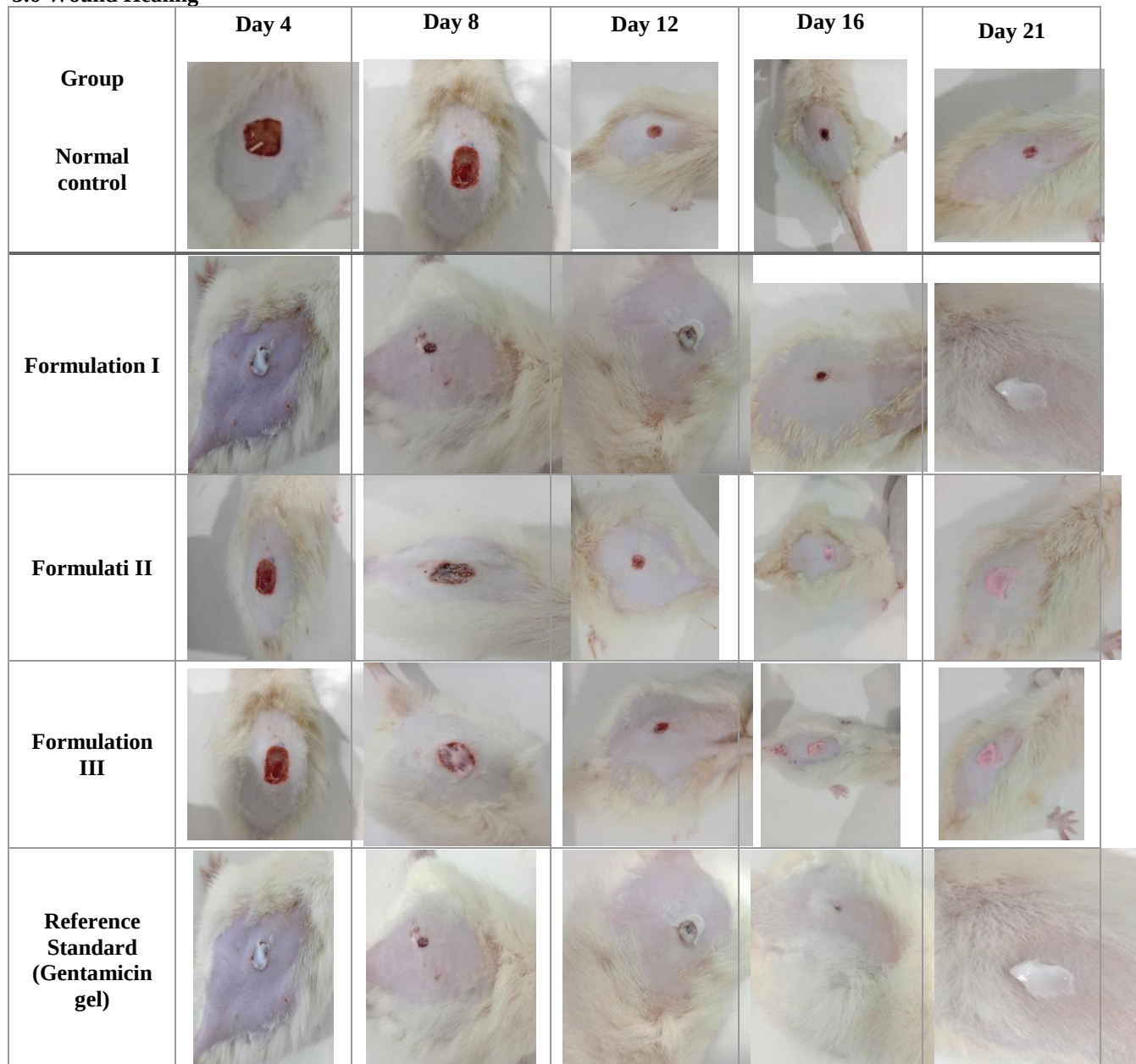
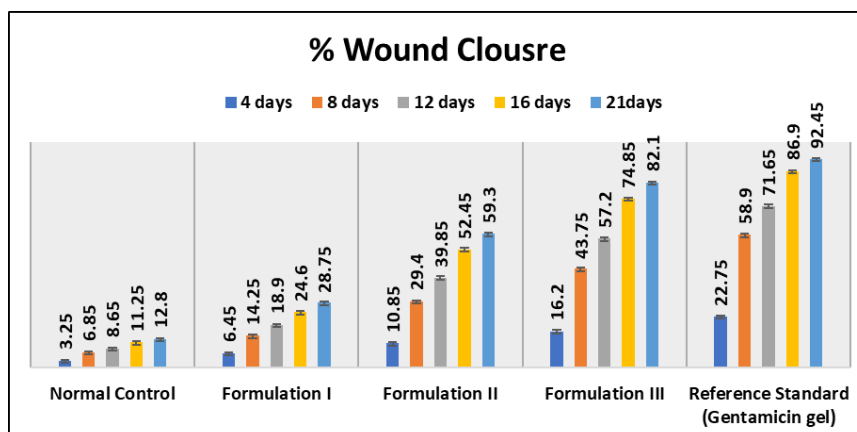


Figure 2: Excision Wound Healing from Polyherbal gel.

Table 11: Percentage wound closure in various treatment groups.

Formulation	Area of wound during different days of observation (%)				
	4 days	8 days	12 days	16 days	21days
Normal Control	3.25 ± 0.21	6.45 ± 0.28	10.85 ± 0.35	16.20 ± 0.42	22.75 ± 0.48
Formulation I	6.85 ± 0.36	14.25 ± 0.45	29.40 ± 0.52	43.75 ± 0.48	58.90 ± 0.44
Formulation II	8.65 ± 0.42	18.90 ± 0.56	39.85 ± 0.61	57.20 ± 0.55	71.65 ± 0.47
Formulation III	11.25 ± 0.51	24.60 ± 0.63	52.45 ± 0.58	74.85 ± 0.50	86.90 ± 0.41
Reference Standard (Gentamicin gel)	12.80 ± 0.55	28.75 ± 0.68	59.30 ± 0.62	82.10 ± 0.46	92.45 ± 0.39



Graph 4: Evaluation of wound healing activity.

DISCUSSION

The present study demonstrated the wound-healing potential of methanolic extracts of *Chamaedorea seifrizii* and *Gigantochloa atrovioleacea*. *G. atrovioleacea* showed a higher extractive yield, total phenolic content, and total flavonoid content than *C. seifrizii*, indicating a greater concentration of methanol-soluble phytoconstituents. Preliminary phytochemical screening confirmed the presence of several bioactive constituents that may contribute to the observed biological activities. The prepared herbal gels exhibited acceptable physicochemical characteristics, good spreadability, and no significant skin irritation, confirming their suitability for topical application. All formulations showed antibacterial activity against *S. aureus*, with the polyherbal Formulation III producing the highest zone of inhibition (13.8 mm). In the excision wound model, Formulation III achieved 86.90% wound closure on day 21, compared with 92.45% for Gentamicin gel, indicating marked wound-healing activity. The improved performance of the combined formulation may be related to the complementary or synergistic effects of phenolic compounds, flavonoids, alkaloids, and glycosides present in both extracts. Overall, the findings support the potential of the *C. seifrizii*–*G. atrovioleacea* polyherbal gel as a promising topical formulation for wound management.

4. CONCLUSION

The present study successfully demonstrated the wound-healing potential of a polyherbal gel formulation containing methanolic extracts of *Chamaedorea seifrizii* and *Gigantochloa atrovioleacea*. The extraction process yielded considerable amounts of bioactive extracts, with *Gigantochloa atrovioleacea* showing higher extract recovery compared to *Chamaedorea seifrizii*. Phytochemical investigations confirmed the presence of important therapeutic constituents such as flavonoids, phenolic compounds, alkaloids, glycosides, tannins, and other secondary metabolites responsible for biological activities.

The quantitative analysis revealed that *Gigantochloa atrovioleacea* possessed higher phenolic and flavonoid

contents, which may contribute to its stronger antioxidant and antimicrobial properties. The prepared herbal gel formulations exhibited acceptable physicochemical characteristics, including suitable pH, viscosity, spreadability, homogeneity, and absence of skin irritation, confirming their suitability for topical application.

Among all formulations, the polyherbal gel (Formulation III) showed superior antimicrobial activity against *Staphylococcus aureus* and demonstrated significant wound contraction in experimental rats. The enhanced wound-healing effect of the polyherbal formulation may be due to the synergistic interaction of phytoconstituents from both plant extracts, which promote antimicrobial action, antioxidant defense, and tissue repair mechanisms.

The findings of the study indicate that the combination of *Chamaedorea seifrizii* and *Gigantochloa atrovioleacea* extracts in a polyherbal gel formulation possesses promising wound-healing potential and may serve as an effective herbal alternative for topical wound management. Further studies involving advanced pharmacological evaluation and clinical investigations are recommended to establish its therapeutic application.

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