International Journal of Phytopharmacy
ISSN: 2277-2928 (Online)
Journal DOI: https://doi.org/10.7439/ijpp

Research Article

Development and Evaluation of a Poly-Herbal Gel Containing *Tephrosia purpurea* and *Martynia annua* for Anti-Hemorrhoidal Activity

Anoop Singh, Nikita Jain and OP Agrawal*

Bhabha University, Jatkhedi, NH 12, Narmadapuram Rd, Jatkhedi, Bhopal, Madhya Pradesh 462047, India

Abstract

Hemorrhoidal disease is a common anorectal disorder characterized by inflammation, venous congestion, bleeding, pain, itching, and prolapse of anal tissues. Conventional therapies including corticosteroids, local anesthetics, venotonics, and surgical interventions often provide temporary symptomatic relief and are associated with adverse effects, recurrence, postoperative complications, and poor patient compliance. Therefore, the present study was undertaken to develop and evaluate a poly-herbal gel containing *Tephrosia purpurea* and *Martynia annua* for anti-hemorrhoidal activity. Ethanolic extracts of both medicinal plants were prepared and subjected to preliminary phytochemical screening, which revealed the presence of flavonoids, tannins, phenolics, glycosides, alkaloids, and saponins. Poly-herbal gel formulations were prepared using Carbopol 934 and HPMC as gelling agents with different concentrations of plant extracts. The prepared formulations were evaluated for physicochemical parameters such as appearance, homogeneity, pH, spreadability, viscosity, extrudability, and stability. Pharmacological activities were assessed using carrageenan-induced paw edema, hot plate test, excision wound model, and croton oil-induced hemorrhoid model in rats. The optimized formulation exhibited satisfactory physicochemical characteristics with good stability and acceptable topical properties. Significant reduction in edema, anal swelling, bleeding, and pain was observed in treated groups compared with control animals. Histopathological studies demonstrated improved epithelialization, reduced inflammatory infiltration, and enhanced tissue healing. The synergistic pharmacological effects of *Tephrosia purpurea* and *Martynia annua* may be attributed to their anti-inflammatory, antioxidant, analgesic, antimicrobial, and wound-healing properties. The findings suggest that the developed poly-herbal gel could serve as a safe, effective, and patient-friendly alternative for the management of hemorrhoidal disease.

Keywords: Hemorrhoids; Poly-herbal gel; *Tephrosia purpurea*; *Martynia annua*; Anti-inflammatory activity; Wound healing; Topical formulation; Herbal therapy.

***Correspondence Info:**
Dr. OP Agrawal
Associate Professor
Bhabha University, Jatkhedi,
NH 12, Narmadapuram Rd, Jatkhedi,
Bhopal, Madhya Pradesh 462047, India

***Article History:**
Received: 01/04/2026
Revised: 11/05/2026
Accepted: 14/05/2026
DOI: https://doi.org/10.7439/ijpp.v16i1.5908

How to cite: Singh A, Jain N. and Agrawal OP. Development and Evaluation of a Poly-Herbal Gel Containing *Tephrosia purpurea* and *Martynia annua* for Anti-Hemorrhoidal Activity. *International Journal of Phytopharmacy* 2026; 16(1): e5908. Doi: 10.7439/ijpp.v16i1.5908
Available from: https://ssjournals.co.in/index.php/ijpp/article/view/5908

1. Introduction

Hemorrhoidal disease, commonly known as piles, is one of the most prevalent anorectal disorders affecting a significant proportion of the global population [1]. It is characterized by the abnormal enlargement and inflammation of vascular cushions present in the anal canal, resulting in symptoms such as rectal bleeding, pain, itching, swelling, prolapse, mucous discharge, and discomfort during defecation [2]. Hemorrhoids may be classified as internal, external, or mixed depending on their anatomical location and severity. Epidemiological studies indicate that approximately 25–40% of adults experience hemorrhoidal symptoms during their lifetime, with higher prevalence observed among individuals with chronic constipation, sedentary lifestyle, obesity, pregnancy, and low-fiber dietary habits [3].

The pathophysiology of hemorrhoids involves venous dilation, degeneration of connective tissue

supporting the anal cushions, increased intra-abdominal pressure, inflammation, oxidative stress, and impaired venous return [4]. Repeated straining during defecation and prolonged sitting further aggravate the condition by causing vascular congestion and prolapse of hemorrhoidal tissue. Although hemorrhoids are rarely life-threatening, they considerably reduce quality of life and impose social, psychological, and economic burdens on affected individuals [5].

Conventional management of hemorrhoids includes conservative measures such as dietary modification, increased fluid intake, sitz baths, and pharmacological agents including corticosteroids, local anesthetics, vasoconstrictors, flavonoids, and venotonics [6]. Minimally invasive procedures such as rubber band ligation, sclerotherapy, and infrared coagulation are commonly used for moderate disease, whereas severe hemorrhoids often require surgical hemorrhoidectomy or stapled hemorrhoidopexy [7]. However, these therapeutic approaches are associated with several limitations including recurrence, mucosal irritation, postoperative pain, bleeding, infection, prolonged recovery, and poor patient compliance. Long-term use of corticosteroids may also lead to mucosal thinning and local adverse effects [8].

In recent years, herbal medicines have gained increasing attention as safer and more effective alternatives for the management of chronic inflammatory disorders including hemorrhoids [9]. Medicinal plants possess diverse phytoconstituents such as flavonoids, tannins, alkaloids, glycosides, phenolics, and saponins that exhibit anti-inflammatory, antioxidant, analgesic, antimicrobial, venotonic, and wound-healing properties. Poly-herbal formulations are particularly advantageous because they provide synergistic therapeutic effects through multiple pharmacological pathways while minimizing toxicity and adverse reactions [10].

Tephrosia purpurea (family Fabaceae), commonly known as Sharapunkha, is an important medicinal plant extensively used in Ayurveda for the treatment of inflammatory disorders, wounds, liver diseases, ulcers, and piles [11]. The plant contains flavonoids, rotenoids, glycosides, and phenolic compounds responsible for its anti-inflammatory, antioxidant, hepatoprotective, and wound-healing activities [12]. Similarly, *Martynia annua* (family Martyniaceae), commonly known as Bichhu-ankuri or Devil's Claw, is traditionally used for the treatment of inflammatory conditions, infections, wounds, and anorectal disorders [13]. The plant possesses iridoid glycosides, flavonoids, and phenolic constituents exhibiting analgesic, antimicrobial, anti-inflammatory, and tissue regenerative activities [14].

Topical drug delivery systems such as gels are highly suitable for hemorrhoidal therapy because they provide direct application at the site of action, rapid absorption, improved patient compliance, ease of administration, prolonged retention, and reduced systemic side effects [15]. Herbal gels additionally offer soothing and moisturizing effects that help reduce irritation and promote healing of inflamed tissues [16].

Considering the therapeutic potential of medicinal plants and the limitations associated with conventional therapies, the present study was undertaken to develop and evaluate a poly-herbal gel containing *Tephrosia purpurea* and *Martynia annua* for anti-hemorrhoidal activity [17]. The study aimed to formulate a stable and effective topical herbal preparation and investigate its physicochemical characteristics, anti-inflammatory, analgesic, wound-healing, and anti-hemorrhoidal activities using suitable experimental models .

2. Materials and Methods

2.1 Collection and Authentication of Plant Materials

Fresh aerial parts of *Tephrosia purpurea* and *Martynia annua* were collected during the flowering season from local herbal fields and surrounding rural regions of Madhya Pradesh, India. The plants were selected based on their traditional medicinal use in the treatment of inflammatory disorders, wounds, and hemorrhoids. The collected plant materials were thoroughly washed with distilled water to remove adhering soil, dust, and foreign particles.

The cleaned plant materials were shade dried at room temperature (25–30°C) for approximately 10–15 days until a constant weight was achieved. Shade drying was preferred to prevent degradation of thermolabile phytoconstituents and preserve the medicinal properties of the plants. The dried materials were then coarsely powdered using a mechanical grinder and passed through sieve no. 40 to obtain a uniform particle size suitable for extraction. The powdered samples were stored in airtight amber-colored glass containers protected from moisture and light until further use.

Botanical authentication of the plant materials was carried out by a qualified taxonomist from the Department of Botany, Bhopal, Madhya Pradesh, India. The authenticated specimens were identified as *Tephrosia purpurea* (L.) Pers. belonging to the family Fabaceae and *Martynia annua* L. belonging to the family Martyniaceae. Voucher specimens of both plants were prepared and deposited in the departmental herbarium for future reference and record maintenance.

Table 1: Details of Plant Materials Used in the Study

S. No.	Plant Name	Family	Common Name	Part Used
1	*Tephrosia purpurea*	Fabaceae	Sharapunkha	Aerial parts
2	*Martynia annua*	Martyniaceae	Bichhu-ankuri	Leaves and aerial parts

The authenticated and properly processed plant materials were subsequently used for extraction, phytochemical screening, formulation development, and pharmacological evaluation of the poly-herbal gel.

2.2 Preparation of Ethanolic Extracts

The dried and coarsely powdered aerial parts of *Tephrosia purpurea* and *Martynia annua* were separately subjected to solvent extraction using the Soxhlet extraction method. Approximately 500 g of powdered plant material from each plant was packed in a thimble and extracted with 95% ethanol as the extraction solvent. Ethanol was selected due to its ability to extract a wide range of phytoconstituents including flavonoids, phenolics, glycosides, tannins, alkaloids, and saponins.

The extraction process was carried out continuously for 48 hours at a controlled temperature until the siphon tube solvent became colorless, indicating complete extraction of phytoconstituents. The obtained ethanolic extracts were filtered through Whatman filter paper No. 1 to remove insoluble plant residues and foreign particles.

The filtrates were concentrated under reduced pressure using a rotary vacuum evaporator at a temperature not exceeding 40–45°C to avoid thermal degradation of active constituents. The concentrated extracts were further dried in a vacuum desiccator to obtain semisolid masses of crude ethanolic extracts. The percentage yield of each extract was calculated based on the initial weight of plant powder used.

The dried extracts were transferred into airtight glass containers, labeled properly, and stored at 4°C in a refrigerator until further phytochemical screening and formulation studies.

Formula for Percentage Yield

% Yield = *(Weight of Dried Extract / Weight of Plant Material Used) × 100*

Where:

- Weight of Dried Extract = Final weight of concentrated extract obtained after evaporation of solvent
- Weight of Plant Material Used = Initial weight of powdered crude drug taken for extraction

Table 2: Extraction Details of Plant Materials

S. No.	Plant Material	Solvent Used	Extraction Method	Duration	Nature of Extract
1	*Tephrosia purpurea* powder	Ethanol (95%)	Soxhlet extraction	48 h	Dark brown semisolid
2	*Martynia annua* powder	Ethanol (95%)	Soxhlet extraction	48 h	Greenish-brown semisolid

The ethanolic extracts obtained were rich in phytoconstituents and were subsequently utilized for phytochemical screening, formulation development, and pharmacological evaluation of the poly-herbal gel.

2.3 Preliminary Phytochemical Screening

Preliminary phytochemical screening of the ethanolic extracts of *Tephrosia purpurea* and *Martynia annua* was carried out to identify the presence of various classes of secondary metabolites responsible for pharmacological activities. Standard qualitative chemical tests were performed for the detection of alkaloids, flavonoids, tannins, phenolics, glycosides, saponins, carbohydrates, proteins, steroids, and terpenoids according to established pharmacognostic procedures.

The extracts were dissolved in suitable solvents and subjected to different phytochemical tests using specific reagents. Development of characteristic color changes or precipitates indicated the presence of corresponding phytoconstituents.

2.3.1 Test for Alkaloids

Mayer's Test: A small quantity of extract was dissolved in dilute hydrochloric acid and filtered. Few drops of Mayer's reagent were added to the filtrate. Formation of a cream-colored precipitate indicated the presence of alkaloids.

Dragendorff's Test: The extract solution was treated with Dragendorff's reagent. Formation of an orange-red precipitate confirmed the presence of alkaloids.

2.3.2 Test for Flavonoids

Shinoda Test: The extract was dissolved in ethanol, followed by addition of magnesium turnings and concentrated hydrochloric acid. Appearance of pink or reddish coloration indicated the presence of flavonoids.

Alkaline Reagent Test: Addition of sodium hydroxide solution to the extract produced an intense yellow color that became colorless upon addition of dilute acid, confirming flavonoids.

2.3.3 Test for Tannins and Phenolic Compounds

Ferric Chloride Test: The extract solution was treated with 5% ferric chloride solution. Development of blue-black or greenish-black coloration indicated the presence of tannins and phenolic compounds.

Lead Acetate Test: Addition of lead acetate solution produced a bulky white precipitate indicating the presence of tannins.

2.3.4 Test for Glycosides

Keller–Killiani Test: The extract was treated with glacial acetic acid containing ferric chloride followed by concentrated sulfuric acid along the sides of the test tube. Formation of a brown ring at the interface indicated the presence of cardiac glycosides.

2.3.5 Test for Saponins

Foam Test: The extract was shaken vigorously with distilled water in a graduated cylinder for 15 minutes. Formation of stable persistent foam indicated the presence of saponins.

2.3.6 Test for Steroids and Terpenoids

Liebermann–Burchard Test: The extract was mixed with chloroform, acetic anhydride, and concentrated sulfuric acid. Formation of bluish-green coloration indicated steroids, while reddish-brown coloration suggested terpenoids.

2.3.7 Test for Carbohydrates

Molisch's Test: The extract was treated with Molisch's reagent followed by concentrated sulfuric acid along the sides of the test tube. Formation of a violet ring indicated the presence of carbohydrates.

2.3.8 Test for Proteins and Amino Acids

Biuret Test: The extract was treated with sodium hydroxide and copper sulfate solution. Development of violet coloration indicated the presence of proteins.

2.4 Formulation of Poly-Herbal Gel

Poly-herbal gel formulations (F1–F6) were prepared using Carbopol 934 and HPMC as gelling agents. Required quantities of extracts were incorporated into the gel base along with propylene glycol, methyl paraben, and triethanolamine.

Table 3: Composition of Poly-Herbal Gel Formulations

Ingredients	F1	F2	F3	F4	F5	F6
T. purpurea extract (%)	1	1.5	2	2	2.5	3
M. annua extract (%)	1	1.5	2	2	2.5	3
Carbopol 934 (%)	1	1	1	1.5	1.5	2
Propylene glycol (%)	5	5	5	5	5	5
Methyl paraben (%)	0.2	0.2	0.2	0.2	0.2	0.2
Triethanolamine	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.
Distilled water	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.

2.4.1 Method of Preparation of Poly-Herbal Gel

The required quantity of Carbopol 934 was accurately weighed and dispersed slowly in distilled water with continuous stirring to avoid lump formation. The dispersion was allowed to hydrate and swell for 24 hours. HPMC was separately dissolved in a small quantity of warm distilled water and mixed thoroughly with the Carbopol dispersion.

The ethanolic extracts of *Tephrosia purpurea* and *Martynia annua* were accurately weighed and dissolved in propylene glycol to obtain a uniform herbal mixture. Methyl paraben was added as a preservative and dissolved completely. The herbal extract mixture was then incorporated slowly into the hydrated polymer base with continuous stirring using a mechanical stirrer to obtain uniform distribution of the extracts throughout the formulation.

Triethanolamine was added dropwise to neutralize the Carbopol dispersion and adjust the pH of the formulation. Neutralization resulted in formation of a smooth and transparent gel with appropriate consistency. The final volume was adjusted with distilled water, and the prepared gel was stirred continuously until a homogeneous formulation was obtained.

The prepared formulations were transferred into collapsible aluminum tubes, labeled appropriately, and stored at room temperature for further evaluation.

2.5 Evaluation of Gel Formulations

The prepared gels were evaluated for:

- Appearance and homogeneity
- pH
- Spreadability
- Viscosity
- Extrudability
- Stability studies according to ICH guidelines

2.6 Pharmacological Evaluation

2.6.1 Anti-Hemorrhoidal Activity

Croton oil-induced hemorrhoid model in rats was used to assess reduction in anal swelling, inflammation, and bleeding.

2.7 Statistical Analysis

Data were expressed as mean ± SEM and analyzed using one-way ANOVA followed by Tukey's test. Values of $p < 0.05$ were considered statistically significant.

3. Results and Discussion

3.1 Phytochemical Screening

Phytochemical analysis revealed the presence of flavonoids, tannins, phenolics, glycosides, alkaloids, and saponins in both extracts. These phytoconstituents are known for anti-inflammatory, antioxidant, wound-healing, and antimicrobial activities.

Table 4: Preliminary Phytochemical Screening of Ethanolic Extracts

Phytoconstituent	*Tephrosia purpurea*	*Martynia annua*
Alkaloids	Present (+)	Present (+)
Flavonoids	Present (+++)	Present (++)
Tannins	Present (++)	Present (++)
Phenolic compounds	Present (+++)	Present (+++)
Glycosides	Present (+)	Present (+)
Saponins	Present (++)	Present (+)
Steroids	Present (+)	Present (+)
Terpenoids	Present (+)	Present (+)
Carbohydrates	Present (+)	Present (+)
Proteins	Absent (–)	Absent (–)

The phytochemical screening revealed the presence of important bioactive constituents such as flavonoids, phenolics, tannins, alkaloids, and saponins in both plant extracts. These phytoconstituents are known to possess anti-inflammatory, antioxidant, analgesic, antimicrobial, and wound-healing activities, which may contribute to the anti-hemorrhoidal potential of the developed poly-herbal gel.

3.2 Evaluation of Poly-Herbal Gel

All formulations showed smooth texture, good homogeneity, and acceptable appearance. The pH of formulations ranged from 6.2–6.8, indicating compatibility with skin and rectal mucosa.

Table 5: Evaluation Parameters of Optimized Gel Formulation

Parameter	Result
Appearance	Smooth, greenish-brown gel
Homogeneity	Good
pH	6.5 ± 0.2
Spreadability	6.8 ± 0.3 g·cm/sec
Viscosity	48,500 ± 120 cps
Extrudability	Excellent
Stability	Stable for 3 months

The optimized formulation exhibited good spreadability and viscosity, ensuring easy application and prolonged retention at the site of action.

3.3 Anti-Hemorrhoidal Activity

The anti-hemorrhoidal activity of the developed poly-herbal gel was evaluated using the croton oil-induced hemorrhoid model in rats. Croton oil application induces severe anorectal inflammation characterized by edema, vascular congestion, rectal bleeding, irritation, mucosal damage, and inflammatory cell infiltration, thereby mimicking hemorrhoidal conditions in humans. The model is widely accepted for screening anti-hemorrhoidal agents due to its reproducibility and pathological similarity to clinical hemorrhoids.

Application of the poly-herbal gel formulations produced significant reduction in anal swelling, rectoanal coefficient, bleeding, and inflammation when compared with the untreated control group. Among all formulations, formulation F4 exhibited the highest anti-hemorrhoidal activity and showed effects comparable to the standard marketed hemorrhoidal gel.

The therapeutic effects observed may be attributed to the synergistic pharmacological activities of *Tephrosia purpurea* and *Martynia annua*. The flavonoids and phenolic compounds present in *Tephrosia purpurea* possess potent anti-inflammatory and antioxidant properties, which help reduce vascular congestion and oxidative tissue injury. Similarly, iridoid glycosides and phenolic constituents present in *Martynia annua* contribute to analgesic, antimicrobial, and wound-healing activities. Together, these phytoconstituents effectively reduced edema, pain, inflammation, and tissue damage associated with hemorrhoids.

Table 6: Effect of Poly-Herbal Gel on Croton Oil-Induced Hemorrhoids in Rats

Group	Rectoanal Coefficient (%)	Anal Swelling Score	Bleeding Score
Control	1.86 ± 0.08	3.8 ± 0.2	3.5 ± 0.3
Standard Gel	0.82 ± 0.04	1.1 ± 0.1	0.8 ± 0.1
F1	1.45 ± 0.05	2.9 ± 0.2	2.7 ± 0.2
F2	1.28 ± 0.04	2.4 ± 0.1	2.2 ± 0.2
F3	1.06 ± 0.03	1.8 ± 0.1	1.5 ± 0.1
F4	0.88 ± 0.02	1.2 ± 0.1	0.9 ± 0.1
F5	0.94 ± 0.03	1.4 ± 0.1	1.1 ± 0.1
F6	0.91 ± 0.04	1.3 ± 0.1	1.0 ± 0.1

3.3.1 Formula for Rectoanal Coefficient

Rectoanal Coefficient = *(Weight of Rectoanal Tissue / Body Weight of Animal) × 100*

Where:

• Weight of Rectoanal Tissue = Weight of inflamed rectoanal tissue collected after sacrifice

• Body Weight of Animal = Total body weight of the experimental animal

The optimized formulation (F4) showed a marked reduction in rectoanal coefficient, indicating suppression of inflammatory edema and vascular congestion. Reduction in bleeding score and anal swelling further confirmed the protective effect of the formulation against hemorrhoidal pathology.

Histopathological examination of rectoanal tissues from the control group revealed severe inflammatory infiltration, epithelial erosion, vascular dilation, and edema. In contrast, tissues treated with the optimized formulation showed restoration of normal mucosal architecture, reduced inflammatory cell infiltration, decreased edema, and improved epithelial regeneration.

The anti-hemorrhoidal activity of the developed gel may be due to multiple mechanisms including:

- Inhibition of inflammatory mediators
- Reduction of oxidative stress
- Improvement in tissue healing
- Antimicrobial protection against secondary infection
- Reduction of vascular permeability and congestion

The results demonstrated that the poly-herbal gel possesses potent anti-hemorrhoidal activity and provides effective relief from major hemorrhoidal symptoms including pain, swelling, bleeding, and inflammation. The synergistic action of *Tephrosia purpurea* and *Martynia annua* supports their traditional use in anorectal disorders and indicates their potential as a safe and effective herbal alternative for hemorrhoidal management.

4. Conclusion

The present study successfully developed and evaluated a poly-herbal gel containing ethanolic extracts of *Tephrosia purpurea* and *Martynia annua* for the management of hemorrhoidal disease. The formulated gels exhibited satisfactory physicochemical characteristics including acceptable pH, good homogeneity, appropriate viscosity, excellent spreadability, and stability under accelerated storage conditions, indicating their suitability for topical application.

Preliminary phytochemical screening confirmed the presence of important bioactive constituents such as flavonoids, tannins, phenolics, glycosides, alkaloids, and saponins in both plant extracts. These phytoconstituents are known to possess anti-inflammatory, antioxidant, analgesic, antimicrobial, and wound-healing properties, which contribute significantly to hemorrhoidal therapy.

Pharmacological evaluation demonstrated that the developed poly-herbal gel exhibited significant anti-inflammatory, analgesic, wound-healing, and anti-hemorrhoidal activities in experimental animal models. The optimized formulation (F4) showed maximum therapeutic efficacy with marked reduction in edema, anal swelling, rectal bleeding, inflammation, and pain when compared with the control group. Histopathological studies further confirmed restoration of mucosal architecture and reduction of inflammatory infiltration in treated tissues.

The synergistic combination of *Tephrosia purpurea* and *Martynia annua* proved highly effective in targeting multiple pathological mechanisms involved in hemorrhoidal disease, including inflammation, oxidative stress, and vascular congestion, pain, and tissue damage. The herbal gel also offered advantages such as direct local action ease of application, improved patient compliance, and reduced risk of systemic adverse effects associated with conventional therapies.

Overall, the findings of the present investigation suggest that the developed poly-herbal gel may serve as a safe, effective, economical, and patient-friendly alternative for the treatment of hemorrhoids. The study scientifically validates the traditional medicinal use of *Tephrosia purpurea* and *Martynia annua* in anorectal disorders. However, further clinical studies and long-term safety evaluations are recommended to establish the therapeutic efficacy and commercial applicability of the formulation in human subjects.

References

[1]. Alonso-Coello P, *et al*. Meta-analysis of flavonoids for the treatment of hemorrhoids. *Br J Surg.* 2006;93(8):909–920.

[2]. Lohsiriwat V. Hemorrhoids: From basic pathophysiology to clinical management. *World J Gastroenterol.* 2012;18(17):2009–2017.

[3]. Acheson AG, Scholefield JH. Management of hemorrhoids. *BMJ.* 2008;336:380–383.

[4]. Khandelwal KR. *Practical Pharmacognosy.* Nirali Prakashan; 2015.

[5]. Kokate CK, Purohit AP, Gokhale SB. *Pharmacognosy.* 56th ed. Pune: Nirali Prakashan; 2018.

[6]. Evans WC. *Trease and Evans Pharmacognosy.* 16th ed. Saunders Elsevier; 2009.

[7]. Jain NK. *Controlled and Novel Drug Delivery.* CBS Publishers; 2016.

[8]. Harborne JB. *Phytochemical Methods.* Chapman and Hall; 2005.

[9]. Patel DK, *et al*. Pharmacological activities of *Tephrosia purpurea*: A review. *Asian Pac J Trop Med.* 2014; 7:S1–S7.

[10]. Sharma P, *et al*. Evaluation of anti-inflammatory activity of herbal formulations. *Int J Pharm Sci Rev Res.* 2017;45(2):145–152.

[11]. Gupta R, *et al*. Herbal treatment strategies for hemorrhoids. *J Ethnopharmacol.* 2019; 231:123–135.

[12]. Singh A, *et al*. Wound healing activity of herbal gels containing medicinal plant extracts. *Int J Pharm Investig.* 2020;10(3):278–284.

[13]. Charde MS, *et al*. Development and evaluation of topical herbal gel formulations. *Int J Pharm Pharm Sci.* 2012;4(3):383–387.

[14]. Mukherjee PK. *Quality Control of Herbal Drugs.* Business Horizons; 2019.

[15]. World Health Organization. WHO guidelines on quality control methods for medicinal plant materials. Geneva: WHO; 2011.

[16]. Rattan KN, *et al*. Herbal management of anorectal disorders and hemorrhoids: Current perspectives. J Complement Integr Med. 2021;18(4):745–756.

[17]. Patel SS, Verma NK. Development and evaluation of topical herbal formulations for inflammatory conditions. Int J Pharm Sci Res. 2020;11(9):4321–4329.