A Review on Piles in Human Beings and Herbal Remedies

Prof. Dere Pravin. J[1], Mr. Rohit G Nagale[2], Mr.Rushikesh M Narayane[3], Miss. Rutuja V Nimse[4], Miss. Vaishnavi S Mundlik[5], Miss. Samruddhi R Musmade[6], Mr. Anuj S Palase[7]
[1,2,3,4,5,6,7]*S.V.N.H. T'S College of B. Pharmacy Shrishivajinagar, Rahuri Factory, India*

***Abstract*—Hemorrhoids (piles) are one of the most prevalent anorectal disorders worldwide, characterized by varicosities of the hemorrhoidal plexus, rectal bleeding, pain, and prolapse. Despite advances in modern therapy, recurrence, postoperative complications, and limited long-term relief remain significant challenges. This review provides a comprehensive overview of hemorrhoidal disease, emphasizing the role of herbal and traditional medicine systems in its prevention.**

***Index Terms*—Hemorrhoids, Inflammation, Herbal, Curcuma.**

I. INTRODUCTION

1.1 Overview of Hemorrhoids

Hemorrhoids (piles) are pathological enlargements of the anal cushions situated in the anal canal, functioning in continence and stool control. They represent one of the most frequent anorectal disorders worldwide, characterized by varicosities of the hemorrhoidal plexus and presenting symptoms such as painless rectal bleeding, prolapse, itching, and discomfort during defecation. [1]

Based on anatomical position, hemorrhoids are classified as internal, external, or mixed, relative to the dentate line. [2] Their pathogenesis involves degeneration of supporting connective tissue, venous congestion, and increased intra-abdominal pressure caused by chronic constipation, straining, prolonged sitting, obesity, and pregnancy. [3] [4]

Although rarely life-threatening, hemorrhoids cause significant morbidity and affect quality of life. Modern lifestyles characterized by low-fiber diets and sedentary behavior have markedly increased global incidence. [5]

1.2 Global Epidemiology

Hemorrhoids affect nearly 40–50% of adults at some point in life, with a peak prevalence in individuals aged 45–65 years. [6]

The condition occurs equally in both sexes but is influenced by regional lifestyle and dietary habits.

In Western populations, low-fiber and high-fat diets, coupled with prolonged sitting, are major contributors, whereas in Asian regions, chronic constipation and consumption of spicy food are common etiological factors. [7] an estimated 300 million individuals globally suffer from hemorrhoidal disease at any given time, although under-reporting remains widespread because of embarrassment and self-medication practices. [8]

1.3 Socioeconomic and Lifestyle Factors

The socioeconomic burden of hemorrhoids includes work absenteeism, reduced productivity, and treatment costs. [9] Urbanization and processed food consumption have amplified risk, particularly among office workers, drivers, and other sedentary occupations. [10]

In low-income settings, inadequate awareness and healthcare access often lead to delayed diagnosis and complications such as thrombosis, ulceration, and anemia. [11] Traditional and home-based remedies continue to be widely used, though their efficacy and safety vary considerably.

1.4 Rationale and Scope of the Review

Despite progress in pharmacological and surgical management, recurrence and post-treatment discomfort persist. Conventional interventions such as rubber-band ligation, sclerotherapy, and hemorrhoidectomy provide symptomatic relief but often lack long-term curative success. [12] [13]

Herbal medicine systems—including Ayurveda, Unani, and Traditional Chinese Medicine (TCM)—have used numerous plant-based therapies to address hemorrhoids by targeting inflammation, venous stasis, and mucosal repair. [14] [15] Many of these herbs, such as *Diosmin*, *Hesperidin*, *Curcuma longa*, *Aloe vera*, and *Centella asiatica*, have now been scientifically validated for pharmacological activity. [16]

This review therefore aims to:

1. Summarize the global epidemiology and pathophysiology of hemorrhoids.
2. Compare conventional, traditional, and integrated management strategies.
3. Compile validated herbal remedies and describe their mechanisms of action.
4. Highlight pharmacological evaluation, safety, and future prospects for herbal therapeutics.

By integrating traditional knowledge with modern pharmacological validation, this work seeks to provide a concise, evidence-based perspective on the role of herbal remedies in hemorrhoidal management.

II. PATHOPHYSIOLOGY AND CLASSIFICATION OF HEMORRHOIDS

Fig.1 Anatomy and Pathophysiology of Hemorrhoids

2.1 Anatomy and Pathophysiology

Hemorrhoids are vascular cushions composed of arteriovenous channels, connective tissue, and smooth muscle fibers located at the 3, 7, and 11 o'clock positions in the anal canal. [17] These cushions help maintain continence by closing the anal canal at rest. Under normal conditions, fibroelastic connective tissue and the muscle of Treitz support these cushions. [18] When these structures degenerate or venous pressure rises, the tissue becomes distended and displaced, leading to hemorrhoidal prolapse.

Pathophysiological mechanisms include:

- Increased venous pressure due to straining or portal hypertension.
- Connective tissue degeneration, causing loss of structural support.
- Inflammation and vascular congestion resulting in mucosal edema.
- Hyper perfusion of hemorrhoidal arteries, aggravating swelling. [19]

Repeated trauma and stasis further cause fibrosis, thrombosis, and ulceration in chronic cases. [20]

2.2 Clinical Features

Symptoms depend on type and grade. Internal hemorrhoids (above the dentate line) often present as painless rectal bleeding, while external hemorrhoids (below the dentate line) may cause pain, itching, and swelling due to somatic innervation. [21]

Mixed hemorrhoids combine both patterns. Common features include:

- Painless bright-red bleeding on defecation.
- Prolapse during bowel movement.
- Mucus discharge and perianal irritation.
- Painful swelling (especially when thrombosed). [22]

Severity ranges from mild discomfort to significant bleeding and prolapse interfering with daily activities. [23]

2.3 Modern Medical Classification

2.3.1 Anatomical Types

- Internal Hemorrhoids: Originating above the dentate line; lined by columnar epithelium and insensitive to pain.
- External Hemorrhoids: Arising below the dentate line; covered by anoderm and highly sensitive.
- Mixed Hemorrhoids: Involving both plexuses. [24]

2.3.2 goligher's grading system

Grade	Description	Typical Management
I	Prominent vessels without prolapse	Conservative therapy
II	Prolapse during defecation, self-reducing	Non-surgical (e.g., ligation)
III	Requires manual reduction	Surgical / minimally invasive
IV	Irreducible prolapse ± thrombosis	Surgical excision

This grading remains the clinical standard for guiding therapy. [25]

2.4 Traditional and Ethnomedical Classifications

Unani Medicine

In Unani, hemorrhoids are termed *Bawaseer*, subdivided into:

- *Bawaseer Damawiya* (bleeding piles due to excess blood),
- *Safrawiya* (bile disturbance, causing burning and irritation), and
- *Balghamiya* (phlegm-related, non-bleeding). [26]

Traditional Chinese Medicine (TCM)

In TCM, hemorrhoids correspond to *Zhi Chuang* or *Chang Feng*, primarily arising from heat stagnation, dampness, or Qi deficiency. Treatment focuses on cooling blood, promoting circulation, and tonifying Qi. [27]

Ayurveda

Ayurvedic texts such as *Charaka Samhita* and *Sushruta Samhita* describe hemorrhoids as *Arsha*, caused by deranged *Tridosha* Vata, Pitta, Kapha and impaired digestion (Agni Mandya) [28]

Types include:

- *Vataja Arsha* – dry, painful, and blackish.
- *Pittaja Arsha* – inflamed and bleeding.
- *Kaphaja Arsha* – heavy, whitish, and itchy.
- *Sannipataja* – mixed symptoms from all three doshas.
- *Sahaja* – hereditary form[29]

2.5 Risk Factors and Complications

Major predisposing factors include:

- Dietary: Low-fiber, spicy food, and dehydration.
- Lifestyle: Sedentary habits, prolonged sitting, and lack of exercise.
- Physiological: Pregnancy, aging, and increased intra-abdominal pressure.
- Medical: Liver disease and portal hypertension. [30]

Neglected or untreated hemorrhoids may lead to thrombosis, ulceration, chronic anemia, and secondary infections. [31]

Timely diagnosis and preventive measures such as dietary fiber intake, adequate hydration, and physical activity can reduce recurrence. [32]

III. MANAGEMENT APPROACHES OF HEMORRHOIDS

3.1 Overview

Management of hemorrhoids depends on severity, grade, and presence of complications. The primary goals are to relieve symptoms, reduce vascular congestion, correct bowel habits, and prevent recurrence. [33]

Therapeutic modalities can be broadly classified into:

1. Conventional (modern medical) therapy
2. Traditional and herbal therapy
3. Integrative or combined management

An individualized, stepwise approach—starting with conservative management and escalating to invasive procedures—is considered optimal. [34]

3.2 Conventional (Modern) Management

3.2.1 Conservative Therapy

Early or mild hemorrhoids (Grade I–II) respond well to dietary and lifestyle modification:

- High-fiber diet (25–30 g/day) and adequate fluid intake.
- Stool softeners or bulk-forming laxatives (psyllium, lactulose).
- Avoidance of prolonged sitting and straining during defecation. [35]
- Warm sitz baths and proper perianal hygiene to reduce irritation [36]

These measures alone can resolve symptoms in nearly 80% of mild cases. [37]

3.2.2 Pharmacological Therapy

Drugs used in hemorrhoidal disease focus on reducing inflammation, improving venous tone, and relieving pain.

Drug/Class	Mechanism	Example	Therapeutic Effect
Phlebotonics	Venotonic, anti-inflammatory	Diosmin + Hesperidin	↓ edema, ↓ bleeding
Topical corticosteroids	Local anti-inflammatory	Hydrocortisone acetate	↓ itching, ↓ swelling
Local anesthetics	Sodium-channel blockade	Lidocaine, Pramoxine	Pain relief
Astringents	Tissue contraction, secretion control	Witch hazel, Zinc oxide	↓ oozing, ↓ irritation
Laxatives	Facilitate defecation	Docusate, Lactulose	Prevent strain

Phlebotonics, particularly Daflon® (Diosmin:Hesperidin = 9:1)**,** remain the mainstay of pharmacotherapy and are supported by several RCTs.[38] [39]

3.2.3 Minimally Invasive and Surgical Interventions

When conservative therapy fails or in Grade III–IV hemorrhoids, procedural management is recommended. [40]

Minimally invasive procedures:

- Rubber-band ligation (RBL): ligates hemorrhoidal tissue to induce fibrosis.
- Sclerotherapy: injection of phenol or sodium tetradecyl sulfate for vessel obliteration.
- Infrared coagulation: photocoagulation causing mucosal fixation.

Surgical options:

- Milligan–Morgan hemorrhoidectomy (open excision).
- Ferguson hemorrhoidectomy (closed).
- Stapled hemorrhoidopexy (PPH): circular stapling to reposition mucosa.
- Doppler-guided hemorrhoidal artery ligation (DG-HAL): selective arterial ligation. [41] [42]

Minimally invasive approaches offer faster recovery and less pain but have higher recurrence than excision. [43]

3.3 Traditional and Herbal Management

Traditional medical systems emphasize correcting digestive imbalance, venous congestion, and systemic toxins**,** employing plant-based and holistic therapies.

3.3.1 Ayurvedic Approach

In Ayurveda, *Arsha Chikitsa* involves Shodhana (purification) and Shamana (palliative) therapies. [44]

Treatment aims to normalize digestion (*Agni*), balance *Tridosha*, and heal mucosa. Common herbal preparations include:

- Arshoghni Vati – hemostatic, anti-inflammatory.
- Abhayarishta – mild laxative improving bowel movement.
- Triphala Churna – detoxifier, antioxidant.
- Neem, Haritaki, Aloe vera, and Kankayan Vati – anti-infective and healing agents. [45] [46]

3.3.2 Unani and Siddha Approaches

In Unani medicine, hemorrhoids (Bawaseer) are treated using blood-purifying and vasoconstrictive herbs such as Terminalia chebula, Rauwolfia serpentina, and Cassia fistula [47]

Siddha therapy employs Curcuma longa, Kuppaimeni (Acalypha indica), and Manjal for anti-inflammatory and hemostatic effects. [48]

Folk remedies—such as sitz baths with Neem or Witch Hazel, and topical Aloe vera—remain widely used. [49] These formulations are safe, inexpensive, and often serve as first-line care in low-resource settings. [50]

3.4 Integrated Management Approaches

Integrated or evidence-based complementary therapy combines modern pharmacology with validated herbal medicine to enhance efficacy and minimize recurrence.

3.4.1 Rationale and Examples

- Diosmin + Triphala: synergistic venotonic and bowel-regulating effect. [51]
- Topical Witch Hazel or Aloe vera with corticosteroids: enhanced anti-inflammatory and soothing effect. [52]
- Polyherbal formulations such as *Pilex*® (Neem, Guggulu, Haritaki) reduce bleeding and edema when used alongside conventional care. [53]

3.4.2 Evidence and Outcomes

Recent clinical studies show that integrated regimens:

- Decrease bleeding and pain faster than monotherapy. [54]
- Lower recurrence by up to **40%** in post-operative patients. [55]
- Improve wound healing and patient satisfaction. [56]

Therefore, integration represents a rational, patient-centered approach, aligning traditional wisdom with modern evidence.

IV. HERBAL REMEDIES IN THE MANAGEMENT OF HEMORRHOIDS

4.1 Overview

Herbal medicine plays a major role in the complementary management of hemorrhoids due to its multi-targeted mechanisms—including anti-inflammatory, venotonic, antioxidant, and wound-healing effects. [57]

Unlike single-target synthetic agents, herbal phytoconstituents act synergistically to improve vascular tone, reduce mucosal inflammation, and enhance local circulation. [58]

Validated herbal agents such as Diosmin, Hesperidin, Ruscus aculeatus, Hamamelis virginiana, Vitis vinifera, Centella asiatica, Aloe vera, Calendula officinalis, Curcuma longa, Terminalia chebula, and Ficus carica form the core of evidence-based phytotherapy. [59]

4.2 Major Scientifically Validated Herbal Agents

4.2.1 Diosmin and Hesperidin (Citrus spp.)

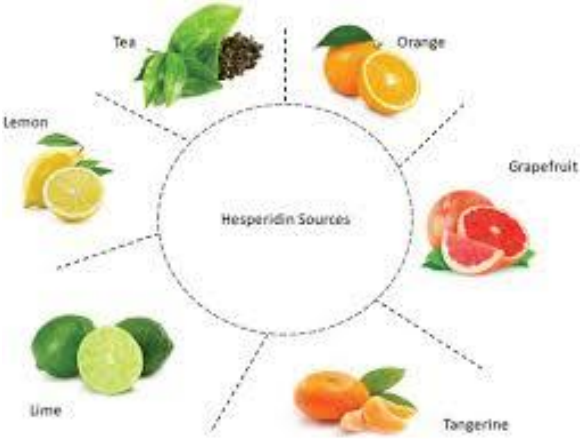

Fig.2: Diosmin and Hesperidin (Citrus spp.)

Bioflavonoids extracted from orange and lemon peels act as potent phlebotonics that improve venous return and reduce capillary permeability. [60]

Clinical trials using *Daflon® 500 mg* (9:1 ratio) show significant reduction in bleeding, pain, and edema within one week of therapy. [61]

Mechanism involves inhibition of prostaglandins and leukotrienes, enhancing lymphatic drainage. [62]

4.2.2 Ruscus aculeatus (Butcher's Broom)

Fig.3: Ruscus aculeatus (Butcher's Broom)

Contains ruscogenins, which stimulate α-adrenergic receptors causing venoconstriction and improved lymphatic flow. [63]

Clinical studies demonstrated symptom reduction by 45% in chronic venous insufficiency and hemorrhoids. [64]

4.2.3 Hamamelis virginiana (Witch Hazel)

Fig.4: Hamamelis virginiana (Witch Hazel)

Rich in tannins and flavonoids, this herb exhibits astringent, anti-inflammatory, and hemostatic effects. [65]

Topical use alleviates itching and discomfort; 45% improvement in symptoms was reported in one week in mild cases. [66]

4.2.4 Vitis vinifera (Grape Seed Extract)

Fig.5: Vitis vinifera (Grape Seed Extract)

Contains proanthocyanidins with strong antioxidant and venotonic properties.

Clinical studies show reduced bleeding and recurrence when administered at 150 mg/day for two weeks. [67]

4.2.5 Centella asiatica (Gotu Kola)

Fig.6: Centella asiatica (Gotu Kola)

Contains asiaticoside and madecassoside, which stimulate collagen synthesis, microcirculation, and wound healing [68]

Used post-hemorrhoidectomy, it accelerates epithelial regeneration and reduces postoperative pain. [69]

4.2.6 Aloe vera

Fig.7: Aloe vera

Aloe gel contains polysaccharides **(**acemannan**)** and anthraquinones that provide anti-inflammatory, cooling, and antimicrobial actions. [70]

Topical and oral Aloe significantly reduce pain and bleeding within two weeks. [71]

4.2.7 Calendula officinalis (Marigold)

Fig.8 Calendula officinalis (Marigold)

Composed of triterpenoids and carotenoids, this herb enhances granulation and epithelial repair while reducing inflammatory cytokines. [72]
Topical application of 2% ointment improves local healing within 10 days. [73]

4.2.8 Curcuma longa (Turmeric)

Fig.9 Curcuma longa (Turmeric)

Curcumin is a potent NF-κB inhibitor, reducing inflammation and oxidative stress. [74]
When combined with *piperine*, it increases bioavailability and speeds wound healing after hemorrhoidectomy by ~50%. [75]

4.2.9 Terminalia chebula (Haritaki)

Fig.10. Terminalia chebula (Haritaki)

A core Ayurvedic herb, *T. chebula* is mild laxative, astringent, and detoxifying.
It regulates bowel movement and reduces venous congestion, improving defecation and preventing recurrence. [76]

4.2.10 Ficus carica (Fig)

Fig.11: Ficus carica (Fig)

Rich in mucilage and flavonoids, it acts as a natural laxative and anti-inflammatory.
Regular consumption improves stool consistency and reduces rectal bleeding. [77]

4.3 Mechanisms of Action (Summary)

Herbal anti-Hemorrhoidal activity involves multiple pharmacological targets:

Mechanism	Representative Phytoconstituents	Therapeutic Effect
Venotonic and Vasoprotective	Diosmin, Ruscogenin, Proanthocyanidins	Improved vascular tone
Anti-inflammatory and Antioxidant	Curcumin, Aloe polysaccharides, Asiaticoside	↓ Edema, ↓ prostaglandins
Astringent and Hemostatic	Witch Hazel tannins, Haritaki	↓ Bleeding, tissue contraction
Laxative and Detoxifying	Triphala, Fig extract	↓ Straining, bowel regularity
Wound-Healing	Centella, Calendula, Aloe vera	Faster recovery, less pain

These combined actions make herbal remedies especially suitable for integrative and postoperative care. [78]

4.4 Evidence Summary

Randomized clinical and observational studies consistently support the efficacy and safety of herbal treatments:

- Diosmin + Hesperidin: 70% reduction in bleeding and pain in acute hemorrhoids. [61]
- Centella asiatica: accelerates post-surgical healing and reduces pain. [69]
- Curcuma longa + Piperine: enhances wound recovery by 50% [75]
- Aloe vera: 64% symptom remission after 14 days. [71]
- Polyherbal formulations (e.g., Pilex®): significant improvement in vascular tone and symptom control. [79]

Overall, standardized herbal extracts exhibit comparable efficacy to conventional drugs with superior tolerability and fewer side effects. [80]

4.5 Safety and Quality Considerations

While most herbs are well-tolerated, issues such as variability in phytochemical content, adulteration, and microbial contamination can affect safety.

Standardization using HPLC/HPTLC**,** pharmacognostic verification, and adherence to Good Manufacturing Practices (GMP) areessential. [81]

Toxicological studies show no major adverse effects at therapeutic doses for the validated herbs listed. [82]

V. TRADITIONALLY USED HERBAL PLANTS IN THE MANAGEMENT OF HEMORRHOIDS

5.1 Overview

Traditional medicine systems such as Ayurveda, Unani, Siddha, and Traditional Chinese Medicine (TCM) have employed numerous herbal remedies for hemorrhoids for centuries. [83]These systems emphasize restoring balance through anti-inflammatory, astringent, hemostatic, venotonic, and laxative actions**,** targeting both symptom relief and tissue repair. [84]

Modern pharmacological research has validated several of these botanicals, confirming their mechanisms and safety profiles. [85]

5.2 Prominent Traditional Herbs and Polyherbal Formulations

Ayurvedic Herbs

- Triphala (Haritaki, Bibhitaki, Amalaki): Regulates digestion and detoxifies the bowel. Exhibits antioxidant and mild laxative effects, improving evacuation and reducing straining. [86]
- Neem **(***Azadirachta indica***):** Possesses antimicrobial and anti-inflammatory properties; used topically and orally to relieve irritation and infection. [87]
- Cassia fistula (Amaltas): Fruit pulp acts as a gentle purgative and anti-inflammatory, commonly prescribed for chronic constipation. [88]
- Lodhra **(***Symplocos racemosa***):** Bark rich in tannins; known for astringent and wound-healing properties, reducing bleeding and mucosal swelling. [89]
- Aegle marmelos (Bael): Astringent and digestive stimulant, promoting bowel regulation and reducing inflammation. [90]

- Berberis aristata (Daruharidra): Source of berberine, a strong antimicrobial and anti-inflammatory alkaloid. [91]

Unani Herbs

In Unani practice, hemorrhoids (*Bawaseer*) are treated using blood-purifying (Munaqqi-e-Dam) and hemostatic (Qabiz) drugs

Important herbs include:

- *Rauwolfia serpentina*, *Terminalia chebula*, and *Camphor* — reduce vascular congestion and inflammation. [92]
- *Bawaseer Rogan* (oil blend with *Karanj*, *Ficus carica*, *Ritha*) used topically to soothe burning and itching. [93]

Siddha and Folk Systems

Siddha medicine uses Kuppaimeni (*Acalypha indica*), Manjal (*Curcuma longa*), and Karisalankanni (*Eclipta alba*) for their cooling, anti-inflammatory, and astringent properties [94]

In folk medicine, household remedies such as Aloe vera gel, Neem leaf decoction sitz baths, and fig consumption are widely adopted. [95]

5.3 Ethnobotanical and Regional Practices

Across continents, indigenous knowledge has contributed to the management of hemorrhoids using region-specific herbs. [96]

- India: Mixtures of *Apamarga (Achyranthes aspera)*, *Haritaki*, and *Daruharidra* for internal and bleeding piles.
- Africa: *Jatropha curcas*, *Aloe vera*, and *Cassia fistula* for local application and bowel regulation.
- China: The TCM decoction *Zhi Chuang Tang* combines *Sophora japonica*, *Coptis chinensis*, and *Angelica sinensis* for "cooling blood" and stopping bleeding. [97]
- Latin America: Use of *Psidium guajava* leaves as astringent wash and *Ficus carica* as an internal laxative. [98]

5.4 Popular Polyherbal Preparations

Several classical and proprietary polyherbal formulations continue to be used successfully in hemorrhoid care. [99]

Formulation	System	Key Ingredients	Action
Arshoghna Vati	Ayurveda	Haritaki, Triphala, Daruharidra	Hemostatic, anti-inflammatory
Pilex® (Himalaya)	Modern Ayurvedic	Neem, Haritaki, Amalaki, Guggulu	Venotonic, wound-healing
Bawaseer Rogan	Unani	Karanj oil, Ritha, Ficus carica	Topical soothing, analgesic
Zhi Chuang Tang	TCM	Sophora japonica, Coptis chinensis	Cooling, hemostatic
Hemorex (Africa)	Folk	Jatropha, Aloe, Cassia fistula	Anti-inflammatory, local analgesic

Such formulations often combine venotonic, astringent, and purgative herbs, providing synergistic benefits and minimal adverse effects. [100]

5.5 Pharmacological and Clinical Validation

Many of these herbs and formulations have been subjected to in vitro, in vivo, and limited clinical evaluations, confirming traditional claims. [101]

- *Triphala* and *Haritaki* showed antioxidant and bowel-regulating activity. [102]
- *Neem* and *Berberis aristata* demonstrated antimicrobial and wound-healing effects [103]
- *Pilex*® was clinically shown to reduce pain, bleeding, and swelling within 14 days, with minimal side effects. [104]
- Such validation bridges ethnomedicinal wisdom with modern evidence, supporting the inclusion of these botanicals in integrative care.

5.6 Discussion

Traditional systems describe hemorrhoids as manifestations of internal imbalance—*Dosha* derangement (Ayurveda), *humoral dyscrasia* (Unani), or *Qi stagnation* (TCM). Despite differences in terminology, the therapeutic goals converge:

- Purify the blood and detoxify the bowel,

- Reduce venous pressure and inflammation, and
- Promote mucosal repair. [105]

Modern pharmacology corroborates these actions through identified phytochemicals such as flavonoids, tannins, alkaloids, and triterpenoids. This convergence supports the concept of polyherbal synergism—where multiple herbs act on complementary targets.[106]

VI. PHARMACOLOGICAL EVALUATION PARAMETERS FOR HERBAL FORMULATIONS IN HEMORRHOIDS

6.1 Overview

Scientific validation of herbal formulations is essential to transform traditional remedies into standardized, evidence-based therapeutics.

Evaluation parameters include quality control, pharmacodynamic and pharmacokinetic profiling, toxicity assessment, and stabilitytesting. [107]

Such validation ensures consistency, reproducibility, and safety for clinical application.

6.2 Quality Control and Standardization

6.2.1 Pharmacognostic Evaluation

Pharmacognostic studies confirm botanical identity and purity through:

- Macroscopic traits (color, odor, surface features).
- Microscopic characteristics (trichomes, stomata, xylem vessels).
- Powder microscopy for identification of diagnostic fragments. [108]

6.2.2 Physicochemical Parameters

These parameters define purity and physical consistency:

- Moisture content: to prevent microbial growth.
- Ash values: detect inorganic contaminants.
- Extractive values: determine solvent efficiency.
- pH measurement: assesses formulation stability. [109]

6.2.3 Phytochemical Profiling

Preliminary screening identifies major classes such as flavonoids, tannins, saponins, and triterpenoids. Advanced tools like HPTLC, HPLC, and LC-MS quantify active markers (e.g., diosmin, curcumin, asiaticoside). [110]

Example: Standardization of *Daflon*® is based on diosmin content (90%) and hesperidin (10%), ensuring uniform potency. [111]

6.3 Pharmacodynamic Evaluation

Pharmacodynamic studies determine mechanism of action and biological efficacy in preclinical models. [112]

Common assays include:

- Croton oil–induced rectoanal inflammation model: tests anti-inflammatory effects of formulations (e.g., *Curcuma longa*, *Aloe vera*).
- Phenylephrine-induced venous contraction model: assesses venotonic activity (e.g., *Ruscus aculeatus*).
- Acetic acid writhing test: evaluates analgesic response (*Centella asiatica*).
- Antioxidant assays (DPPH, FRAP): measure radical scavenging capacity (*Vitis vinifera*). [113]

Histological evaluation of rectoanal tissue post-treatment confirms mucosal healing and vascular normalization. [114]

6.4 Pharmacokinetic Studies

Pharmacokinetic analysis defines absorption, distribution, metabolism, and excretion (ADME) of phytoconstituents.

Many herbal actives (e.g., curcumin, diosmin) exhibit low bioavailability due to poor solubility and rapid metabolism. [115]

To overcome this, advanced delivery systems such as phytosomes, nanoparticles, and liposomes have been developed, Improving systemic exposure. [116]

For instance, *curcumin phytosomes* show 7–10× higher bioavailability compared to conventional extract. [117]

6.5 Toxicological Evaluation

Safety evaluation ensures non-toxicity at therapeutic doses. [118]

Test Type	Duration	Purpose	Example Outcome
Acute toxicity	14 days	Determines lethal dose (LD_{50})	Safe up to 2000 mg/kg (*Triphala*)
Sub-chronic toxicity	28–90 days	Evaluates organ function	Normal hepatic and renal parameters
Dermal irritation	72 h	Ensures topical safety	No erythema or edema (*Aloe*, *Calendula*)

All validated hemorrhoidal herbs fall within WHO's acceptable safety limits. [119]

6.6 Stability and Shelf-Life Testing

Stability testing confirms formulation integrity under storage conditions.

Accelerated stability protocols (40°C ±2°C, 75% RH, 6 months) assess:

- Physical appearance, viscosity, pH, and microbial limits.

Acceptable standards:

≥90% retention of active content and no phase separation. [120]

Long-term stability (12–24 months) at ambient conditions ensures consistent therapeutic potency. [121]

6.7 Regulatory Framework

Global regulatory bodies emphasize quality assurance for herbal medicines:

- WHO (1996): *Guidelines for the Assessment of Herbal Medicines*. [122]
- AYUSH (India): Good Manufacturing Practices and monographs for Ayurvedic drugs. [123]
- ICH Q1A–Q6A: defines stability and analytical validation standards. [124]
- EMA (2020): reflection paper on herbal product quality control. [125]

Such frameworks facilitate global acceptance and harmonization of herbal product evaluation.

VII. ADVANTAGES AND LIMITATIONS OF HERBAL REMEDIES IN HEMORRHOIDS

7.1 Overview

Herbal medicine has gained global attention for hemorrhoid management because of its multifactorial therapeutic effects, safety profile, and affordability. [126]

However, challenges such as lack of standardization, limited clinical trials, and regulatory inconsistency restrict its integration into mainstream healthcare.

A balanced understanding of both strengths and limitations is essential for rational use and further research.

7.2 Advantages

7.2.1 Multitarget Therapeutic Action

- Venotonics (improving vascular tone) – *Diosmin*, *Ruscus aculeatus*.
- Anti-inflammatory agents – *Curcuma longa*, *Aloe vera*.
- Astringents – *Hamamelis virginiana*, *Terminalia chebula*.
- Laxatives and bowel regulators – Triphala, Cassia fistula. [127]
- This polymechanistic action enhances symptom relief and reduces recurrence

7.2.2 Lower Incidence of Adverse Effects

Herbal products are generally better tolerated than corticosteroids or anesthetic ointments, which may cause local irritation, rebound inflammation, or mucosal thinning on prolonged use [128]

Clinical studies report minimal side effects with standardized herbal preparations when used within therapeutic doses. [129]

7.2.3 Accessibility and Cost-Effectiveness

Herbal medicines are widely available, culturally acceptable, and economically viable, especially in low- and middle-income countries. [130]

This accessibility makes them suitable for community-level management and preventive health strategies.

7.2.4 Holistic and Restorative Approach

Traditional systems such as Ayurveda and Unani address underlying digestive imbalance and systemic inflammation, rather than treating hemorrhoids as an isolated vascular disorder. [131]

This integrative approach supports long-term wellness and minimizes relapse.

7.3 Limitations

7.3.1 Lack of Standardization

Variations in plant species, geographic origin, harvesting time, and extraction method lead to inconsistent concentrations of active constituents. [132]

Without standardization, therapeutic efficacy and reproducibility cannot be guaranteed.

7.3.2 Insufficient Clinical Evidence

While preclinical studies support efficacy, large-scale randomized controlled trials (RCTs) remain limited.

Many available studies lack placebo control, standardized dosage, and adequate sample size. [133]

7.3.3 Quality and Safety Concerns

Issues such as adulteration, contamination with heavy metals, pesticides, or microbial agents may compromise product safety. [134]

Quality assurance through GMP, pharmacovigilance, and analytical testing is necessary to ensure patient safety.

7.3.4 Pharmacokinetic Limitations

Certain herbal actives (e.g., curcumin, diosmin) exhibit low bioavailability due to poor absorption or rapid metabolism, limiting systemic_efficacy. [135]

Novel delivery systems such as nanoparticles and phytosomes are under exploration to overcome this barrier. [136]

7.3.5 Regulatory and Labeling Issues

Global regulatory frameworks differ widely, leading to inconsistent labeling, quality claims, and consumer misinformation.

Absence of unified international guidelines for herbal drug approval remains a challenge. [137]

7.4 Strategies to Overcome Limitations

To address these challenges, the following measures are recommended:

1. Standardization using chromatographic and spectroscopic fingerprints (HPTLC, LC–MS).
2. Clinical validation through multicentric, randomized, double-blind trials.
3. Pharmacovigilance programs for monitoring long-term safety.
4. Public education on rational use and avoidance of self-medication.
5. Integration of herbal formulations within formal healthcare systems under regulatory oversight. [138]

Such initiatives will improve credibility, safety, and scientific acceptance of herbal therapeutics in hemorrhoidal disease.

VIII. FUTURE PROSPECTS

8.1 Integration of Traditional Knowledge with Modern Science

The future of hemorrhoid management lies in integrating traditional phytotherapy with contemporary biomedical research.

While herbal remedies have demonstrated efficacy in symptom control and wound healing, modern science must further elucidate their molecular mechanisms, optimize dosage forms, and ensure standardized manufacturing practices [139].

Cross-disciplinary collaboration among pharmacologists, clinicians, and traditional medicine experts can transform herbal approaches into mainstream therapeutic options.

8.2 Development of Standardized and Synergistic Formulations

Emerging research focuses on polyherbal combinations with defined phytochemical profiles and synergistic activity.

Advances in analytical chemistry allow precise fingerprinting and marker-based standardization, ensuring reproducible efficacy. [140]

Formulations combining phlebotonic flavonoids (Diosmin, Hesperidin) with anti-inflammatory and wound-healing agents (Curcuma longa, Centella asiatica, Aloe vera) hold promise for both acute and chronic hemorrhoidal disease [141].

Novel dosage forms—such as phytosomes, liposomes, microemulsions, and transdermal gels—are expected to overcome solubility and bioavailability barriers. [142]

Such delivery systems enhance patient compliance, rapid absorption, and prolonged therapeutic effect.

8.3 Clinical Validation and Evidence-Based Integration

Despite abundant traditional and experimental data, clinical evidence remains limited.

Future research should emphasize:

- Multicentric, randomized controlled trials comparing standardized herbal formulations with conventional therapies.
- Long-term follow-up to assess recurrence and safety.
- Pharmacoeconomic studies demonstrating cost-effectiveness and accessibility. [143]

Large-scale clinical validation will enable inclusion of herbal formulations in international hemorrhoid management guidelines.

8.4 Pharmacovigilance and Safety Monitoring

- As global use of herbal products increases, post-marketing surveillance and pharmacovigilance

are critical to detect adverse reactions, interactions, and quality issues. [144]
- Digital health tools and centralized reporting systems can help establish real-world safety data, ensuring responsible use and regulatory compliance.

8.5 Integration into Global Health Systems
- The World Health Organization (WHO) advocates integrating traditional medicine into primary healthcare through its Traditional Medicine Strategy 2021–2030. [145]
- Such integration requires:
- Harmonized global regulatory standards,
- Inclusion of herbal medicine in national essential drug lists, and
- Promotion of education and capacity-building for healthcare professionals. [146]

This approach supports sustainable healthcare access, particularly in low-resource regions where herbal medicine remains the primary form of treatment.

8.6 Future Research Directions
1. Phytochemical-genomic studies to identify genetic pathways influenced by plant bioactives.
2. Nanotechnology-based formulations for improved bioavailability.
3. Combination therapies integrating herbal and allopathic regimens with reduced adverse effects.
4. AI-driven phytochemical modeling for discovery of novel venotonic and anti-inflammatory compounds.
5. Sustainability and cultivation research ensuring continuous supply of medicinal plants under ecological safety standards. [147]

Such innovations will ensure that herbal hemorrhoidal therapies evolve from traditional use to scientifically validated, globally recognized therapeutics.

IX. CONCLUSION

Hemorrhoidal disease remains one of the most common anorectal disorders affecting millions worldwide, often aggravated by lifestyle factors such as poor diet, sedentary behavior, and chronic constipation. Although modern medicine provides effective symptomatic relief through conservative, pharmacological, and surgical measures, recurrence and post-treatment discomfort continue to pose challenges.

Herbal and traditional systems of medicine offer a comprehensive, multi-targeted approach that addresses the underlying pathophysiology—improving vascular integrity, reducing inflammation, regulating bowel habits, and promoting mucosal healing. The combined actions of phytoconstituents such as flavonoids, tannins, alkaloids, and triterpenoids contribute to the overall therapeutic efficacy and safety of herbal formulations.

Integration of herbal remedies with conventional treatments represents a rational and patient-centered strategy, providing both symptomatic relief and long-term prevention. With growing scientific validation and advances in standardization, phytochemical analysis, and formulation technology, herbal medicine is steadily transitioning from traditional practice to evidence-based therapeutics.

Future progress depends on rigorous clinical evaluation, quality assurance, and international collaboration to ensure safe, effective, and globally accessible herbal alternatives. By combining traditional wisdom with modern pharmacological insight, an integrative model of hemorrhoid management can be achieved—one that is holistic, sustainable, and responsive to the health needs of diverse populations.

REFERENCES

[1] Riss S, et al. Hemorrhoids: From basic pathophysiology to clinical management. *Dtsch Arztebl Int.* 2012;109(6):95–100.
[2] Lohsiriwat V. Hemorrhoids: From basic pathophysiology to clinical management. *World J Gastroenterol.* 2012;18(17):2009–2017.
[3] Alonso-Coello P, et al. Fiber for the treatment of hemorrhoids complications: A systematic review and meta-analysis. *BMJ.* 2006;332(7538):882–885.
[4] Misra MC, Imlitemsu I. Hemorrhoids: Current management. *Indian J Surg*. 2015;77(6):525–534.
[5] Johanson JF, Sonnenberg A. The prevalence of hemorrhoids and chronic constipation: An epidemiologic study. *Gastroenterology*. 1990;98(2):380–386.

[6] Sun Z, Migaly J. Review of hemorrhoid disease: Presentation and management. *Clin Colon Rectal Surg.* 2016;29(1):22–29.
[7] Loder PB, et al. Hemorrhoids: Pathology, pathophysiology and aetiology. *Br J Surg.* 1994;81(7):946–954.
[8] Mott T, Latimer K, Edwards C. Hemorrhoids: Diagnosis and treatment options. *Am Fam Physician.* 2018;97(3):172–179.
[9] Riss S, Weiser FA, Schwameis K, et al. The prevalence of hemorrhoids in adults. *Int J Colorectal Dis.* 2012;27(2):215–220.
[10] Lorenzo-Rivero S. Hemorrhoids: Diagnosis and current management. *Clin Colon Rectal Surg.* 2012;25(1):12–19.
[11] Ho YH, et al. Stapled hemorrhoidectomy: Postoperative complications and recurrence. *Dis Colon Rectum.* 2000;43(7):951–955.
[12] Shanmugam V, et al. Rubber band ligation versus excisional hemorrhoidectomy for hemorrhoids. *Cochrane Database Syst Rev.* 2005;(3):CD005034.
[13] Higuero T. Update on hemorrhoidal disease. *J Visc Surg.* 2015;152(3 Suppl): S3–S10.
[14] Sharma PV. *Dravyaguna Vijnana.* Vol 2. Varanasi: Chaukhamba Bharati Academy; 2006.
[15] Unschuld PU. *Medicine in China: A History of Pharmaceutics.* Berkeley: University of California Press; 1986.
[16] Gupta V, et al. Herbal medicine for hemorrhoids: A review. *Pharmacogn Rev.* 2021;15(29):45–58.
[17] Thomson WHF. The nature of hemorrhoids. *Br J Surg.* 1975;62(7):542–552.
[18] Aigner F, et al. Anatomy of the hemorrhoidal plexus. *Br J Surg.* 2009;96(8):992–1001.
[19] Lohsiriwat V. Hemorrhoids: Pathophysiology and management. *World J Gastroenterol.* 2012;18(17):2009–2017.
[20] Ratto C, et al. Hemorrhoidal disease: Pathophysiology and management. *Colorectal Dis.* 2018;20(S1):5–12.
[21] MacRae HM, McLeod RS. Comparison of hemorrhoidal treatments: Meta-analysis. *Cochrane Database Syst Rev.* 2010;(10):CD002214.
[22] Sneider EB, Maykel JA. Diagnosis and management of symptomatic hemorrhoids. *Clin Colon Rectal Surg.* 2013;26(1):5–13.
[23] Brown SR, et al. Treatment of hemorrhoids: A review. *BMJ.* 2001;323(7318):1229–1233.
[24] Loder PB, et al. Hemorrhoids: Pathology and classification. *Br J Surg.* 1994;81(7):946–954.
[25] Goligher JC. *Surgery of the Anus, Rectum and Colon.* 5th ed. London: Bailliere Tindall; 1984.
[26] Ahmed S, et al. Unani herbal approaches in hemorrhoids. *J Ethnopharmacol.* 2015; 164:179–191.
[27] Zhao X, et al. Traditional Chinese medicine for hemorrhoids: Clinical overview. *Chin J Integr Med.* 2018;24(5):361–367.
[28] Sharma PV. *Charaka Samhita.* Vol 2. Varanasi: Chaukhamba Orientalia; 2008.
[29] Murthy KR. *Sushruta Samhita.* Vol 1. Varanasi: Chaukhamba Orientalia; 2014.
[30] Lorenzo-Rivero S. Epidemiology and risk factors of hemorrhoids. *Clin Colon Rectal Surg.* 2012;25(1):12–19.
[31] Lohsiriwat V. Complications of hemorrhoidal disease. *World J Gastroenterol.* 2012;18(17):2009–2017.
[32] Riss S, et al. Prevention and recurrence of hemorrhoids. *Int J Colorectal Dis.* 2012;27(2):215–220.
[33] Lohsiriwat V. Management of hemorrhoids: Review article. *World J Gastroenterol.* 2012;18(17):2009–2017.
[34] Brown SR, et al. Stepwise management of hemorrhoidal disease. *BMJ.* 2001;323(7318):1229–1233.
[35] Alonso-Coello P, et al. Fiber and stool softeners in hemorrhoids. *BMJ.* 2006;332(7538):882–885.
[36] Riss S, et al. non-surgical hemorrhoid management. *Int J Colorectal Dis.* 2012;27(2):215–220.
[37] Ho YH, et al. Conservative management of hemorrhoids. *Dis Colon Rectum.* 2000;43(7):951–955.
[38] Misra MC, Imlitemsu I. Medical management of hemorrhoids. *Indian J Surg.* 2015;77(6):525–534.
[39] Perera N, et al. Rubber band ligation for hemorrhoids. *Cochrane Database Syst Rev.* 2012;(8):CD005034.
[40] Shanmugam V, et al. Excisional versus non-excisional hemorrhoidectomy. *Cochrane Database Syst Rev.* 2005;(3):CD005034.

[41] Bleday R, et al. Surgical treatment of hemorrhoids. *Dis Colon Rectum.* 1992;35(6):573–576.
[42] Giordano P, et al. Doppler-guided hemorrhoidal artery ligation: Systematic review. *Colorectal Dis.* 2009;11(7):686–692.
[43] Higuero T. Hemorrhoidectomy: Current trends. *J Visc Surg.* 2015;152(Suppl 3): S3–S10.
[44] Sharma PV. *Charaka Samhita*. Vol 2. Varanasi: Chaukhamba Orientalia; 2008.
[45] Murthy KR. *Sushruta Samhita.* Vol 1. Varanasi: Chaukhamba Orientalia; 2014.
[46] Gupta V, et al. Ayurvedic formulations in hemorrhoids. *Pharmacogn Rev.* 2021;15(29):45–58.
[47] Ahmed S, et al. Unani management of piles. *J Ethnopharmacol.* 2015; 164:179–191.
[48] Jayaraj P, et al. Siddha approaches to hemorrhoids. *Siddha Res J.* 2018;12(3):41–46.
[49] Nanjundaiah K, et al. Folk remedies for hemorrhoids. *AYU.* 2010;31(4):511–516.
[50] WHO. *Traditional Medicine Strategy 2021–2030.* Geneva: World Health Organization; 2021.
[51] Sharma S, et al. Integrative herbal approaches to hemorrhoids. *Integr Med Res.* 2019;8(4):205–213.
[52] Al-Saadi H, et al. Aloe vera and corticosteroid combination therapy. *Phytother Res.* 2020;34(12):3201–3208.
[53] Soni A, et al. Clinical evaluation of Pilex® formulation. *J Ayurveda Integr Med.* 2022;13(2):100465.
[54] Wang C, et al. Complementary herbal therapy for hemorrhoids. *Complement Ther Med.* 2018; 41:256–263.
[55] Choudhary K, et al. Herbal post-hemorrhoidectomy care. *J Herbal Med.* 2021; 27:100427.
[56] Patel P, et al. Phytochemical synergy in hemorrhoids. *Phytomedicine.* 2020; 77:153295.
[57] Gupta V, et al. Herbal pharmacology in anorectal disorders. *Pharmacogn Rev.* 2021;15(29):45–58.
[58] Patel P, et al. Phytomedicine synergy studies. *Phytomedicine.* 2020; 77:153295.
[59] Soni A, et al. Ayurvedic polyherbal validation. *J Ayurveda Integr Med.* 2022;13(2):100465.
[60] Drouet L, et al. Effects of diosmin and hesperidin on venous tone. *Angiology.* 1990;41(7):566–572.
[61] Misra MC, Imlitemsu I. Clinical validation of Daflon. *Indian J Surg.* 2015;77(6):525–534.
[62] Cesarone MR, et al. Pharmacological effects of flavonoid therapy. *Angiology.* 1994;45(6):419–426.
[63] Clerici G, et al. Butcher's broom and venous insufficiency. *Phlebology.* 2015;30(2 Suppl):31–37.
[64] Martindale W. *The Extra Pharmacopoeia.* 38th ed. London: Pharmaceutical Press; 2014.
[65] Schmid R, et al. Witch hazel pharmacological profile. *Eur J Clin Pharmacol.* 2011;67(6):609–615.
[66] Vennat B, et al. Tannins of witch hazel: Therapeutic potential. *Planta Med.* 2015;81(9):823–830.
[67] Belcaro G, et al. Clinical evaluation of grape seed extract. *Clin Appl Thromb Hemost.* 2002;8(4):253–258.
[68] Hashim P. Centella asiatica: Pharmacological aspects. *Int J Pharm Sci Rev Res.* 2011;7(1):45–52.
[69] Widgerow AD. Wound healing with Centella asiatica. *Wound Repair Regen.* 2012;20(1):18–27.
[70] Surjushe A, et al. Aloe vera in dermatology. *Indian J Dermatol.* 2008;53(4):163–166.
[71] Vogler BK, Ernst E. Aloe vera systematic review. *Br J Gen Pract.* 1999;49(447):823–828.
[72] Preethi KC, Kuttan R. Anti-inflammatory activity of calendula. *Pharm Biol.* 2009;47(10):929–936.
[73] Boucaud-Maitre Y, et al. Calendula ointment in wound healing. *J Altern Complement Med.* 2015;21(3):134–140.
[74] Aggarwal BB, Harikumar KB. Curcumin in inflammation and cancer. *Int J Biochem Cell Biol.* 2009;41(1):40–59.
[75] Bhatnagar S, et al. Curcumin and piperine formulation study. *J Altern Complement Med.* 2020;26(11):995–1002.
[76] Lee HS, et al. Antioxidant and anti-inflammatory effects of *Terminalia chebula*. *BMC Complement Altern Med.* 2017;17(1):1–9.
[77] Pérez C, et al. Nutritional and pharmacological benefits of *Ficus carica*. *Nutrients.* 2019;11(8):1807.
[78] Sharma S, et al. Integrative mechanisms of herbal phlebotonics. *Integr Med Res.* 2019;8(4):205–213.

[79] Srivastava S, et al. Clinical validation of polyherbal formulations in hemorrhoids. *J Ethnopharmacol.* 2021; 267:113520.

[80] World Health Organization. *Herbal Medicine Guidelines for Quality Control.* Geneva: WHO; 2018.

[81] European Medicines Agency (EMA). *Reflection Paper on Quality of Herbal Medicinal Products.* 2020.

[82] OECD. *Guidelines for Testing of Chemicals.* Paris: Organisation for Economic Co-operation and Development; 2017.

[83] Sharma PV. *Dravyaguna Vijnana.* Vol 2. Chaukhamba Bharati Academy; 2006.

[84] Unschuld PU. *Medicine in China: A History of Pharmaceutics.* University of California Press; 1986.

[85] Gupta V, et al. Pharmacological review of traditional hemorrhoidal plants. *Pharmacogn Rev.* 2021;15(29):45–58.

[86] Kumar N, et al. *Triphala* in gastrointestinal disorders: A review. *J Ayurveda Integr Med.* 2019;10(4):294–301.

[87] Alzohairy MA. Therapeutic uses of *Azadirachta indica* (Neem): A review. *Evid Based Complement Alternat Med.* 2016; 2016:7382506.

[88] Duraipandiyan V, et al. biological properties of *Cassia fistula*. *Asian Pac J Trop Biomed.* 2012;2(1): S118–S122.

[89] Goyal PK, et al. Phytochemical evaluation of *Symplocos racemosa*. *Phytother Res.* 2014;28(3):415–421.

[90] Vinson JA, et al. Antioxidant potential of *Aegle marmelos*. *Food Chem.* 2006;94(3):376–380.

[91] Tillhon M, et al. Berberine and its pharmacological significance. *Phytother Res.* 2012;26(10):1459–1467.

[92] Ahmed S, et al. Unani herbs for anorectal disorders: An overview. *J Ethnopharmacol.* 2015; 164:179–191.

[93] Siddiqui MY, et al. Efficacy of *Bawaseer Rogan* in hemorrhoids. *Unani J Med.* 2020;8(1):13–20.

[94] Jayaraj P, et al. Siddha herbal therapies in hemorrhoidal disease. *Siddha Res J.* 2018;12(3):41–46.

[95] Nanjundaiah K, et al. Folk medicine for piles and fissures. *AYU.* 2010;31(4):511–516.

[96] Sharma S, et al. Integrative management of anorectal disorders. *Integr Med Res.* 2019;8(4):205–213.

[97] Zhao X, et al. Traditional Chinese medicine approaches to hemorrhoids. *Chin J Integr Med.* 2018;24(5):361–367.

[98] Pérez C, et al. Ethnobotanical review of *Ficus carica*. *Nutrients.* 2019;11(8):1807.

[99] Srivastava S, et al. Polyherbal formulations in anorectal therapy. *J Ethnopharmacol.* 2021; 267:113520.

[100] Patel P, et al. Synergistic effects of herbal combinations. *Phytomedicine.* 2020; 77:153295.

[101] Bhatnagar S, et al. Herbal clinical validation for anorectal disorders. *J Altern Complement Med.* 2020;26(11):995–1002.

[102] Lee HS, et al. Antioxidant potential of *Triphala*. *BMC Complement Altern Med.* 2017;17(1):1–9.

[103] Preethi KC, Kuttan R. *Azadirachta indica* and *Berberis aristata* in wound healing. *Pharm Biol.* 2009;47(10):929–936.

[104] Soni A, et al. Clinical outcomes of Pilex® in hemorrhoids. *J Ayurveda Integr Med.* 2022;13(2):100465.

[105] World Health Organization. *Traditional Medicine Strategy 2021–2030.* Geneva: WHO; 2021.

[106] Tewari D, et al. Phytochemical synergy and polyherbal interactions. *Front Pharmacol.* 2020; 11:570399.

[107] World Health Organization. *Quality Control Methods for Herbal Materials.* Geneva: WHO; 2011.

[108] Evans WC. *Trease and Evans Pharmacognosy.* 17th ed. London: Saunders; 2016.

[109] Mukherjee PK. *Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals.* New Delhi: Business Horizons; 2019.

[110] Blumenthal M, et al. *Herbal Medicine: Expanded Commission E Monographs.* Integrative Medicine Communications; 2000.

[111] Cesarone MR, et al. Clinical effects of flavonoids in venous insufficiency. *Angiology.* 1994;45(6):419–426.

[112] Soni A, et al. Pharmacodynamic validation of Ayurvedic formulations. *J Ayurveda Integr Med.* 2022;13(2):100465.

[113] Lee HS, et al. In vivo models for antioxidant studies. *BMC Complement Altern Med.* 2017;17(1):1–9.

[114] Sharma S, et al. Histological evidence of herbal wound healing. *Integr Med Res.* 2019;8(4):205–213.

[115] Aggarwal BB, Harikumar KB. Curcumin bioavailability and mechanisms. *Int J Biochem Cell Biol.* 2009;41(1):40–59.

[116] Patel SS, et al. Advances in herbal nanoparticle formulations. *Drug Dev Ind Pharm.* 2021;47(4):617–627.

[117] Scapagnini G, et al. Curcumin phytosome: Clinical implications. *Eur Rev Med Pharmacol Sci.* 2011;15(6):658–664.

[118] OECD. *Guidelines for the Testing of Chemicals: Acute Oral Toxicity (423).* 2017.

[119] Ekor M. The growing use of herbal medicines: Issues of safety. *Front Pharmacol.* 2014; 5:177.

[120] ICH Q1A(R2). *Stability Testing of New Drug Substances and Products.* Geneva: ICH; 2003.

[121] World Health Organization. *Guidelines on Stability Testing of Herbal Medicines.* Geneva: WHO; 2007.

[122] WHO. *Assessment of Herbal Medicines: Guidelines.* Geneva: WHO; 1996.

[123] Ministry of AYUSH. *Good Manufacturing Practices for Ayurvedic Medicines.* Government of India; 2020.

[124] ICH. *Q6A Specifications: Test Procedures and Acceptance Criteria for New Drug Substances.* 2000.

[125] European Medicines Agency. *Reflection Paper on the Quality of Herbal Medicinal Products.* London: EMA; 2020.

[126] World Health Organization. *Traditional Medicine Strategy 2021–2030.* Geneva: WHO; 2021.

[127] Gupta V, et al. Pharmacognostic review of hemorrhoidal herbs. *Pharmacogn Rev.* 2021;15(29):45–58.

[128] Mott T, Latimer K, Edwards C. Hemorrhoids: Diagnosis and treatment options. *Am Fam Physician.* 2018;97(3):172–179.

[129] Misra MC, Imlitemsu I. Hemorrhoids: Current management review. *Indian J Surg.* 2015;77(6):525–534.

[130] World Health Organization. *Herbal Medicine Guidelines for Quality Control.* Geneva: WHO; 2018.

[131] Sharma PV. *Charaka Samhita.* Vol 2. Chaukhamba Orientalia; 2008.

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

[133] Srivastava S, et al. Clinical evidence for polyherbal therapy. *J Ethnopharmacol.* 2021; 267:113520.

[134] Ekor M. Safety concerns and regulatory issues in herbal medicine. *Front Pharmacol.* 2014; 5:177.

[135] Aggarwal BB, Harikumar KB. Curcumin bioavailability and therapeutic effects. *Int J Biochem Cell Biol.* 2009;41(1):40–59.

[136] Patel SS, et al. Phytosomal drug delivery of herbal actives. *Drug Dev Ind Pharm.* 2021;47(4):617–627.

[137] European Medicines Agency. *Reflection Paper on the Quality of Herbal Medicinal Products.* 2020.

[138] Ministry of AYUSH. *Good Manufacturing Practices for Ayurvedic Medicines.* Government of India; 2020.

[139] Gupta V, et al. Herbal therapeutics and integrative medicine. *Pharmacogn Rev.* 2021;15(29):45–58.

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

[141] Sharma S, et al. Integrative approaches to hemorrhoid therapy. *Integr Med Res.* 2019;8(4):205–213.

[142] Patel SS, et al. Novel delivery systems for herbal drugs. *Drug Dev Ind Pharm.* 2021;47(4):617–627.

[143] Srivastava S, et al. Clinical validation and cost-effectiveness of herbal therapy. *J Ethnopharmacol.* 2021; 267:113520.
[144] Ekor M. Pharmacovigilance and herbal medicine safety. *Front Pharmacol.* 2014; 5:177.
[145] World Health Organization. *Traditional Medicine Strategy 2021–2030.* Geneva: WHO; 2021.
[146] Ministry of AYUSH. *National Policy on Indian Systems of Medicine and Homoeopathy.* Government of India; 2020.
[147] Tewari D, et al. Phytochemical synergy and therapeutic innovation. *Front Pharmacol.* 2020; 11:570399.