

The Hemostatic Potential of Shonitasthapana Mahakashaya: A Scientific Appraisal Bridging Ayurvedic Principles with Modern Pharmacology

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Abstract

Introduction: Ayurveda, the ancient Indian system of medicine, offers profound insights into health and disease. Acharya Charaka, in his seminal work, the Charaka Samhita, classified medicinal herbs into 50 groups of ten, known as Mahakashayas, based on their primary pharmacological action. The Shonitasthapana Mahakashaya is one such group, specifically designated for its hemostatic or anti-hemorrhagic properties. 'Shonita' refers to blood, and 'Sthapana' means to check or stabilize. This group of ten herbs is paramount in the management of various bleeding disorders (Raktapitta).

Objective: This article aims to provide a comprehensive review of the Shonitasthapana Mahakashaya, elucidating the classical Ayurvedic understanding and correlating it with contemporary pharmacological research. It delves into the individual properties of the ten constituent herbs, their synergistic action, and the probable mechanism by which they achieve hemostasis.

Methodology: A thorough review of classical Ayurvedic texts, including the Charaka Samhita with its commentaries, and modern scientific literature from databases like PubMed, Scopus, and Google Scholar was conducted. Information regarding the ethnobotanical, phytochemical, and pharmacological aspects of the ten herbs was compiled and analyzed.

Results: The Shonitasthapana Mahakashaya comprises ten herbs: Madhu (Honey), Madhuka (Glycyrrhiza glabra), Rudhira (a combination of Kumkuma - Crocus sativus or blood, Mocha rasa (Bombax ceiba), Mrittika (Mud/Clay), Lodhra (Symplocos racemosa), Gairika (Red Ochre), Priyangu (Callicarpa macrophylla), Sharkara (Sugar), and Lajja (Puffed Paddy). Analysis of these components reveals a predominance of Kashaya (astringent), Sheeta (cold), and Grahi (absorbent) properties. Phytochemical studies have confirmed the presence of tannins, flavonoids, alkaloids, saponins, and other bioactive compounds, which are known for their vasoconstrictor, anti-inflammatory, and wound-healing activities, contributing to their hemostatic effect.

Conclusion: The Shonitasthapana Mahakashaya represents a sophisticated and effective formulation for managing bleeding conditions. Its multi-pronged approach, targeting vasoconstriction, platelet aggregation, and coagulation cascade modulation, validated by modern scientific evidence, underscores

the profound wisdom of Ayurvedic pharmacology. Further clinical research is warranted to fully integrate this ancient knowledge into contemporary medical practice for managing hemorrhagic disorders.

Keywords: Shonitasthapana Mahakashaya, Ayurveda, Hemostasis, Rakta Stambhana, Anti-hemorrhagic, Raktapitta, Charaka Samhita, Pharmacology.

INTRODUCTION

Hemorrhage, or uncontrolled bleeding, is a critical medical condition that can arise from trauma, surgery, or various pathological states such as peptic ulcers, dysfunctional uterine bleeding, and bleeding disorders like hemophilia and thrombocytopenia [1]. Effective management of bleeding is crucial to prevent significant blood loss, hypovolemic shock, and mortality. While modern medicine offers various hemostatic agents, from local absorbable sponges to systemic pro-coagulant drugs, there is a growing interest in exploring natural, plant-based remedies that may provide a safer and more holistic approach [2]. Ayurveda, the traditional Indian system of medicine, has a rich and detailed understanding of hemorrhagic conditions, broadly classified under the term Raktapitta (bleeding from various orifices) [3]. The management principles in Ayurveda focus not just on arresting the bleed but also on pacifying the vitiated Doshas (humoral energies), particularly Pitta, which is primarily implicated in bleeding disorders due to its hot and penetrating nature [4].

Acharya Charaka, one of the principal contributors to Ayurveda, in his treatise Charaka Samhita, presented a unique classification of about 500 medicinal herbs into 50 groups, each containing ten herbs, based on their cardinal pharmacological action. These groups are known as the Mahakashayas or "great decoction groups" [5]. This classification is a testament to the advanced pharmacological thinking of ancient India, focusing on the functional utility of herbs rather than just their morphological characteristics.

Among these fifty groups is the **Shonitasthapana Mahakashaya**, a group dedicated to hemostasis [6]. The term 'Shonitasthapana' is derived from two Sanskrit words: 'Shonita' meaning 'blood' and 'Sthapana' meaning 'to check', 'to arrest', or 'to establish normalcy' [7]. Therefore, the herbs in this group are primarily Rakta Stambhana (hemostatic or anti-hemorrhagic). They are prescribed for conditions of excessive bleeding, both internal and external.

The genius of this formulation lies in its synergistic combination of herbs that work through multiple pathways to control bleeding. These herbs predominantly possess Kashaya (astringent), Sheeta (cold), and Ruksha (dry) properties. The Kashaya Rasa (astringent taste) is known to cause vasoconstriction (Samkocha) and absorption (Shoshana), which physically helps in staunching blood flow. The Sheeta Virya (cold potency) counteracts the heat (Ushnata) of Pitta Dosha, which is often the underlying cause of the liquefaction and outflow of blood [8].

This article aims to provide an in-depth exploration of the Shonitasthapana Mahakashaya. It will examine each of the ten constituents as described by Charaka, analyzing their properties based on classical Ayurvedic principles (Rasa, Guna, Virya, Vipaka, Karma) and correlating them with modern phytochemical and pharmacological research. By bridging this ancient wisdom with contemporary scientific understanding, we can better appreciate the therapeutic potential of this Mahakashaya in managing bleeding disorders.

Literary Review: The Ten Drugs of Shonitasthapana Mahakashaya

The Charaka Samhita, in the fourth chapter of Sutra Sthana, enumerates the ten ingredients of the

Shonitasthapana Mahakashaya.

The verse is as follows:

मधु मधुकं कुङ्कुमं मोचरसो मृत्कपालं लोध्रं गैरिकं प्रियङ्गुः शर्करा लाजा इति दशेमानि शोणितस्थापननि भवन्ति॥ (46)(च.सू.४/९)

Madhu, Madhukam, Kumkumam, Mocharaso, Mrutkapalam, Lodhram, Gairikam, Priyanguh, Sharkara, Laja iti dashemani Shonitasthapanani bhavanti (Ch.Su. 4/9) ^[6]

This formulation is unique as it includes not only herbs but also substances of animal and mineral origin, showcasing the holistic approach of Ayurvedic pharmacy.

The ten constituents are: ⁷¹,

Table 1: Dravya of Shonitasthapana Mahakashaya

S.no.	Dravya name/ Family	Rasa panchaka	Karma	Part used	Phytoconstituents
1	Madhu(honey)	Sara, ruksha, guru Kashaya, madhura rasa Madhura vipak Shita virya	Kaphashamak	-	fructose, glucose ^{61,62}
2	Madhuk Glycyrrhiza glabra Linn. Fabaceae	Guru, Snighdha Madhura rasa Madhura vipaka Shita virya	Vatapitta har	Root	Glycyrrhizin ⁶³ , isoliquiritin ⁶⁴
3	Rudhira Crocus sativus L. Iridaceae	Snighdha, Katu, tikta rasa, Katu vipak Ushna virya	Tridhoshshamak	Stigma/Stamen	crocin, picroc rocin, safranal ⁶⁵
4	Mocharasa (Shalmali) Bombax ceiba L. (Bombacaceae)	Laghu, Snighdha Kashaya rasa Katu vipak Shita virya	Kaphapitta har	Gum/ exudate	galactose, galacturonic acid, rhamnose ^{66,67}
5	Mritkapala	Laghu, ruksha Kashaya rasa Katu vipak Shita virya	Kaphapitta shamak	-	-
6	Lodhara Symplocos racemosa Roxb. Symplocaceae	Laghu, ruksha, sara Kashaya rasa Katu vipaka Shita virya	Kaphapitta har	Bark	tannins, saponins, phenols, alkaloids, and reducing sugars ⁶⁸
7	Gairik (Ochre)	Snighdha, Kashaya, Madhura,	Raktapita. Raktashodhaka,	-	Iron

		shitavirya, kaphapitta shamak			
8	Priyangu Callicarpa macrophylla Vahl. Verbenaceae	Guru, Ruksha Tikta, Kashaya, Madhura rasa Katu vipak Shita virya	Tridhoshshamak	Flower, Bark, Root	terpenoids, flavonoids, carbohydrate, lignans, ⁶⁹
9	Sharkara	Snighdha, guru, mradu Madhura rasa Madhura vipak Shita virya	Vatapittahar	-	-
10	Laja Oryza sativa L. Poaceae	Laghu, Snighdha Madura, Kashaya rasa Katu vipaka Shita virya	Pittavatashamak	Seed	alkaloids, flavonoids, steroids, and proteins ⁷⁰

This combination reflects a sophisticated understanding of synergy. While some ingredients like Lodhra are powerful astringents, others like Madhuka have soothing and healing properties, and substances like Madhu act as carriers (Yogavahi) and healing agents ^[10].

Pharmacology of Constituent Drugs

This section details the Ayurvedic and modern pharmacological properties of each ingredient, explaining its contribution to the overall hemostatic action of the Mahakashaya.

1. Madhu (Honey)

Ayurvedic Properties: Rasa (Taste) - Madhura (Sweet), Kashaya (Astringent); Guna (Quality) - Guru (Heavy), Ruksha (Dry); Virya (Potency) - Sheeta (Cold); Vipaka (Post-digestive effect) - Madhura (Sweet); Karma (Action) - Vranaropana (Wound healing), Sandhaniya (Uniting), Lekhana (Scraping), Yogavahi (Catalytic agent) ^[11].

Modern Pharmacology: Honey is a complex substance containing sugars, enzymes (like glucose oxidase), amino acids, vitamins, and minerals. Its high osmolarity and low pH contribute to its antibacterial properties ^[12]. The enzyme glucose oxidase produces hydrogen peroxide, a mild antiseptic ^[13]. Importantly for hemostasis, honey promotes autolytic debridement, reduces inflammation, and stimulates the growth of granulation and epithelial tissues, which is crucial for sealing a wound ^[14]. Its viscous nature provides a protective barrier, and its astringent quality helps in constricting blood vessels. As a Yogavahi, it enhances the absorption and efficacy of the other herbs in the formulation ^[15].

2. Madhuka (Glycyrrhiza glabra L.)

Ayurvedic Properties: Rasa - Madhura (Sweet); Guna - Guru (Heavy), Snigdha (Unctuous); Virya - Sheeta (Cold); Vipaka - Madhura (Sweet); Karma - Raktapittahara (Alleviates bleeding disorders), Vranaropana (Wound healing), Chakshushya (Good for eyes), Balya (Strength promoting) ^[16].

Modern Pharmacology: The primary active constituent of Licorice is glycyrrhizin. It also contains numerous flavonoids and isoflavonoids like glabridin and liquiritigenin ^[17]. These compounds have demonstrated significant anti-inflammatory, antioxidant, and demulcent properties ^[18]. Glycyrrhizin has a structure similar to corticosteroids, which may explain its potent anti-inflammatory effects, helping to reduce capillary fragility and permeability ^[19]. Its soothing and demulcent action protects mucous membranes, which is beneficial in cases of gastrointestinal bleeding. Studies have also indicated its ability to promote healing of gastric ulcers ^[20].

3. Rudhira (Kumkuma)

Kumkuma (Crocus sativus L.)

Ayurvedic Properties: Rasa - Katu (Pungent), Tikta (Bitter); Guna - Snigdha (Unctuous); Virya - Ushna (Hot - though used in this cold potency formula for its specific action on blood); Vipaka - Katu (Pungent); Karma - Varnya (Improves complexion), Rakta Shodhaka (Blood purifier), Vranahara (Heals ulcers) ^[21]. Despite its Ushna Virya, it is used in minute quantities and is considered Tridosahara (pacifies all three doshas). Its primary role here is likely related to its effect on blood circulation and repair.

Modern Pharmacology: Saffron's main components are crocin, crocetin, and safranal. It exhibits strong antioxidant and anti-inflammatory properties ^[22]. Studies have shown it can influence platelet aggregation, though this effect can be dose-dependent ^[23]. Its inclusion may be to modulate the clotting process and prevent excessive thrombosis while promoting healthy clot formation.

- **Rakta (blood)- in Ayurveda context rakta has many synonyms as rudhira, shonita, aashrik**
- Guna – laghu, snigdha
- Rasa – Madhura, lavan
- Vipak -Madhura
- Virya – Ushna
- Karma– kaphavata shamak, pitta vardhak, aartavjanan, balaya, shonitasthapan

4. Mocharasa (Bombax ceiba L.)

Ayurvedic Properties: Rasa - Kashaya (Astringent); Guna - Laghu (Light), Snigdha (Unctuous); Virya - Sheeta (Cold); Vipaka - Katu (Pungent); Karma - Grahi (Absorbent/Anti-diarrheal), Raktapittahara (Alleviates bleeding), Shothahara (Anti-inflammatory) ^[27].

Modern Pharmacology: The resin is rich in tannins (e.g., tannic and gallic acid), which are powerful astringents ^[28]. Tannins act by precipitating proteins on the surface of bleeding tissues, forming a protective layer that arrests capillary oozing and promotes vasoconstriction ^[29]. This mechanism is fundamental to its role as a Raktastambhana agent. It is classically used for diarrhea, dysentery, and various bleeding conditions like menorrhagia and bleeding piles ^[30].

5. Mrittika (Baked Earth)

Ayurvedic Properties: Rasa - Kashaya (Astringent); Guna - Ruksha (Dry), Sheeta (Cold); Karma - Raktastambhana (Hemostatic), Shothahara (Anti-inflammatory), Vishaghna (Anti-toxic) ^[31].

Modern Pharmacology: Clay, particularly bentonite and kaolin, has been used for millennia to stop bleeding. Clay particles possess a negative surface charge which activates Factor XII (Hageman factor) in the intrinsic pathway of the coagulation cascade ^[32], ^[33]. This initiates a chain reaction leading to the formation of a fibrin clot. Modern hemostatic agents like QuikClot® utilize zeolite, a type of clay, for this very reason ^[34]. Its absorbent and drying properties also help to concentrate clotting factors at the site of injury.

6. Lodhra (*Symplocos racemosa*)

Ayurvedic Properties: Rasa - Kashaya (Astringent); Guna - Laghu (Light), Ruksha (Dry); Virya - Sheeta (Cold); Vipaka - Katu (Pungent); Karma - Chakshushya (Good for eyes), Grahi (Absorbent), Raktapittahara (Alleviates bleeding disorders), specifically indicated for Pradara (menorrhagia) [35].

Modern Pharmacology: The bark of Lodhra is rich in alkaloids like loturine and colloturine, and a high concentration of tannins [36]. Its potent astringent and anti-inflammatory properties are well-documented [37]. Pharmacological studies have validated its efficacy in managing uterine bleeding disorders. It is believed to regulate ovarian hormones and reduce uterine muscle contractility, thereby controlling menorrhagia [38]. Its high tannin content contributes directly to local vasoconstriction and protein precipitation at the bleeding site [39].

7. Gairika (Red Ochre)

Ayurvedic Properties: Rasa - Madhura (Sweet), Kashaya (Astringent); Guna - Snigdha (Unctuous), Sheeta (Cold); Karma - Raktapittahara (Alleviates bleeding), Hikkashamana (Alleviates hiccups), Visha hara (Anti-toxic) [40].

Modern Pharmacology: Gairika is a natural mineral ore of iron, consisting mainly of ferric oxide (Fe₂O₃). While it can be a source of iron, its primary role in this formulation is hemostatic. Like clay, its particulate nature can provide a physical matrix to support clot formation. Its cooling property (Sheeta Virya) is essential for pacifying Pitta. Ferric salts are known to be protein precipitants and astringents, which can help in arresting capillary bleeding when applied locally [41].

8. Priyangu (*Callicarpa macrophylla*)

Ayurvedic Properties: Rasa - Tikta (Bitter), Kashaya (Astringent), Madhura (Sweet); Guna - Laghu (Light), Ruksha (Dry); Virya - Sheeta (Cold); Vipaka - Katu (Pungent); Karma - Raktapittahara (Alleviates bleeding), Dahaprashamana (Alleviates burning sensation), Sandhaniya (Promotes union) [42].

Modern Pharmacology: The plant contains flavonoids, terpenoids, and phenylpropanoids [43]. Studies have shown its extract to possess significant anti-inflammatory, analgesic, and wound-healing properties [44]. Its astringent action, attributed to tannins, aids in hemostasis. It is traditionally used for bleeding gums, internal hemorrhages, and as a cooling application for headaches and fevers [45].

9. Sharkara (Sugar)

Ayurvedic Properties: Rasa - Madhura (Sweet); Guna - Guru (Heavy), Snigdha (Unctuous); Virya - Sheeta (Cold); Vipaka - Madhura (Sweet); Karma - Dahaprashamana (Alleviates burning), Tarpana (Nourishing), Raktapittanuta (Alleviates bleeding disorders) [46].

Modern Pharmacology: Sugar, like honey, has a high osmolarity. When applied to wounds, this osmotic gradient draws fluid out of the tissues, reducing edema and inhibiting bacterial growth [47]. This dehydrating environment also helps to concentrate platelets and clotting factors. Furthermore, sugar provides a direct source of energy for cellular repair processes. Its cooling and soothing properties help to pacify the inflammation and burning sensation associated with Pitta-driven hemorrhage [48].

10. Laja (Puffed Paddy)

Ayurvedic Properties: Rasa - Madhura (Sweet), Kashaya (Astringent); Guna - Laghu (Light), Ruksha (Dry); Virya - Sheeta (Cold); Vipaka - Madhura (Sweet); Karma - Grahi (Absorbent), Tarpana (Nourishing), Chardinigrahana (Anti-emetic), Raktapittahara (Alleviates bleeding) [49].

Modern Pharmacology: Puffed paddy is essentially parched rice. It is light, dry, and highly absorbent. In the context of hemostasis, its Grahi (absorbent) and Ruksha (drying) properties are paramount. It can absorb excess fluid from a wound or the gastrointestinal tract, helping to check fluid loss and concentrate

blood components to facilitate clotting. It is also cooling and nourishing, making it an ideal substance for managing bleeding associated with debility and inflammation [50].

Probable Mode of Action

The hemostatic efficacy of the Shonitasthapana Mahakashaya stems from a multi-targeted, synergistic mechanism. It does not rely on a single pathway but integrates several actions to arrest bleeding effectively and promote healing.

1. **Astringent Action (Kashaya Rasa):** This is the primary mechanism. Ingredients like **Lodhra**, **Mocharasa**, **Priyangu**, and **Laksha** are rich in tannins. Tannins precipitate proteins, leading to vasoconstriction of capillaries and small blood vessels at the site of bleeding. This reduces blood flow and forms a protective layer, sealing the injured surface [29], [39].
2. **Activation of Coagulation Cascade:** Mineral components like **Mrittika (Clay)** and **Gairika (Ochre)** provide a negatively charged surface that activates the intrinsic coagulation pathway, specifically Factor XII. This triggers a cascade of enzymatic reactions, culminating in the conversion of fibrinogen to fibrin, forming a stable blood clot [32], [33].
3. **Cooling and Anti-Pitta Action (Sheeta Virya):** According to Ayurveda, excess Pitta (heat) is a primary cause of hemorrhage (Raktapitta). The majority of the ingredients, including **Madhuka**, **Lodhra**, **Mocharasa**, **Sharkara**, **Laja**, and **Gairika**, possess Sheeta Virya (cold potency). This systemic cooling effect counteracts the heat of Pitta, reducing blood vessel dilation and capillary fragility, thereby controlling the tendency to bleed [8].
4. **Absorption and Drying (Grahi & Ruksha Guna):** Ingredients like **Laja**, **Mocharasa**, and **Mrittika** have absorbent and drying properties. They help to absorb excess blood and serum from the bleeding site, concentrating platelets and clotting factors, which accelerate the formation of a clot [31], [49].
5. **Wound Healing and Tissue Repair (Vranaropana):** The action does not stop at just arresting the bleed. **Madhu**, **Madhuka**, and **Laksha** have proven wound-healing properties [14], [20], [25]. They reduce inflammation, prevent secondary infection, and promote the regeneration of healthy tissue, ensuring a complete and robust recovery.
6. **Synergistic and Catalytic Action (Yogavahi):** **Madhu (Honey)** acts as a Yogavahi, a substance that enhances the potency and penetration of other drugs in the formulation. It ensures that the active principles of the other nine ingredients are effectively delivered to the target tissues [15].

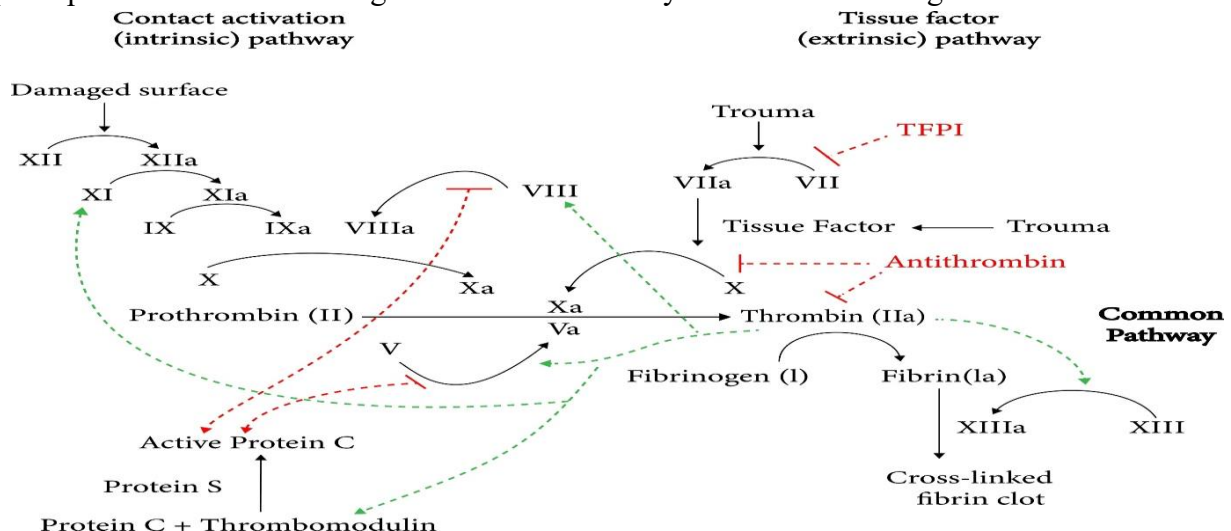


Fig. 1: Mode of Action**Discussion**

The formulation of the Shonitasthapana Mahakashaya is a prime example of the brilliance of Ayurvedic polyherbal principles. Acharya Charaka did not simply list ten hemostatic herbs; he curated a combination of plant, animal, and mineral substances that work in concert to address the multifaceted nature of hemorrhage.

The Mahakashaya's approach is holistic. It provides immediate local action through astringency and coagulation activation (e.g., Lodhra, Mrittika), while also delivering a systemic cooling and Pitta-pacifying effect (e.g., Madhuka, Sharkara). This dual action is crucial for treating conditions like Raktapitta, where both local vessel rupture and systemic heat are implicated.

The Sanskrit term 'Rudhira' corresponds to blood. In contemporary medical science, blood transfusion is a standard procedure to address conditions of significant blood loss or diminished hemoglobin (Hb) levels. The detailed description of 'Rudhira' in the classical texts by the ancient sage Charaka provides textual evidence for the principle that blood is replenished by blood itself (Rakta Dhatu is nourished by its own kind). This concept further highlights the fundamental objective of Ayurveda, which is the maintenance of 'Samyavastha'—a state of physiological equilibrium or homeostasis.

Modern pharmacology validates these ancient principles. The discovery of tannins causing protein precipitation mirrors the Ayurvedic concept of Kashaya Rasa causing Stambhana (stoppage). The role of clay in activating the clotting cascade provides a molecular basis for the use of Mrittika. This convergence of ancient text and modern science builds a strong case for the rational use of this Mahakashaya.

The potential clinical applications are vast. It could be used for:

- **Gastrointestinal Bleeding:** Peptic ulcers, gastritis.
- **Gynecological Bleeding:** Menorrhagia, metrorrhagia.
- **Epistaxis:** Nosebleeds.
- **Bleeding Gums** and other dental hemorrhages.
- **Hemoptysis and Hematemesis:** As an adjuvant therapy.
- **Topical application:** For cuts and wounds.

The safety profile of these natural ingredients is generally high, especially when compared to systemic synthetic hemostatic drugs, which can carry a risk of thromboembolism ^[51]. However, standardization, quality control, and dosage determination based on modern clinical trials are essential steps for its wider acceptance and integration into mainstream medicine. Future research should focus on creating standardized extracts of this Mahakashaya and conducting randomized controlled trials to evaluate its efficacy and safety in various bleeding conditions.

Conclusion

The Shonitasthapana Mahakashaya, as detailed in the Charaka Samhita, is a rationally designed hemostatic formulation. Its ten ingredients provide a comprehensive therapeutic strategy that includes vasoconstriction, activation of the coagulation cascade, systemic cooling, inflammation reduction, and promotion of tissue repair. The individual properties of the herbs and their synergistic action are well-supported by both classical Ayurvedic texts and modern pharmacological studies. This ancient combination holds significant promise as a safe and effective treatment for a wide range of bleeding disorders. It stands as a powerful reminder of the profound and enduring wisdom of Ayurveda and

highlights the need for further scientific investigation to unlock the full potential of such classical formulations for the benefit of global health.

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