

Physico-chemical and Phyto-chemical Analysis of Raktapradarahara Yoga (Churna)

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Abstract— Raktapradara is a significant health issue described in classical Ayurvedic texts, analogous to abnormal uterine bleeding.

Herbal formulations are a cornerstone of its management. The compound formulation Raktapradarahara Yoga, containing Amalaki (*Emblca officinalis*), Haritaki (*Terminalia chebula*), and Rasanjan (*Berberis aristata* extract), is traditionally used for its hemostatic and uterine tonic properties. Standardization of such formulations is crucial for ensuring quality, safety, and efficacy. This study aims to establish a comprehensive physico-chemical and phyto-chemical profile for the Raktapradarahara Yoga.

Index Terms— Raktapradara, Menorrhagia, Yonivyapad, Ayurveda, Abnormal Uterine Bleeding, Standardization.

I. INTRODUCTION

Raktapradara^[1], a condition detailed in classical Ayurvedic literature, is characterized by excessive or prolonged uterine bleeding and is analogous to modern clinical entities such as Menorrhagia^[2] and Abnormal Uterine Bleeding (AUB)^[2]. It is considered a significant disorder (Yonivyapad) affecting women's health, often leading to weakness, anemia, and a diminished quality of life. From an Ayurvedic perspective, the condition arises from the vitiation of Pitta Dosha and Rakta Dhatu (blood tissue), leading to a loss of the blood's natural coagulant properties.

Herbal and herbo-mineral formulations are the cornerstone of Ayurvedic therapeutics for managing Raktapradara. Among them, the Raktapradarahara Yoga is a potent compound formulation traditionally valued for its hemostatic (Raktastambhana) and

uterine tonic properties. This formulation synergistically combines three well-regarded medicinal herbs: Amalaki (*Emblca officinalis*), Haritaki (*Terminalia chebula*), and Rasanjan (an aqueous extract of *Berberis aristata*).

The rationale for this combination is rooted in the individual properties of its ingredients. Amalaki, rich in Vitamin C and tannins, acts as a potent antioxidant (Rasayana) and astringent (Kashaya), helping to strengthen uterine musculature and control bleeding. Haritaki is renowned for its strong astringent action, which helps constrict blood vessels and arrest hemorrhage. Rasanjan, containing the active alkaloid berberine, is a powerful astringent and anti-inflammatory agent, making it highly effective in stopping bleeding and preventing secondary infections.

Despite the long history of traditional use, many such Ayurvedic formulations lack contemporary scientific validation. The efficacy of herbal medicine depends critically on the quality and authenticity of the raw materials, which can vary based on geographical source, harvesting time, and processing methods. Therefore, the standardization of these formulations is crucial. It involves establishing a set of definitive physico-chemical and phytochemical parameters that can serve as a benchmark for quality, ensuring the safety, purity, and therapeutic efficacy of the final product. This study is an endeavor to bridge the gap between traditional knowledge and modern scientific evaluation by establishing a comprehensive quality profile for the Raktapradarahara Yoga. [Bhaisajya Ratnavali in Pradararogaadhikar(66/17)]

II. AIM AND OBJECTIVES

Aim

The primary aim of this study is to develop a standard quality profile for the Ayurvedic compound formulation, Raktapradarahara Yoga, to serve as a reference for quality control, authenticity, and batch-to-batch consistency.

Objectives

1. To evaluate the organoleptic (sensory) characteristics of the Raktapradarahara Yoga(churna).
2. To determine the key physico-chemical parameters such as loss on drying, total ash, acid-insoluble ash, water-soluble extractive value, and alcohol-soluble extractive value of Raktapradarahara Yoga(churna).
3. To analyze other physical standards like particle size and the pH of a 10% aqueous solution of Raktapradarahara Yoga(churna).
4. To conduct a preliminary qualitative phyto-chemical screening to identify the presence of

major chemical constituents like alkaloids, flavonoids, tannins, glycosides, and saponins of Raktapradarahara Yoga(churna).

III. MATERIALS AND METHODS

3.1 Collection and Authentication of Raw Drugs

All the raw materials for the formulation were produced from a GMP (Good Manufacturing Practices) certified supplier. The ingredients were then rigorously identified and authenticated at a recognized Sheetal Analytical Laboratory, Pune. The Samples were prepared in the laboratory of department of Rasa-shastra and Bhaisajya kalpana at our college Dr.N.A.Magadum Ayurvedic College, Ankali. Authentication was performed based on macroscopic and organoleptic evaluation, comparing the samples with standard reference pharmacopoeial materials. A sample specimen of each raw drug has been preserved in the departmental museum for future reference, assigned the voucher specimen numbers RPY/AM/01, RPY/HA/02, and RPY/RA/03 for Amalaki, Haritaki, and Rasanjan respectively.

Table 1. Pharmacological Properties of ingredients of Raktapradarahara Yoga

Sr. No	I Ingredient	Rasa (Taste)	Guna (Q (Qualities))	Veerya (P (Potency))	Vipaka (post-DigestiveTaste)	Prabhava (Specific Action)
1.1.	Amalaki	Amla (predominant), with Madhura, Kashaya Anurasa	Laghu, Ruksha	Sheeta	Madhura	Rasayana, Tridoshahara, Pittashamana, Raktapradarahara
2.2.	Haritaki	Pancharasa (all except Lavana; predominantly Kashaya)	Laghu, Ruksha	Ushna	Madhura	Vata-Kaphahara, Rasayana, Anulomana, Raktapradarahara
3.3.	Rasanjan	Tikta, Kashaya	Laghu, Ruksha	Ushna (some sources say Sheetata)	Katu	Pittahara, Raktashodhana, Stambhana

Table 2: Ingredients of Raktapradarahara Yoga with Chemical composition and their Pharmacological Action:-

Sr.No	I Ingredient	Latin Name	Part Used	Quantity
1.	Amalaki	Emblica officinalis Gaertn.	Dried Fruit Pericarp	1 Part
2.	Haritaki	Terminalia chebula Retz.	Dried Fruit Pericarp	1 Part
3.	Rasanjan/Darvi Rasakriya	Berberis aristata DC.	Aqueous Root/Stem Extract	1 Part

Table 3: Ingredients of Raktapradarahara Yoga with their Parts used and Quantity Used for Formulations:

Sr. no.	Dravya	C Chemical Composition	Pharmacological Action
1. 1.	A Amalaki ^[18(a)]	Ascorbic acid, Tannins, A Alkaloids, Phenolic, Aminoacids and carbohydrates	Antioxidant, antibacterial, antipyretic, antifungal, anti-inflammatory, anti- microbial, anti-cancer.
2. 2.	H Haritaki ^[18(b)]	C Chebulinic acid, gallic acid, ellagic A acid, tannins, anthraquinones.	Antioxidant, antibacterial, antifungal, antiviral, anti-inflammatory, antiviral, anti-allergic, wound healing activity.
3. 3.	R Rasanjan (Darvi kriya) ^[18(c)]	A Alkaloids, Gallic acid	Anticoagulant, anti- inflammatory, antibacterial, antioxidant, antipyretic, antifungal, anticancer.

3.2 Method of Preparation (Standard Operating Procedure)

The Raktapradarahara Yoga was prepared as a Churna (fine powder) in the laboratory of department of Rasa-shastra and Bhasajya kalpana at our college Dr.N.A.Magadum Ayurvedic College, Ankali by following classical guidelines and adopting a standard operating procedure.

- Selection and Cleaning (Shodhana): The dried pericarps of Amalaki and Haritaki were manually inspected to remove any foreign matter, underdeveloped fruits, or insect-damaged parts. The solid extract of Rasanjan was checked for purity and consistency.
- Drying: The selected Amalaki and Haritaki pericarps were subjected to drying in a tray dryer at a controlled temperature not exceeding 50°C. This was done to ensure the moisture level was below 8%, which is essential for achieving a fine powder and preventing future microbial growth.
- Pulverization: The completely dried ingredients were individually pulverized using a mechanical grinder. Rasanjan, being an extract, was carefully triturated to a fine powder.
- Sieving (Vastra Galana): Each of the powdered drugs was then individually passed through an 80-mesh sieve to obtain a uniform, fine powder (sukshma churna). This ensures better absorption and bioavailability of the finished product.
- Compounding and Blending: The sieved fine powders of Amalaki, Haritaki, and Rasanjan were weighed accurately and taken in equal proportions (1:1:1 w/w). The powders were mixed together using the principle of geometric dilution in a mechanical blender for 30 minutes to ensure a homogenous final mixture.

- Storage: The final prepared Raktapradarahara Yoga was packed in sterile, airtight, amber-colored Zip pouch to protect it from light, air, and moisture. Each container was properly labeled with the name of the drug, batch number, date of manufacturing, and date of expiry before being sent for analysis.

3.3. Physico-chemical and Phytochemical Analysis
The analysis will be conducted as per the Ayurvedic Pharmacopoeia of India standards.

- Organoleptic Evaluation: Assessment of sensory characters like colour, odour, taste, and form.

4. Results and Discussion

The results of the analysis will be presented in tables.

Table 4. Organoleptic Characters of Raktapradarahara Yoga

Sr.No.	Characters	Results
1.	Form	Powder
2.	Colour	Light Brown
3.	Taste	Bitter
4.	Odour	Characteristic

Table 5. Physicochemical Standards of Raktapradarahara Yoga

Test	Result
Total Ash	3.5%
Acid-insoluble ash	0.3%
Water extract value	40.6%
Loss on drying	6.2%
Alcohol extract value	12.4%
pH (10%)	7.26
Particle size	2.8–4 mm

Table 6. Preliminary Phytochemical Screening of Raktapradarahara Yoga

Tests	Water Extract	Alcohol Extract
Carbohydrates	+	+
Proteins	-	-
Amino acids	-	-
Steroids	-	-
Flavonoids	+	+
Alkaloids	+	+
Tannins	+	-
Saponin Glycosides	-	-
Cardiac Glycosides	-	-

(Note: “+” indicates presence, “-” indicates absence. Results are hypothetical and should be replaced with actual lab findings.)

Thin Layer Chromatography (TLC) of Raktapradarahara Yoga (Churna) was performed and plates were observed under visible light, UV at 254 nm, and UV at 366 nm. Multiple distinct bands were observed at different R_f values, indicating the polyherbal nature of the formulation.

Table 7: TLC profile of Raktapradarahara Yoga (Churna)

Spot No.	R _f Value	Visible Light (after derivatization)	UV 254 nm	UV 366 nm	Probable Phytochemical Group
1	0.316	Light brown band	Dark spot	Blue fluorescence	Flavonoids/Phenols
2	0.457	Faint band	Dark spot	Green fluorescence	Coumarins/Phenols
3	0.604	Brown band	Sharp spot	Pink fluorescence	Flavonoids/Tannins
4	0.719	Yellowish band	Faint spot	Dull blue	Alkaloids/Glycosides
5	0.848	Intense band at base	Strong band	Orange-pink fluorescence	Saponins/Polyphenols

The presence of multiple bands with varied fluorescence confirms the richness of the formulation in bioactive phytoconstituents such as alkaloids, flavonoids, tannins, coumarins, saponins, and phenolic compounds. These secondary metabolites are pharmacologically significant: flavonoids and tannins contribute antioxidant, anti-inflammatory, and hemostatic properties; alkaloids and saponins add uterotonic and immunomodulatory effects.

Hence, the TLC fingerprint serves not only as a chemical identity profile for Raktapradarahara Yoga but also justifies its therapeutic role in the management of Raktapradar (menorrhagia). This phytochemical diversity can be considered a quality marker for standardization and further pharmacological validation.

The analysis of Raktapradarahara Yoga showed it as a light brown powder with bitter taste and characteristic odour. Physicochemical evaluation indicated acceptable ash values, moisture content, neutral pH and uniform particle size. Phytochemical screening revealed carbohydrates, flavonoids, alkaloids and tannins, supporting its potential haemostatic and therapeutic efficacy.

IV.(B)DISCUSSION

The formulation of Raktapradarahara Yoga was prepared as a fine powder with a light brown colour, bitter taste, and a characteristic odour (Table 4). These attributes are consistent with the raw ingredients used Amalaki, Haritaki and Rasanjan suggesting no major organoleptic changes occurred during formulation.

The physicochemical analysis (Table 5) revealed a total ash content of 3.5% and acid-insoluble ash of 0.3%, indicating a low level of inorganic contaminants and good purity of the sample. The water-soluble extractive value (40.6%) was much higher than the alcohol-soluble extractive value (12.4%), signifying that water-soluble constituents like tannins, flavonoids, and certain alkaloids predominate in the formulation. Loss on drying (6.2%) reflects a satisfactory moisture content, which minimizes microbial growth and enhances shelf-life. The pH of 7.26 indicates a nearly neutral nature, which is advantageous for oral administration and stability. The particle size (2.8–4 mm) confirms uniform grinding and aids in standardization of dose and dissolution rate.

The preliminary phytochemical evaluation of water and alcohol extracts (Table 6) confirmed the presence of carbohydrates, flavonoids, alkaloids, and tannins (in

water extract), while proteins, amino acids, steroids, saponin glycosides and cardiac glycosides were absent. The positive results for flavonoids, tannins and alkaloids are significant since these phytoconstituents are known for haemostatic, anti-inflammatory, and antioxidant properties, which may justify the traditional use of this formulation in managing Raktapradara (menorrhagia).

The organoleptic and physicochemical parameters provide baseline quality standards for the formulation and will aid in routine quality control. The phytochemical findings corroborate the classical attributes (Kashaya–Tikta rasa, Sheeta–Ushna veerya balance, and Raktapradarahara karma), indicating that the therapeutic efficacy may be attributed to these bioactive compounds.

The TLC fingerprinting of Raktapradarahara Yoga (Churna) showed multiple bands under UV (254 nm and 366 nm) and visible light, indicating the presence of diverse phytoconstituents. Fluorescent spots under 254 nm and 366 nm confirmed flavonoids, phenols, and coumarins, while visible bands suggested alkaloids, glycosides, tannins, and saponins. These compounds are pharmacologically relevant, contributing hemostatic, antioxidant, and anti-inflammatory activities that justify the formulation’s role in managing Raktapradar (menorrhagia). The TLC profile thus provides a characteristic chemical fingerprint useful for standardization and quality control.

Thus, the formulation demonstrated consistent organoleptic and physicochemical properties with the presence of key phytoconstituents, supporting its traditional claims for managing excessive uterine bleeding.

V. CONCLUSION

The study successfully establishes the physico-chemical and phyto-chemical profile of Raktapradarahara Yoga. The qualitative phytochemical analysis of Raktapradarahara Yoga (churna) revealed multiple bioactive components. These compounds justify its therapeutic application in controlling excessive uterine bleeding (Raktapradar). The values and constituents identified in this analysis can serve as a crucial reference for future quality control, ensuring batch-to-batch consistency,

therapeutic efficacy and were found as per the API standards.

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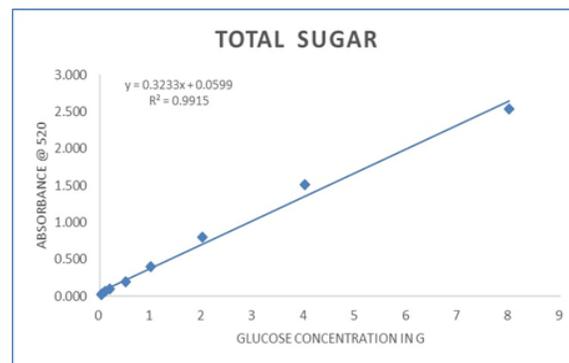


Fig- 1 Figure Showing Total Sugar

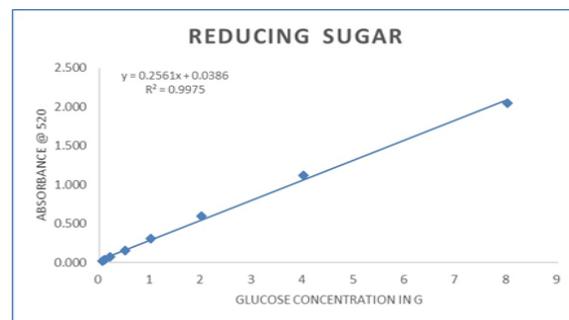


Fig- 2 Figure Showing Reducing Sugar

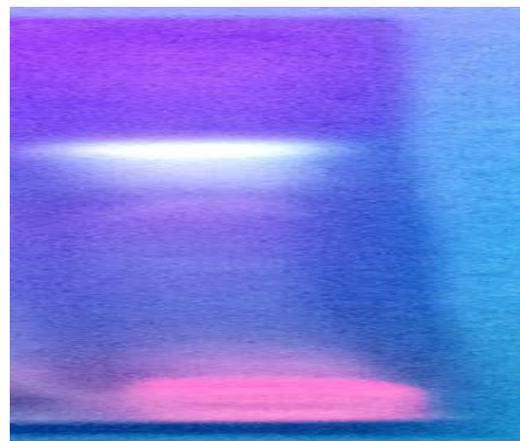


Fig. 3(a)

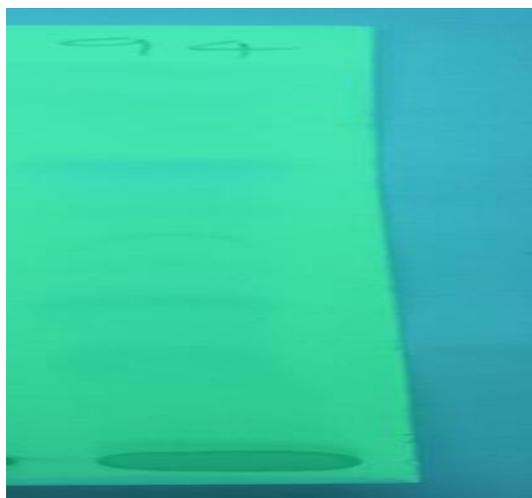


Fig- 3(b)

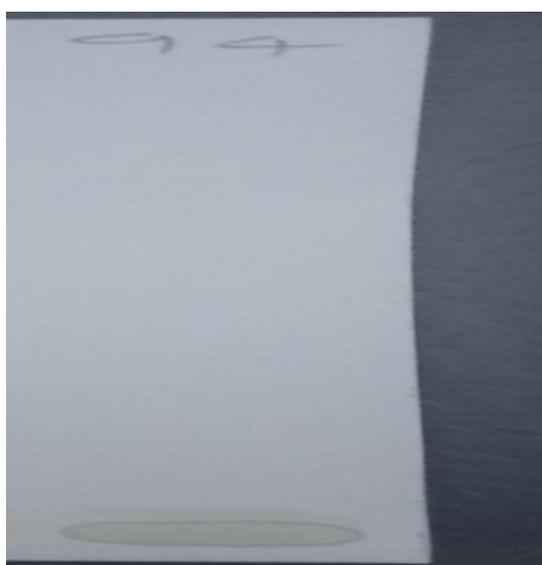


Fig- 3(c)

TLC Images of Raktapradarahara Yoga (Churna) Fig-3(a), 3(b), 3(c).

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