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ORA- Analytical Study

Analytical standardization of *Piccha basti* using Physicochemical and Phytochemical Parameters.

[1]Savita B. Bhosale, [2*]Prashant G. Jadar, [3]B.S. Prasad, [4]Sunil S. Jalalpure, [5]Indrajit S. Shinde

ABSTRACT:

Background: *Piccha Basti* (therapeutic enema procedure) used in the management of *Gulma* (Irritable bowel syndrome), *Grahani* (Ulcetative colitis), *Atisara* (Dysentery) etc. Ensuring its consistency, safety, and therapeutic efficacy requires a systematic approach to standardization. Integrating organoleptic, physicochemical, and phytochemical analysis provides a comprehensive understanding of its quality attributes. The application of modern analytical techniques enhances quality assurance by minimizing variability and detecting potential contaminants. **Aim**: To standardize *Piccha basti* through organoleptic, physicochemical, and phytochemical evaluation thereby ensuring its consistency, safety, and effectiveness in the therapeutic uses. **Method**: The standardization of *Piccha basti* was conducted using three samples prepared in different time with same method and analyzed in triplicate to ensure standard values along with quality and consistency. Organoleptic evaluation assessed sensory characteristics such as color, odor, taste, appearance, and texture. **Result**: Physicochemical analysis revealed that the pH levels were near to neutral lies in between mean values 6.06 to 6.20. Specific Gravity values ranged from 1.047 to 1.083, whereas viscosity ranges between 277.1cP to 380.2cP. The Refractive Index was consistent at 1.291–1.367, reflecting uniform optical properties. The total solid content varied slightly, from 1.577 gms. to 1.646 gms. and total ash 5.383 % to 6.034%. Acid insoluble ash 1.169% to 1.808% whereas water soluble ash varies from 4.166% to 4.771%, water soluble extract varies from 47.505% to 50.740 % whereas alcohol soluble extract 46.845% to 56.388%. Centrifugation test varies from 46.09sec to 50.3sec and creaming test all shows upward movements. Phytochemical analysis provided for each sample, confirming the presence of essential phytochemical compounds. **Conclusion**: The results demonstrated a high degree of uniformity across all samples, ensuring reproducibility and reliability in the formulation of *Piccha Basti*. These findings support the standard values for reference, therapeutic use of the standardized formulation in clinical settings.

KEYWORDS: *Piccha Basti*, *Grahani, Gulma*, Quality assurance, standardization.

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Corresponding Author Email:

drjadar@yahoo.in

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1. INTRODUCTION

Pichha Basti, a specialized Ayurvedic enema, is a key therapeutic intervention for *Atisara* (Dysentery ICD 11-SA 56 and ICD 10 CM-A06), *Jwara* (Fever ICD 11 MG26 and ICD 10 CM- R 50.9), *Shotha* (Inflammation ICD 11-DD7Z and ICD 10 CM- K50.90), *Gulma* (Irritable bowel syndrome or Inflammatory bowel diseases ICD11-DD91 and ICD10 CM-K58.2), *Grahani* (Ulcerative colitis ICD 11-DD71 and ICD 10 CM-K51) etc. [1] *Piccha basti* has been recommended by both *Acharya Charaka* [2] and *Acharya Sushruta*. [3] The anti-inflammatory, ulcer-healing, and hemostatic properties of *Pichha Basti*, derived from *Shalmali Vrunta(*Petiole) and other herbal ingredients, balancing *Pitta*, reducing inflammation and supporting gut healing. [4] In Ayurvedic practices, the quality and consistency of preparation of *basti* and its physical and chemical properties are crucial for ensuring their therapeutic efficacy, guaranteeing quality and consistency, and are also essential for drug absorption and the efficient operation of its constituents. *Vaitarana Basti* was standardized using organoleptic, physicochemical, and HPTLC methods to ensure consistency. [5] Physicochemical analysis of *Lekhana Basti* is crucial for reproducibility and understanding its absorption, receptor action, and microbial effects. [6] An experimental study evaluated the pharmacokinetics of *Lekhana Basti*, showing systemic absorption of its phytochemicals, including active *Triphala* components, as evidenced by HPLC. The findings support optimizing treatment and standardizing *Basti* formulations for therapeutic use and potential human applications as demonstrated in a pharmacokinetic HPLC-based animal study. [7] The significant insight into physicochemical evaluation and pharmacokinetic profiling of *Basti* preparations, and their inclusion would strengthen the analytical foundation of the current work. [8] These studies align with modern quality-control practices and contextualize the current findings within established analytical frameworks.

Numerous papers have discussed the therapeutic role of *Piccha basti* but there is often lack of standardization in the preparation, composition, and administration of *Piccha Basti*, which may lead to variations in therapeutic outcomes. Even though there is a lack of direct references specifying standard values for *Piccha basti* dosage, composition, and indications, depending heavily on *Doshic* dominance individual *prakriti*, and clinical context. While classical texts provide rich descriptive insights, the lack of empirical standard values and the scattered nature of references create challenges for both research validation and modern clinical standardization.

To address this gap, it becomes essential to standardize the formulation by analysing and integrating physicochemical and phytochemical parameters into a structured quality control protocol and efficacy. Furthermore, the absorption and pharmacokinetics of the active components are significantly influenced by these physicochemical properties, highlighting the need for comprehensive standardization.

In the present study, *Piccha basti* was formulated according to the guidelines outlined in the *Charaka Samhita* [9] with *Swedita*(steamed) *Shalmali vrunta* selected as the principal ingredient. The formulation

was prepared in three different batches, and each of the three batches was analyzed in triplicate to comprehensive organoleptic, physicochemical, and phytochemical techniques to ensure quality and consistency evaluations. These assessments aimed to ensure the quality, uniformity, and reliability of the formulation across batches. In clinical settings, although minor modifications in ingredients are made depending on patient-specific conditions, standardizing the base formulation is crucial to uphold consistency and ensure therapeutic success.

With this background, the present analytical study is, to standardize *Piccha basti* based on physicochemical and phytochemical parameters to ensure batch-wise consistency and quality control. The primary aim is to integrate these analytical findings into a framework for quality control and assurance, thereby ensuring consistency, safety, and efficacy in therapeutic application. This approach also intended to ensure the consistency, safety, while also establishing a reliable benchmark through standardization is imperative for advancing the formulation's credibility, quality assurance and reproducibility in both clinical and research contexts.

Objectives: To standardize *Piccha basti* based on Physicochemical and Phytochemical parameters to ensure batch-wise consistency and quality control.

2. MATERIALS AND METHODS:

Raw drug collection and authentication

All the raw drugs were procured from KLE Ayurveda Pharmacy and other GMP certified pharmacies. *Shalmali vruntta* was collected from natural habitat and cow's milk was procured from local cow's farm. *Shalmali vrunta* (CRF/Auth/2020/Dec/12) and *Yashtimadhu* (CRF/Auth/2020/Oct/24) were authenticated at KAHER'S Shri B.M.K Ayurveda Mahavidyalaya, Belagavi, Karnataka (Ayush approved Lab). *Piccha basti* was prepared without altering the classical methods and by using authenticated raw material as follows:

Contents of *Piccha basti:*

There is no direct reference for the preparation of *Piccha basti*, measurement of *basti dravyas* except Milk and *Shalmali vrunta* paste. *Piccha basti* is prepared by reference taken from *Charak Samhita, Chikitsta sthana.* [10] Common *Basti* preparation method adopted using *Avara matra.* [11]

Table No. 1: Ingredients of *Piccha basti*

Sr. No.	Drugs name	Latin/Scientific name	Quantity
1.	*Saindhava lavana*	Rock salt	5 gms.
2.	*Madhu*	Honey	76.8 gms.
3.	Medicated oil*	Medicated oil	38.4 gms.
4.	Medicated G*hrita***	Medicated *Ghrita*	38.4 gms.
5.	*Dugdha*	Milk	768 ml.
6.	*Shalmali vrunta*	Bombax cieba	48 gms.
7.	*Yashtimadhu churna*	Glycerizzia glabra	24 gms.

Jatyadi taila was taken as medicated oil* and *Changeri ghrita* was taken as medicated ghrita**

Table No.2: The classical properties:

Sr. No.	Drugs name	*Rasa*	*Guna*	*Virya*	*Vipaka*
1.	*Saindhava lavana*	*Lavana, Madhura*	*Laghu, Snigdha,Vishyandhi*	*Sheeta*	*Madhura*
2.	*Madhu*	*Madhura, kashaya*	*Laghu, Ruksha*	*Usna*	*Madhura*
3.	*Dugdha*	*Madhura*	*Guru, Snigdha*	*Sheeta*	*Madhura*
4.	*Shalmali*	*Kashaya*	*Laghu,Snigdha*	*Sheeta*	*Madhura*
5.	*Yastimadhu*	*Madhura*	*Guru,Snighdha*	*Sheeta*	*Madhura*

Table No.3: Organoleptic and Physicochemical Standards of Ingredients Used in the Formulation

Sl.No.	Ingredients	Organoleptic Characters	Physicochemical Standards
1.	*Saindhava Lavana*	Appearance: Irregular shaped hard masses; Colour: Pinkish white Odour: not specific Taste: Salty	pH 8.78; Na+ present ; K+ Present
2.	*Madhu*	Appearance: Translucent yellow; Odour: Pleasant & favour; Taste: Sweet	Specific Gravity: 1.43; Moisture Content: 9.74%; Reducing Sugars: 70.4; Sucrose :4.01; Ash content:0.3
3.	*Dugdha*	Appearance: White, opaque liquid; Odor: Characteristic; Taste: Sweetish	pH: 6.6; Fat Content: 3.1%; Specific Gravity: 1.02; Total Solids: 12%; Acidity: 0.10%
4.	*Chnageri Ghrita*	Form: *Ghrita* ; Colour: Green Odour: Characteristic	Loss on drying : 0.245%; Saponification value:161.28; Iodine value: 38.83; Refractive Index:1.476; Acid value:9.465
5.	*Jatyadi Taila*	Form: *Taila*; Colour: Reddish Brown; Odour: Pleasant	Moisture content: 0.004%; Saponification value:187.05; Iodine value: 96.6; Refractive Index :1.46; Acid value:2.88
6.	*Yastimadhu*	Form : *Churna*; Colour: Brownish yellow Taste :Sweet; Odour: Aromatic	Moisture content :10.81%; Ash value: 7.905%; Acid insoluble ash :1.60%; Water soluble extractive: 32.643%; Alcohol soluble extractive:20.495%
7.	*Shalmali*	Form : Paste with mucilage; Colour: Slightly greenish yellow; Taste: Astringent, slightly bitter; Odour: Mild aromatic	Moisture content :8.81%; Ash value 6.16%; Acid insoluble ash :1.81%; Water soluble extractive: 24.10%; Alcohol soluble extractive:9.31%

Method of preparation: [12]

The preparation of *Pichha Basti* was carried out in three distinct batches as per *Charak Samhita* which was labeled as Batch 1, Batch 2, and Batch 3, respectively For the *Shalmali Vrunta Swedana*, 50 grams of *Shalmali vrunta* were collected and placed on the fresh green grass bed and wrapped to prepare a *potali* (bolus). The bolus was then uniformly coated with a thick layer of black mud. The s*wedana* was conducted using nine dry cow dung cakes (mean weight: ±176 gms). The total

duration of the procedure was 34 minutes. In Ignition Phase (0–10 min) external temperature ranged from 86°C to 198°C. This phase initiated uniform ignition of all cow dung cakes, producing mild smoke and gentle heat. In core Heating Phase (10–30 min) external temperatures raised to 250°C–400°C, providing sustained and intense heat. This ensured complete drying of the wet mud applied during the therapy. Internal temperature of the *bolus* during the peak heating period (20–30 min) reached approximately 50°C–70°C, suitable for *swedana* of *Shalmali vrunta.* Then the dried mud was removed, the *swedita* (processed) vruntas were collected and ground into a paste. A total of 48 gms. of *vrunta* paste was obtained, which was then thoroughly mixed with 768 milliliters of boiling milk and set aside. For the next step, *Saindhava Lavana* was finely powdered in a pre-cleaned, dried porcelain mortar. Honey was added to the powdered salt, and the mixture was triturated in a clockwise direction until the sticking sound disappeared. Gradually, *Jatyadi Taila* was incorporated into the mixture with continuous trituration until a homogeneous blend was achieved. Following this, *Changeri Ghrita* was added in a similar manner and mixed thoroughly. Subsequently, the *kshira sadhita Shalmali* (milk-processed *Shalmali*) was added, and the mixture was meticulously stirred to ensure uniformity. Finally, a wet-ground paste of *Yastimadhu* was incorporated, and the entire preparation was again triturated thoroughly. The final *Piccha basti* formulation was filtered through a sieve to obtain a smooth, homogeneous mixture ready for use.

Figure 1: ***Shalmali vrunta***

Figure 2: *Mrutika lipta(mud covered) Potali*

Figure 3: ***Swedana vidhi***

Figure 4: *Vrunta kalka* in *dugdha*

Standardization of the *Piccha basti:*

The standardization of *Piccha basti* was carried out using Organoleptic characters, Physicochemical parameters including pH, specific gravity, viscosity, refractive index, total solids, various ash values, soluble extracts, dispersibility, centrifugation, and creaming tests, dilution tests and Phytochemical analysis following standard guidelines.

3. RESULTS:

The results of the analytical study of *Piccha basti* were noted and evaluated.

Table No.4: The Organoleptic study of *Piccha basti*

Sr. No.	Parameters	Batch 1	Batch 2	Batch 3
1.	Taste	Slightly sweet, salty	Slightly sweet, salty	Slightly sweet, salty
2.	Odor	Characteristic	Characteristic	Characteristic
3.	Color	Slightly greenish	Slightly greenish	Slightly greenish

4.	Appearance	Semi solid	Semi solid	Semi solid
5.	Touch	Moderate viscous	Moderate viscous	Moderate viscous

The organoleptic study plays a vital role in determining the quality and uniformity of a formulation. These parameters measured using the senses, such as color, odor, texture, appearance and taste. They offer important insights into the formulation's acceptability and consistency from a user's viewpoint. As a qualitative assessment, organoleptic analysis acts as a complements tool for quantitative method. [Table no.4]

Table No.5: The Physico-chemical study of *Piccha basti*

Sr. No.		**BATCH 1**			**BATCH 2**			**BATCH 3**		
1.	**Parameter**	**MEAN**	**SD**	**RSD%**	**MEAN**	**SD**	**RSD%**	**MEAN**	**SD**	**RSD%**
2.	**pH**	6.200	0.045	0.739	6.086	0.035	0.577	6.060	0.026	0.436
3.	**Specific gravity**	1.083	0.036	3.355	1.047	0.007	0.670	1.053	0.003	0.305
4.	**Viscosity**	380.13	1.553	0.408	380.26	0.757	0.199	277.16	1.607	0.579
5.	**Refractive index**	1.367	0.016	1.217	1.291	0.006	0.473	1.335	0.013	0.977
6.	**Total solids**	1.608	0.007	0.435	1.577	0.006	0.412	1.646	0.022	1.347
7.	**Total ash (%)**	6.034	0.008	0.147	5.383	0.006	0.111	5.803	0.016	0.280
8.	**Acid insoluble ash (%)**	1.169	0.068	5.823	1.808	0.036	2.006	1.519	0.007	0.462
9.	**Water soluble ash (%)**	4.775	0.162	3.403	4.162	0.055	1.324	4.203	0.007	0.180
10.	**Water soluble extract (%)**	47.752	0.101	0.212	47.505	0.021	0.044	50.740	0.041	0.080
11.	**Alcohol soluble extract (%)**	46.845	0.102	0.218	50.621	0.225	0.049	56.388	0.010	0.019
12.	**Centrifugation test**	46.093	0.439	0.954	48.283	0.036	0.466	50.323	0.092	0.184
13.	**Creaming test**	Upward			Upward			Upward		

Physicochemical parameters of the three batches are summarized in this table No.5. The analyzed characteristics are pH, Specific Gravity, Refractive Index, Total Solids, Total ash, Acid insoluble ash, Water soluble ash, water soluble extract, alcohol soluble extract, centrifugation test and creaming test. Every parameter provides as an important indicator of the product's physical and chemical stability, uniformity, and quality**.** For the determination of pH 10 ml of *Piccha basti* was collected and homogenized. The pH of the samples was measured using a calibrated pH meter (make: Toshniwal Instruments Mfg.Pvt.Ltd 2023, pH range 0.0-14, Accuracy ± 0.01, pH ± 1 digit, Resolution 0.01pH/1mV, Power:230 V ±10%, 50 Hz) to assess the acidity or alkalinity of the sample. [13] For Specific Gravity, 10 ml of *Piccha basti* was used, and the Specific gravity was determined using a calibrated pycnometer, measuring the density of the liquid in

relation to water. [14] It helps in identifying purity or concentration. To assess Viscosity, *Piccha basti* was placed in Brookfield Digital CAP 2000 Plus viscometer (make: Amtek company 2016, Viscosity range 0.2-15,000 Poise, speed 100 RPM, sample size >1 ml, spindle 01, Temp control 5^{o}C to 75 ^{o}C run 60 sec, Hold 10sec) to measure a fluid's resistance to flow. [15] It is essential in determining how easily a liquid flows or pours. For the Refractive Index, a few drops of the *Piccha basti* are placed on the prism of the Abbe refractometer (Make:Labgo, Range 1.300-1.700, Brix range 0-100%, accuracy:nD:±-0.0002, Brix: ±-0.1%), and read the value. The ratio of the speed of light in a vacuum to its speed in a particular substance is called the refractive index. [16] It helps in identifying and characterizing substances. To assess Total solid content, 2 gms. of *Piccha basti* was evaporated on rectangular water bath (Make: Bio Technics India, Temp. range Ambient +5°C to 100°C, Accuracy ±0.5°C, Operates on 230V AC) under controlled conditions, leaving only the solid residues behind. The remaining solids were then weighed to calculate the total solid content in the *Piccha basti*. [17] This method gives reliable measure of the total solids present in *Piccha basti.* For total ash 2 gms. of *Piccha basti* was heated to a high temperature in muffle furnace (Pathak electrical works 2022, Maximum. temp range 1150^{0}C heating element AI grade Kanthal wire, K type thermocouple, volts 220, Accuracy ±5°C), removing organic matter. [18] It's used to assess purity, quality, and potential contamination. The portion of the ash is then treated with a dilute acid that is insoluble in an acid. [19] It provides information about the silicate content of the *Piccha basti.* To assess water soluble Ash 2 gms. of *Piccha basti* was heated to a high temperature the amount of ash that can dissolve in water typically by boiling the ash in water, filtering the mixture, and then determining the weight of the insoluble residue. [20] This test is important for determining the solubility characteristics of minerals. To determine water-soluble extractives, a 5gms. of *Piccha basti* diluted with 100 ml of water and kept in closed flask for twenty-four hours, shaking frequently during six hours and allowing to stand for eighteen hours. Then filtered rapidly, evaporated 25 ml of the filtrate to dryness in a tarred flat bottomed shallow dish, and dry at 105^{0}C, to and weighed to calculate the percentage of water-soluble material. [21] To determine alcohol-soluble extract, a sample is extracted with alcohol, the solvent is evaporated, and the remaining residue is weighed to calculate the percentage of alcohol-soluble material. [22] For Centrifugation (Kadavil elctro mechanical industries 2016, structure Benchtop, capacity 12X 2ml, power supply 230V-AC, speed range 2000 rpm Timer 1-99min, Accuracy ±20r/min) 5 ml of *basti Dravya* was taken for each centrifuge tubes and centrifuge 2000 rpm for 5 min**.** [23] There was clear separation between different components, with heavier substances at the bottom and lighter liquids at the top. It helps determine whether the ingredients in the *Basti* are properly mixed or if separation has occurred due to improper preparation. It could also be used as part of the quality control process for ensuring the medicinal potency of

the preparation. In creaming test *Piccha basti* was placed in transparent glass at room temperature and after 24 hrs. visually inspected the emulsion for any signs of phase separation. [24] If you notice a significant oil layer at the top, this indicates that the emulsion has creamed. The test helps to determine the stability and quality of the emulsion, which is crucial for ensuring consistent efficacy and safety of the products.

Figure 5: pH meter

Figure 6: Brookfield viscometer

Table no. 6: The Phyto-chemical study of *Piccha basti*

Sr. No.	Parameters (tests)	Batch 1	Batch 2	Batch 3
1.	Carbohydrates	Positive	Positive	Positive
2.	Monosaccharides	Positive	Positive	Positive
3.	Non-reducing sugars	Negative	Negative	Negative
4.	Proteins	Positive	Positive	Positive
5.	Amino acids	Positive	Positive	Positive
6.	Steroids	Negative	Negative	Negative
7.	Cardiac glycosides	Negative	Negative	Negative
8.	Anthraquinones	Negative	Negative	Negative
9.	Saponin	Positive	Positive	Positive
10.	Alkaloids	Negative	Negative	Negative
11.	Reducing sugars	Positive	Positive	Positive
12.	Pentose sugar	Positive	Positive	Positive
13.	Hexose sugar	Positive	Positive	Positive
14.	Flavonoids	Negative	Negative	Negative
15.	Tannins	Negative	Negative	Negative

This table displays the Phyto chemical characteristics of three samples of *Piccha basti.* The analyzed parameters Carbohydrates, Monosaccharides, Non-reducing sugars, Proteins, Amino acids, Steroids, Cardiac glycosides, Anthraquinones, Saponins, Alkaloids, Reducing sugars, Pentose sugar, Hexose sugar, Flavonoids and Tannins. For the determination of carbohydrates 2 drops Molisch reagent added to 2ml of *Piccha basti* with 1ml of of concentrated H_2SO_4 which shows purple ring at the interface presence of carbohydrate. [25] 2ml of Barfoed's reagent added to 2ml of *Piccha basti* and heated for 5 min on water bath which shows red ppt presence of Monosaccharide. [26] 6 drops of dilute iodine solution added to 2 ml of *Piccha basti* where there is absence of blue colour represents absence of non-reducing sugar. [27] 5 ml Million's reagent added to 3 ml of *Piccha basti* and heated on water bath, there is presence of white ppt which turned brick red indicates presence of proteins. [28] 3 drops of 5% Ninhydrin sol. added to 3 ml of *Piccha basti* and heated on boiling water bath for 10 min. It turned to purple colour presence of Amino acids. [29] In Salkowski

reaction test 2 ml of Chloroform and slowly 2 ml of Conc. H_2So_4 added to 2 ml of *Piccha basti.* There is absence of red ring at the interference which shows absence of steroid. [30] In Keller–Killiani test, 1ml Glacial acetic acid, 1 drop of 5% Ferric chloride solution and slowly 1ml conc. Sulphuric acid added to 2 ml of *Piccha basti* where there is absence of reddish brown colour interference and bluish green on upper layer which was significance of absence of Cardiac Glycosides. [31] In Born Trager's test, 3ml of *Piccha basti* added, boiled and filtered. To cold filtrate equal volume of chloroform added, shaked and the organic solvent separated and to this Ammonia added. There is absence of pinkish red colour indicates absence of Anthraquinone glycosides. [32] To 3 ml of distilled water 3 ml of *Piccha basti* added and shaked well. As there is persistent foam shows presence of saponins. [33] Few drops of Dragendroff's reagent added to 2 ml of *Piccha basti* found absence of orange brown precipitate which represents alkaloids absent. [34] In Benedict's test 3ml *Piccha basti* added to 3ml Benedict's reagent and heated for 5 min. There is green colour change which shows presence of Reducing sugar. [35] 3ml of Bial's reagent boiled and 8 drops of *Piccha basti* added. The liquid color changes to green which shows presence of Pentose sugars. [36] 1ml of *Piccha basti* were mixed with 3 ml of Seliwanoff's reagent and heated for 2 minutes. There was observation of red precipitate which results presence of Hexose (fructose) sugar. [37] In 1 ml of *Piccha basti* 2 ml of 2% NaOH solution followed by a few drops of diluted HCl added and observed absence of yellow coloured ppt which represents absence of flavonoids. [38] In 5 % Ferric chloride solution 6 drops of *Piccha basti* added which doesn't turn to deep blue-black colour shows absence of Tannin. [39]

4. DISCUSSION:

The present study aimed to standardize *Piccha basti* by evaluating its organoleptic, physicochemical, and phytochemical characteristics in accordance with Ayurvedic principles. In the organoleptic study of all three batches showed consistent properties. The colour across all samples is described as "slightly greenish," suggests that the ingredients and the preparation process used to make *Piccha basti* likely produce a uniform visual result. A characteristic odour is observed in all samples suggesting that the preparation method or ingredients contribute to a distinct aroma. In appearance the samples are semi-solid, indicating a soft texture, viscous consistency shows *mrudhu* and *Picchila* guna**,** essential for mucosal coating, lubrication, reduction of friction in the colon and retention during administration and non-irritant, and easily acceptable for therapeutic enema. The samples moderate viscous consistency in touch is an important factor when assessing the formulation's quality and effectiveness. The taste across all samples was uniformly showed Slightly sweet, Salty, which was expected mixing of Milk, honey, rock salt etc. in the preparation. The uniformity in taste across samples is expected due to these consistent ingredients, reinforcing the overall consistency of the formulation.

Physicochemical study

The pH of all the batches resulting mean value 6.06 to 6.20, suggesting uniform neutral, supports *Snigdha*

guna by preventing mucosal supports being non-irritating to mucosa and preserving natural tissue moisture. Specific Gravity measured 1.047 to 1.083, resulting consistent density in all the batches. It is important because it indicates how heavy or light the sample is compared to water and can help assess its consistency. The refractive index was nearly similar for all batches, with values of 1.290 and 1.362, reflecting similar optical properties. The total solid content shows a minor variation, ranging from 1.577 gms. to 1.677 gms. indicating the concentration of active ingredients. All these three properties indicate dense, viscous consistency which is the hallmarks of *Picchila* with *Guru guna* ensuring grounding and retention.

The total ash 5.383 % to 6.034 % resulting inorganic matter present in the sample. Acid-insoluble ash varies from 1.169 to 1.808% showing mineral content of a sample that is not soluble in acid. This can indicate the presence of certain types of minerals that are more resistant in digestion or breakdown. Water soluble ash varies from 4.162 % to 4.775 % indicates the amount of ash that dissolve in water. These three properties reflect mineral-rich composition supporting *Stambhana guna***,** which stabilizes tissue and arrests excessive fluid discharge, important in managing diarrhea and mucosal irritations.

Water soluble extracts vary from 47.505 % to 50.740 % showing the amount of the sample that can dissolve in water, which might be important in understanding the bioavailability and reflect mucilaginous constituents bolstering *Picchila guna***.** Alcohol soluble extracts ranging from 46.845% to 56.388 %, this represents the proportion of the sample that can dissolve in alcohol. This could be important for determining which active compounds is extractable using alcohol as a solvent. A higher alcohol-soluble extractive value may reflect the presence of complex glycosides or emulsifying agents that contribute to the binding, adhesive, and cohesive character of the formulation, directly supporting the *Picchila guna.*

The centrifugation test time ranges from 46.09 seconds to 50. 32 seconds. This test is used to determine the stability of the formulation under centrifugal force, which could be an indicator of phase separation or settling, confirm physical integrity and homogeneity. This is necessary to preserve intended Ayurvedic qualities during clinical administration The mention of "all upward movements" suggests that during the creaming test, no separation or settling occurred, indicating good stability of the formulation. It also confirms robust formulation integrity, essential to maintain *Picchila* cohesion and guru stability during clinical use.

The analytical findings confirm that the formulation embodies the gunas *Snigdha* (unctuous), *Picchila* (mucilaginous), *Stambhana* (astringent), *Mridu* (soft), and *Guru* (heavy), in alignment with classical descriptions found in *Caraka Samhita* and traditional therapeutic uses in conditions such as *Atisara***,** *Grahani***,** *Gulma* etc. [40]

Phytochemical Analysis

Phytochemical screening consistently revealed saponins, amino acids, monosaccharides and other

bioactive constituents across batches. These molecules contribute anti-inflammatory, mucoprotective, and astringent effects, validating the integrated Ayurvedic *guna* profile (*Snigdha, Picchila, Stambhana*) at a molecular level.By confirming the presence of essential phytochemical compounds in each sample, ensuring that the active components of *Piccha basti* are consistent across batches.

Physicochemical and phytochemical analyses are critical initial steps in the drug development process. Without proper standardization, the quality and composition of *Piccha basti* would be inconsistent. This inconsistency leading to unpredictable therapeutic outcomes or conduct reliable safety and efficacy studies. The Physicochemical parameters help maintain batch-to-batch consistency, which is key to ensuring predictable pharmacological response. This consistency directly supports the reproducibility of clinical outcomes, a cornerstone of therapeutic reliability. The phytochemical analysis confirms the presence of bioactive compounds that are primarily responsible for the therapeutic action of the formulation. This serves as indirect yet essential evidence that the formulation contains the necessary components to exert its intended biological effects. These efforts also contribute to making sure that each batch has the same therapeutic value. It can be taken as reference as a standard values of *Piccha basti* which is crucial for maintaining trust in the product's effectiveness.

5. CONCLUSION:

Overall, the samples of *Piccha basti* are remarkable consistency in sensory, physicochemical and phytochemical properties. These values can be taken as a reference for standard values of *Piccha basti* preparation. The slight variation in specific parameters (like total solids, ash content, and dispersibility) could be attributed to natural differences in raw materials or slight deviations during preparation. However, the overall consistency in these properties suggests a well-controlled manufacturing process that ensures the product's uniformity. By applying validated scientific methods to assess traditional formulations, we preserve their Ayurvedic pharmacodynamic principles—such as *Snigdha*, *Picchila*, *and Guru, Mridu, and Stambhana gunas— while* meeting the demands of contemporary evidence-based healthcare. Standardization of such classical formulations plays a pivotal role in bridging traditional knowledge with modern clinical expectations. By adopting validated scientific methodologies, the formulation retains its traditional therapeutic integrity while ensuring patient safety**,** dose accuracy and predictable therapeutic outcomes**.**

Limitations of the Study:

While the present analytical and Ayurvedic assessment of *Piccha basti* offers valuable insights into its standardization. Still several limitations must be acknowledged:

Need further more study in analytical part to get accurate values for standardization and marker compounds.

Need experimental study for validation of Bioactivity which helps to directly correlate analytical properties with clinical efficacy.

Need comparative formulation analysis with other method of preparation of *Piccha basti* for pharmacodynamic profile and therapeutic relevance.

Abbreviations:

cP -Centipoise

ICD-International Classification of Diseases

CM-Clinical Modification

gm. – grams

sec.- seconds

ml- milliliter

min-minute

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Authors Details:

[1]PhD Scholar, Pharmacy In-charge, KLE Ayurveda Pharmacy, Belagavi, India.

[2*]Professor, Department of Rasashastra and Bhaishajya Kalpana, KLE Academy of Higher Education and Research, Deemed to be University, Shri BMK Ayurveda Mahavidyalaya, Shahpur, Belagavi, Karnataka, India

[3]Former President of the Board of Ayurveda, National Commission for Indian System of Medicine, Ministry of Ayush, Government of India.

[4]Principal and Professor, Department of Pharmacognosy, KLE College of Pharmacy, Belagavi, KLE Academy of Higher Education and Research, Belagavi, India.

[5]Ph.D Scholar, Department of Ethnomedicine, ICMR - National Institute of Traditional Medicine, Belagavi, India

Authors Contribution:

Conceptualization and clinical management: SB, PGJ

Data collection and literature search: SB, PGJ

Writing – original draft: SB

Reviewing & editing: BSP, SSJ, ISS

Approval of final manuscript: All authors

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