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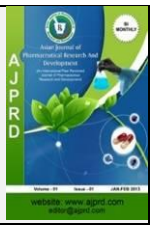

Open Access Research Article

Evaluation of Ayurvedic *Rasadi* Parameters across Distinct Varieties of *Ashwagandha* (*Withania Somnifera* L. Dunal): An Ayurvedic Pharmacodynamic Approach

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ABSTRACT

Background: *Withania somnifera* (*Ashwagandha*) is a prominent *Rasayana* drug in *Ayurveda* known for its broad therapeutic applications. Classical Ayurvedic literature describes that the pharmacodynamic activity (*Dravya-karmukata*) of medicinal plants is governed by the fundamental principles of *Rasapanchaka*, namely *Rasa*, *Guna*, *Veerya*, *Vipaka*, and *Prabhava*. Variability among different varieties of *Ashwagandha* may influence these parameters and subsequently alter their therapeutic efficacy. **Objective:** The present study was undertaken to evaluate and validate *Rasapanchaka* parameters across distinct varieties of *Ashwagandha* through an Ayurvedic pharmacodynamic approach. **Materials and Methods:** Four varieties of *Ashwagandha* were comparatively assessed using classical Ayurvedic evaluation criteria. The study focused on the analysis of *Rasadi* parameters, including *Rasa* (*Rasa Nirdharana*), *Guna* (Ashing time, Binding water volume) and *Veerya*(Endothermic-Exothermic reaction). Comparative observations were interpreted in the context of Ayurvedic pharmacodynamics. **Results:** The comparative evaluation indicated noticeable variations in *Rasapanchaka* attributes among the studied varieties of *Ashwagandha*. These differences may contribute to variation in pharmacodynamic properties and therapeutic responses. The findings suggest that Ayurvedic parameters can serve as valuable indicators for assessing varietal authenticity, quality, and functional efficacy. **Conclusion:** Evaluation of *Rasapanchaka* parameters provides a systematic Ayurvedic framework for understanding pharmacodynamic variability among *Ashwagandha* varieties. The study supports the scientific validation of classical Ayurvedic concepts and may contribute toward quality standardization, pharmacognostic authentication, and evidence-based therapeutic application of *Ashwagandha* in Ayurvedic practice.

Keywords: Varieties of *Ashwagandha*, *Rasapanchaka*, *Rasa*, *Guna*, *Virya.*

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INTRODUCTION:

Medicinal plants constitute one of the most valuable resources for traditional and modern healthcare systems worldwide. During the last few decades, the global herbal medicine market has witnessed remarkable expansion due to increasing consumer preference for natural therapeutics, rising awareness regarding preventive healthcare, and growing scientific validation of traditional medicinal systems. The World Health Organization (WHO) has reported that nearly 80% of the population in developing countries relies primarily on traditional medicine for their basic healthcare needs.[1]

In parallel, the commercialization of herbal products and nutraceuticals has accelerated the demand for quality assessment, authentication, and standardization of medicinal plants.[2] Among the medicinal plants extensively utilized in *Ayurveda*, *Withaniasomnifera* (*Ashwagandha*) occupies a prominent position owing to its *Rasayana*, adaptogenic,

immunomodulatory, anti-inflammatory, neuroprotective, and rejuvenative properties.[3,4]

Ashwagandha has gained significant global recognition due to its broad therapeutic applicability and increasing incorporation into herbal formulations,

dietary supplements, and pharmaceutical preparations.[i] However, the growing industrial demand and extensive cultivation practices have led to the emergence and utilization of different varieties of *Ashwagandha* exhibiting considerable morphological, phytochemical, and therapeutic variability. Such varietal differences may substantially influence the pharmacodynamic activity and therapeutic efficacy of the drug. Therefore, scientific evaluation and validation of different varieties of *Ashwagandha* through classical Ayurvedic principles become essential for ensuring quality, authenticity, and therapeutic consistency.

Ayurveda explains the pharmacological behavior and therapeutic action (*Dravya-karmukata*) of any medicinal substance through the fundamental concept of *Rasapanchaka*, comprising *Rasa* (taste), *Guna* (qualities), *Veerya* (potency), *Vipaka* (post-digestive transformation), and *Prabhava* (specific inexplicable action).

These five parameters collectively determine the biological activity, therapeutic utility, and physiological interaction of a *Dravya* within the body. Among these principles, *Rasa* is considered the primary and directly perceivable attribute, leading classical Ayurvedic scholars to classify drugs based on taste under the concepts of *Rasa Varga* or *Rasa Skandha*.[5] The therapeutic action of a drug is primarily initiated through its *Rasa*, which acts as an important sensory and pharmacodynamic indicator.

Rasa is perceived through the gustatory organ[6], namely the tongue, and represents not merely the sensory perception of taste but also serves as an indicator of the *Panchamahabhoutika* composition[7], intrinsic properties[8], and probable pharmacological actions of the substance.[9] In Ayurvedic pharmacology, *Rasa* is regarded as the simplest and most practical parameter for identifying the predominance of *Mahabhutas* in a *Dravya*.

The concept establishes a direct relationship between taste perception and therapeutic activity, thereby making *Rasa* determination one of the most important approaches for preliminary pharmacodynamic evaluation of medicinal substances.Several Ayurvedic scholars during the twentieth century attempted to develop systematic methods for taste identification and intensity assessment to standardize *Rasa* evaluation scientifically. Consequently, *Rasa*-based assessment has continued to remain one of the most fundamental principles for predicting the pharmacological properties and biological actions of medicinal plants.

Apart from *Rasa*, *Guna* represents another essential pharmacodynamic determinant in *Ayurveda*. *Guna* refers to the inherent qualities or properties of a *Dravya* that facilitate its therapeutic action and functional behavior within the body.[10]The concept of *Guna* constitutes the core foundation for understanding physiological and pathological processes in Ayurveda because every element and substance is expressed through its specific properties. *Gurvadi Gunas* such as *Guru* (heavy), *Laghu* (light), *Snigdha* (unctuous), *Ruksha* (dry), *Sheeta* (cold), and *Ushna* (hot) play a major role in maintaining physiological equilibrium and are extensively applied in diagnosis, prognosis, and therapeutics.

The application of *Guna* in clinical practice is deeply associated with the principles of *Dosha*, *Dhatu*, and *Mala*. Alterations in physiological and pathological states are primarily manifested through changes in *Gunas*[11], and therefore therapeutic interventions aim to restore equilibrium through appropriate application of opposing properties based on *Samanya-Vishesha Siddhanta*.[12]

Gurvadi Gunas are also considered *Sharira Gunas* because they are inherently associated with bodily tissues and biological substances. Since these *Gunas* originate from *Panchamahabhutas*, they possess significant therapeutic relevance in maintaining homeostasis and restoring normal physiological functions.

Veerya represents the dynamic potency or bioactive energy responsible for executing the therapeutic action of a drug. Classical Ayurvedic literature defines *Veerya* as the functional power that performs biological activity within the body.[13] Although *Rasa*, *Guna*, *Vipaka*, and *Prabhava* contribute collectively to drug action, *Veerya* is regarded as the immediate active principle responsible for therapeutic manifestation.

Acharya Charaka explained that *Veerya* can be assessed through *Anumana Pramana* (inference) based on its sustained action within the body, while in certain substances it may also be perceived directly (*Pratyaksha Pramana*) through contact with the tongue.[14] *Veerya* predominantly exists in two major forms, *Ushna* (hot potency) and *Sheeta* (cold potency), both of which significantly influence metabolic, physiological, and pharmacological responses.

Despite extensive pharmacological and phytochemical investigations on *Ashwagandha*, limited scientific efforts have been directed toward validating its varietal differences through classical Ayurvedic pharmacodynamic parameters. Contemporary standardization approaches predominantly focus on phytochemical markers, while the traditional Ayurvedic framework of *Rasapanchaka* remains comparatively underexplored.

Therefore, evaluation of distinct varieties of *Ashwagandha* through *Rasapanchaka*-based assessment may provide a more integrative and functionally relevant understanding of their therapeutic variability. Such an approach could bridge traditional Ayurvedic wisdom with modern scientific validation and contribute toward evidence-based standardization of medicinal plant varieties.

Table 1: *Rasadi* Parameters of *Ashwagandha* in Various Ayurvedictexts

S. No.	Text	*Rasa*				*Veerya*	*Guna*		
		Katu	*Tikta*	*Kashaya*	*Madhura*	*Ushna*	*Ushna*	*Laghu*	*Snigdha*
1.	Dha.Ni.[16]		+	+		+	+		
2.	K.Ni.[17]		+	+		+	+		
3.	Bha.Ni.[18]		+	+		+	+		
4.	R.Ni.[19]	+	+			+	+		
5.	M.Ni.[20]		+	+		+	+		
6.	Ma.Ni.[21]		+	+		+	+		
7.	P.Ni.[22]		+			+	+		
8.	Ni.Aa.[23]	+	+	+		+	+		
9.	D.G.Vig.[24]	+	+		+	+		+	+
10.	API [25]		+	+		+		+	

(Dha.Ni.-Dhanvantari Nighantu, K.Ni.-Kaiydeva Nighantu, Bha.Ni.-Bhavprakasha Nighantu, R.Ni.-Raj Nighantu, M.Ni.-Madanpala Nighantu, Ma.Ni.-Mahaushadha Nighantu, P.Ni.-Priya Nighantu, Ni.Aa.-Nighantu Adarsh, D.G.Vig.-Dravyaguna Vigyana, API-Ayurvedic Pharmacopoeia of India)

Most of the *Nighantukara* have mentioned *Tikta*, *Kashaya*, *Katu Rasa* and *Ushna Veerya*.

MATERIAL & METHOD:

Collection of sample material:

For this study, roots of all the four varieties of *Ashwagandha* were collected from authentic places and sources. Roots of Wild Ashwagandha (WA) were collected from periphery of Vadodara (Gujarat) with the help of experts and botanists for identification from MS University, Vadodara. Nagori Ashwagandha (NA) roots were collected from Nagaur distriuct of Rajasthan.

A Jawahar Ashwagandha-134 (JA-134) root, which is a variety of Ashwagandha prepared by Jawaharlal Nehru Krishi University, Madhya Pradesh, were taken from Directorate of Medicinal and Aromatic Plant Research, Anand (Gujarat), while Gujarat Anand Ashwagandha-1 (GAA-1) roots, which is a variety of Ashwagandha prepared by Anand Agricultural Universitywere collected from same University, Anand (Gujarat). These institutes provided authentication letters along with samples.

Preparation of sample material:

Except WA, all other varieties of *Ashwagandha* samples were procured in dry raw material form. After proper examination of suitability for further process, all four varieties of *Ashwagandha* samples materials were fine powdered (100 number sieve size) at Government Ayurved Pharmacy, Vadodara.

RASA-NIRDHARANA:

The study was started after getting registered in CTRI (CTRI/2021/02/031372, 17/02/2021). The study was conducted by single blind method in 30 healthy volunteers, having knowledge of *Rasa* perception from 2nd year B.A.M.S. of Government Ayurved College, Vadodara. All the volunteers were kept blind about knowledge of all samples. All the samples were administered in powder forms.

The volunteers were asked to cleanse their mouth with water prior to the onset of the experiment. Five minutes after cleansing the mouth they were given 2 gm of the test drug. Then they were requested to note down perceived *Rasa* and *Anurasa*. Along with that, perceived feelings were also noted as per specially designed proforma. Studies of Rasa-nirdharana for all four samples were conducted keeping one hour gap between each sample. The obtained data were analyzed. For that percentage was taken for concluding the results for all four samples.

GUNA NIRDHARANA:

Guru-Laghu Guna Nirdharana

According to Bhavaprakasha Nighantu *Guru* is *Chirapaki* - the word '*Chira'* means – long, a delay, or for a long time and the word '*Paka'* means – burning, digestion, assimilation etc., i.e., which takes longer time to burn or digest, and *LaghuDravya* is *Shighrapaki* – the word '*Shighra'* means – quick, speedy, rapid, So *Shighrapaki* is that which takes lesser time to burn or digest.

Requirements: Drug powder, Heating mantle, silica crucible, tong, glass rod, weighing machine, spatula, stop watch.

Ashing time procedure:[26]

1 gm of the dried drug powder sieved through 80 no mesh was collected in a silica crucible of known weight. The crucible along with the powder was kept on heating mantle at 100˚C temperature continuously in an air still room, until the total powder was burnt and turned into ash. While burning, a glass rod was used to shift the powder for uniform burning. The time consumed to turn the drug into ash was measured with the stop clock. Ashing time in seconds / 1gm powder was recorded. The values were taken for three times on every powder.

Snigdha-Ruksha Guna Nirdharana

Snigdhata is the quality which causes adhesion of powder etc. It possesses *Jala Mahabhuta Pradhanya*. Thus, this stands as a parameter to identify the *Snigdha Guna* in a drug.

The drug which has more *Snigdha Guna* is presumed to use less water to get bounded.

Requirements: Drug powder, distilled water, glass rod, watch glass, burette, weighing machine

Drug's binding Water Volume Method (DBWV) Procedure:

1 gm of dried drug powder sieved through 80 no mesh was collected in a watch glass. Drops of distilled water were added slowly with a graduated burette to the powder until the powder was turned into dough like lump. The water added to that point was measured in ml. The values were taken for three times on every powder.

VEERYA NIRDHARANA:

Requirements: Drug powder, distilled water, beaker, thermometer, glass rod, weighing machine

Endothermic-Exothermic reactions:

100 ml of distilled water was taken in beaker and the temperature of the water was noted with the help of thermometer. 10 gram of powdered drug was added to the above 100 ml of distilled water and shook well. Changes in the temperature were noted down with thermometer after 1 minute, 2 minutes and 5 minutes.[27]

OBSERVATIONS AND RESULTS:

Rasa Nirdharana:

A total of 30 volunteers aged between 19-21 years participated in the study.

Table 2: Response of volunteers for R*asa* of varieties of *Ashwagandha* roots

Sr. No.	*Rasa*	WA	NA	JA-134	GAA-1
1.	*Madhura*	-	-	96.67%	20%
2.	*Amla*	-	-	-	-
3.	*Lavana*	-	-	-	-
4.	*Katu*	-	-	-	-
5.	*Tikta*	7%	66.67%	-	16.67%
6.	*Kashaya*	93%	33.33%	3.33%	63.33%

WA and GAA-1 showed *Kashaya Rasa*, while NA and JA-134 showed *Tikta* and *Madhura Rasa* respectively.

A Pearson's Chi-square test was performed to determine whether the sensory perception of Rasa differed among the four *Withania somnifera* varieties. The analysis demonstrated a statistically significant association between variety and predominant Rasa ($\chi^2 = 84.60$, df = 6, $p < 0.001$). Cramer's V indicated a large effect size (V = 0.594), confirming that the variation in taste perception was strongly influenced by the variety. WA was predominantly perceived as *Kashaya*, NA as *Tikta*, JA-134 as *Madhura*, whereas GAA-1 exhibited a mixed profile dominated by *Kashaya*.

Table 3: Response of volunteers for *Anurasa* of varieties of *Ashwagandha* roots

Sr. No.	*Anurasa*	WA	NA	JA-134	GAA-1
1.	*Madhura*	23.33%	36.66%	3.33%	16.67%
2.	*Amla*	-	-	23.33%	3.33%
3.	*Lavana*	-	3.33%	-	-
4.	*Katu*	13.3%	-	-	-
5.	*Tikta*	47%	20%	80%	60%
6.	*Kashaya*	10%	63.33%	70%	36.67%

WA and GAA-1 showed *Tikta Anurasa*, while NA and JA-134 showed *Kashaya* and *Tikta-Kashaya Anurasa* respectively.

Table 4: Response of volunteers for different *Lakshana* of *Rasa*

No.	Findings	WA	NA	JA-134	GAA-1
1.	Besmears the mouth	20%	26.67%	63.33%	33.33%
2.	Feeling of unctuousness	16.67%	26.67%	23.33%	10%
3.	Pleasurable sensation in body	10%	3.33%	13.33%	10%
4.	Abundant saliva secretion thereby cleansing the mouth	46.67%	43.33%	43.33%	46.67%
5.	Tingling sensation of teeth	3.33%	3.33%	3.33%	6.67%
6.	Horripilation in skin	0%	6.67%	3.33%	10%
7.	Shrinking of eyebrows and lids	0%	13.33%	6.67%	3.33%
8.	Tongue and mouth get moistened and soft	36.67%	33.33%	26.67%	30%
9.	Burning sensation in buccal cavity and throat	0%	3.33%	6.67%	0%
10.	Tingling sensation in tongue tip	6.67%	16.67%	10%	6.67%
11.	Burning sensation in tongue and oral cavity	3.33%	0%	0%	10%
12.	Salivation	40%	66.67%	80%	66.67%
13.	Secretion from eyes and nose	0%	0%	0%	0%
14.	Cleansing and drying the mouth	46.67%	63.33%	36.67%	40%
15.	Feeling of temporary loss of taste perception	23.33%	53.33%	43.33%	20%
16.	Feeling of stiffness in tongue	20%	16.67%	30%	23.33%
17.	Choking feeling in throat	23.33%	10%	20%	23.33%

JA-134 besmeared the mouth and increased salivation. Other three varieties mostly produced cleansing through salivation and then increased dryness of mouth. Through NA volunteers felt temporary loss of perception.

Guna Nirdharana:

Guru-Laghu Guna Nirdharana:

Table 5: Ashing time of varieties of *Ashwagandha* roots

Sr. No.	Name of variety	1st reading (Sec.)	2nd reading (Sec.)	3rd reading (Sec.)	Average reading (Sec.)	Standard Deviation (SD)	Coefficient of Variation (CV%)
1.	**WA**	632	623	629	628	4.58	0.73
2.	**NA**	602	620	622	615	11.02	1.79
3.	**JA-134**	690	700	684	691	8.08	1.17
4.	**GAA-1**	640	638	633	637	3.61	0.57

For WA, NA, JA-134 and GAA-1 ashing time in seconds were 628, 615, 691 and 637 respectively.

Replicate measurements showed excellent precision, with coefficients of variation ranging from 0.57% to 1.79%. One-way ANOVA demonstrated a statistically significant difference among the varieties ($F(3,8)=5.89$, $p\approx0.02$). Tukey's post-hoc analysis indicated that JA-134 had a significantly greater mean duration than NA ($p < 0.05$), whereas the remaining pairwise comparisons were not statistically significant.

Ashes of varieties of *Ashwagandha* roots for *Guru-LaghuGuna Nirdharana*

Figure 1: WA

Figure 2: NA

Figure 3: JA-134

Figure 4: GAA-1

Snigdha-Ruksha Guna Nirdharana:

Table 6: Binding water volume for varieties of *Ashwagandha* roots

Sr. No.	Name of variet	1st reading (ml)	2nd reading (ml)	3rd reading (ml)	Average reading (Sec.)	Mean ± SD (mL)	CV (%)
1.	**WA**	2.5	2.7	2.6	2.6	2.60 ± 0.10	3.85
2.	**NA**	1.3	1.5	1.6	1.5	1.47 ± 0.15	10.42
3.	**JA-134**	1.7	2	1.9	1.9	1.87 ± 0.15	8.19
4.	**GAA-1**	1.2	1.5	1.4	1.4	1.37 ± 0.15	11.18

Lumps of varieties of *Ashwagandha* roots for *Snigdha-Ruksha Guna Nirdharana*

Figure 5: WA, NA, JA-134 & GAA-1 (From right to left)

2.6, 1.5, 1.9 and 1.4 ml water volume was required respectively for WA, NA, JA-134 and GAA-1.WA exhibited the highest mean value (2.60 ± 0.10 mL), followed by JA-134 (1.87 ± 0.15 mL), NA (1.47 ± 0.15 mL), and GAA-1 (1.37 ± 0.15 mL).

The coefficients of variation ranged from 3.85% to 11.18%, indicating acceptable repeatability of the measurements.

One-way ANOVA revealed a highly significant difference among the varieties ($F(3,8)=42.75$, $p<0.001$). Tukey's post-hoc analysis demonstrated that WA had significantly greater mean volume than NA, JA-134, and GAA-1, whereas NA and GAA-1 did not differ significantly.

Veerya Nirdhaana:

At 0-minute, temperature of distilled water was 35.4˚C for all four samples.

Table 7: Temperature difference for endothermic/exothermic reaction

Sr. No.	Name of variety	At 1 minute (Difference Temperature)	At 2 minutes(Differencein Temperature)	At 5 minutes (Differencein Temperature)	Average diff. in Temperature
1.	WA	35.6 ˚C (+0.2 ˚C)	35.7 ˚C (+0.3˚C)	35.7 ˚C (+0.3˚C)	+0.3˚C
2.	NA	35.6 ˚C (+0.2 ˚C)	35.7 ˚C (+0.3˚C)	35.7 ˚C (+0.3˚C)	+0.3 ˚C
3.	JA-134	35.6 ˚C (+0.2 ˚C)	35.7 ˚C (+0.3˚C)	35.7 ˚C (+0.3˚C)	+0.3 ˚C
4.	GAA-1	35.7 ˚C (+0.3˚C)	35.8 ˚C (+0.4˚C)	35.8 ˚C (+0.4˚C)	+0.4˚C

After 5 minutes, WA, NA and JA-134 showed 0.3˚C increase in temperature, while GAA-1 shown 0.4˚C increase in temperature.

Samples of varieties of *Ashwagandha* roots for *Veerya Nirdharana*

Figure 6: WA, NA, JA-134 & GAA-1 (From right to left)

DISCUSSION:

Rasa Nirdharana

Rasa is considered the foremost perceptible pharmacodynamic attribute of a *Dravya* in *Ayurveda* and serves as the primary determinant for predicting the therapeutic action of medicinal substances. Classical Ayurvedic literature describes *Ashwagandha* predominantly as possessing *Tikta* (bitter) and *Kashaya* (astringent) *Rasa*, while specific references regarding *Anurasa* are not explicitly mentioned.[28] Since *Rasa* is directly perceived through gustatory interaction, the method of "*RasoNipate*" described in *Ayurveda* is regarded as the most authentic approach for *Rasa* assessment. Accordingly, the present study employed direct sensory evaluation in healthy volunteers to assess the *Rasa* profile of four varieties of *Ashwagandha*.

The findings demonstrated considerable variation among the evaluated varieties. WA and GAA-1 exhibited predominance of *KashayaRasa* with *Tikta Anurasa*, whereas NA predominantly expressed *TiktaRasa*. In contrast, JA-134 demonstrated predominance of *Madhura Rasa* accompanied by *Tikta-Kashaya Anurasa*. These observations indicate significant varietal diversity in organoleptic and pharmacodynamic attributes among *Ashwagandha* varieties.

The sensory manifestations observed during *Rasa* assessment corresponded closely with classical Lakshana of respective *Rasas*. WA, NA, and GAA-1 produced

salivation followed by dryness of the oral cavity, which is characteristic of *Tikta* and *Kashaya Rasas*.[29] Conversely, JA-134 produced a coating or besmearing sensation in the mouth, which is traditionally associated with *MadhuraRasa* dominance.[ii] Thus, the observed sensory responses strongly supported the subjective Rasa experiences reported by the volunteers.

From the Ayurvedic perspective, the variation in *Rasa* among *Ashwagandha* varieties can be explained through differences in *Panchamahabhoutika* composition. *Ayurveda* postulates that each *Rasa* originates from the predominance and interaction of specific *Mahabhutas*. *Madhura Rasa* is formed predominantly by *Prithvi* and *JalaMahabhutas*, *TiktaRasa* by *Vayu* and *Akasha Mahabhutas*, and *Kashaya Rasa* by *Vayu* and *Prithvi Mahabhutas*.[30] Therefore, the *Madhura* predominance observed in JA-134 may indicate relatively greater contribution of *Prithvi-Jala Mahabhuta* compared to the other varieties.

This concept may be hypothetically correlated with the modern scientific principle of molecular interactions and ionization phenomena. Similar to selective ionic bonding determined by valence electron compatibility, *Mahabhutas* may interact in specific combinations to produce distinct *Rasas* and pharmacodynamic effects. For instance, increasing dominance of *Prithvi* and *Jala Mahabhutas* may proportionally enhance *Madhura Rasa* expression, analogous to increasing molecular concentration intensifying chemical properties. Although such comparisons are theoretical and conceptual, they provide an interdisciplinary framework for interpreting Ayurvedic principles through contemporary scientific perspectives.

The predominance of *Tikta* and *Kashaya Rasa* observed in WA, NA, and GAA-1 corroborates classical Ayurvedic descriptions of *Ashwagandha*. However, the *Madhura* predominance observed in JA-134 suggests probable genotypic, environmental, or phytochemical variations influencing *Mahabhoutika* composition and sensory pharmacodynamics. Such observations highlight the importance of varietal standardization while evaluating medicinal plants through Ayurvedic parameters.

Guna Nirdharana

Guna represents the intrinsic qualitative attributes responsible for the functional behavior and therapeutic efficacy of a *Dravya*. Among the twenty *Gurvadi Gunas* described in *Ayurveda*, *Guru*, *Laghu*, *Snigdha*, *Ruksha*, *Ushna*, and *Sheeta* are considered particularly significant in pharmacodynamics and therapeutics. Despite the extensive therapeutic use of *Ashwagandha*, classical texts provide limited direct references regarding its *Guru-Laghu* and *Snigdha-Ruksha* properties. Acharya P.V. Sharma has described *Ashwagandha* as possessing *Laghu* and *SnigdhaGuna*.[31]

Guru-Laghu Guna

In the present study, the Ashing Time Method was utilized to comparatively assess *Guru-Laghu Guna* among the four *Ashwagandha* varieties. The recorded ashing times for WA, NA, JA-134, and GAA-1 were 628, 615, 691, and 637 seconds, respectively. Lower ashing time was interpreted as an indicator of *Laghu Guna*, whereas prolonged ashing time represented *Guru Guna*. Accordingly, NA demonstrated the highest *Laghu* property, while JA-134 exhibited the highest *Guru* property among the evaluated varieties.

From the Ayurvedic perspective, *Laghu Guna* denotes ease of digestion, metabolic transformation, and rapid assimilation, whereas *Guru Guna* indicates slower digestion and greater structural density. This phenomenon may be theoretically interpreted using the concept of intermolecular and interatomic interactions. Substances possessing *Laghu* characteristics may exhibit relatively lower molecular density and weaker intermolecular binding, facilitating easier combustion and transformation. Conversely, *Guru* substances may possess stronger molecular organization and greater structural compactness requiring higher energy expenditure for degradation and transformation.

Ayurveda attributes *GuruGuna* predominantly to *Prithvi* and *Jala Mahabhutas*, while *Laghu Guna* is associated with *Vayu* and *Akasha Mahabhutas*.In the present study, JA-134 exhibited both *MadhuraRasa* and *Guru Guna* predominance. Since *Madhura Rasa* is classically associated with *Guru* property, these findings provide experimental support for the traditional Ayurvedic understanding correlating *Madhura Rasa* with *Guru Guna*.[32]

Snigdha-Ruksha Guna

The Drug Binding Water Volume Method was employed to assess *Snigdha-Ruksha Guna* among the studied varieties. The amount of water required for binding was 2.6 ml, 1.5 ml, 1.9 ml, and 1.4 ml for WA, NA, JA-134, and GAA-1, respectively. WA required the maximum quantity of water for binding, indicating predominant *Ruksha Guna*, whereas the remaining varieties demonstrated relatively greater *Snigdha* characteristics.

Ruksha Guna is characterized by relative deficiency of *Jala Mahabhuta* and reduced moisture-retaining capacity, while *Snigdha Guna* reflects increased unctuousness and hydration potential.[34]

These findings suggest that water absorption and binding characteristics may serve as practical physicochemical correlates for assessing *Snigdha-Ruksha Guna* experimentally. Such approaches may contribute toward objective standardization of Ayurvedic pharmacodynamic parameters using laboratory-based methodologies.

Veerya Nirdharana

Veerya is regarded as the dynamic potency responsible for executing the pharmacological activity of a substance.[35] Although multiple classifications of *Veerya* are described in Ayurvedic literature, all are fundamentally categorized into *Ushna* (hot potency) and *Sheeta* (cold potency).[36] *Veerya* assessment is traditionally performed through *Nipata*, *Anumana*, and *Nipato-Anumana* methods in the human body.

In the present study, an Endothermic-Exothermic Method was employed as a laboratory-based adaptation of *NipataPariksha* to assess *Veerya* of *Ashwagandha*

varieties. The method evaluated changes in temperature following immediate interaction of the drug with water. Observations were repeated at intervals of one minute, two minutes, and five minutes.

After five minutes of mixing 10 g powder in 100 ml distilled water, WA, NA, and JA-134 demonstrated an increase of 0.3°C, while GAA-1 exhibited a 0.4°C increase in temperature. The observed rise in temperature indicated an exothermic reaction for all four varieties. Since exothermic behavior signifies generation of heat, these findings may be correlated with *Ushna Veerya* described for *Ashwagandha* in classical Ayurvedic texts.[37]

The results suggest that calorimetric approaches may offer a preliminary experimental framework for assessing *Veerya* in medicinal plants. Although the observed temperature changes were quantitatively small, the consistency of exothermic response across all varieties strengthens the possibility of translating traditional Ayurvedic pharmacodynamic principles into measurable laboratory parameters.

Overall, the present study demonstrates that *Rasapanchaka*-based assessment can effectively differentiate pharmacodynamic variability among varieties of *Ashwagandha*. Integration of classical Ayurvedic evaluation methods with experimental laboratory techniques may provide a scientifically relevant approach for standardization, authentication, and therapeutic evaluation of medicinal plant varieties. Moreover, it supports their integration into contemporary quality evaluation frameworks.

CONCLUSION:

The present study demonstrated significant variability in *Rasapanchaka* attributes among the four evaluated varieties of *Ashwagandha*, indicating distinct pharmacodynamic profiles despite belonging to the same botanical species. Experimental assessment of Ayurvedic parameters revealed that WA was characterized by predominant *Kashaya Rasa* with *Tikta Anurasa*, comparatively *Laghu Guna*, pronounced *Ruksha Guna*, and *Ushna Veerya*. NA exhibited *Tikta Rasa* predominance with *KashayaAnurasa*, the highest degree of *Laghu Guna* among all evaluated varieties, relative *Snigdha Guna*, and *Ushna Veerya*. In contrast, JA-134 displayed a distinctive pharmacodynamic profile marked by predominant *Madhura Rasa*, *Tikta–Kashaya Anurasa*, the highest *Guru Guna*, relative *Snigdha Guna*, and *Ushna Veerya*. GAA-1 demonstrated *KashayaRasa* with *Tikta Anurasa*, *Laghu Guna*, the greatest degree of *Snigdha Guna*, and the most pronounced *Ushna Veerya* among the studied varieties.

The observed differences in *Rasa*, *Guna*, and *Veerya* suggest underlying variations in the *Panchamahabhoutika* composition and functional properties of these varieties, which may ultimately influence their therapeutic applicability and clinical performance. The concordance between classical Ayurvedic principles and experimentally derived observations supports the utility of *Rasapanchaka*-based evaluation as a scientific framework for differentiating medicinal plant varieties. Furthermore, the findings indicate that Ayurvedic pharmacodynamic parameters can serve as valuable tools for varietal characterization, quality assessment, and standardization of *Ashwagandha*. Such an integrative approach may contribute to evidence-based validation of traditional Ayurvedic concepts while facilitating the rational selection of specific *Ashwagandha* varieties for targeted therapeutic applications.

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CONFLICTS OF INTEREST

Nil

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