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Experimental assessment of ayurvedic attributes Rasa , Guna Virya and Vipaka of Blepharis maderaspatensis Linn a folklore plant

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Abstract

The Indian subcontinent harbours a wide diversity of medicinal plants, many of which are not extensively documented in Ayurvedic literature. Many extra-pharmacopeial plants used in traditional practice remain unexplored. Blepharis maderaspatensis Linn. (Acanthaceae), a perennial herb with traditional medicinal applications used in wound healing, ulcers[1] and eye disorders, was selected for Ayurvedic pharmacodynamic evaluation. In this study, Rasa, Virya, and Vipaka of the plant were assessed through systematic experimental methods. Fresh leaves were processed into Swarasa for analysis. Rasa was evaluated in 30 healthy volunteers, where 86.6% perceived Kashaya Rasa and 13.4% perceived Tikta Rasa as the primary taste, while Tikta, Madhura, and Kashaya were noted as secondary tastes, establishing Kashaya–Tikta Rasa predominance. The acute toxicity study was conducted prior to this investigation. Virya was examined both in-vitro and in-vivo; the in-vitro study showed an endothermic reaction, while in-vivo observations on Wistar albino rats indicated increased appetite, decreased water intake, reduced fecal output with smooth consistency, and significantly increased urine output, collectively confirming Sheeta Virya. Vipaka was assessed in rats through metabolic parameters, which showed increased appetite, decreased water intake, significantly higher urine output, and minor changes in fecal output and body weight, consistent with Katu Vipaka. Overall, the study concludes that Blepharis maderaspatensis Linn. possesses Kashaya–Tikta Rasa, Sheeta Virya, and Katu Vipaka, suggesting potential Pachana (digestive stimulant), Vrana ropana-Vrana shodhana ,Stambhana (astringent), and Mutrala (diuretic) actions. These findings support its therapeutic relevance in Ayurveda and highlight the need for further pharmacological and clinical validation.

Keywords:
Blepharis maderaspatensis Linn., Rasa,Vipaka, Virya, Katu Vipaka, Deepana-Pachana.

1. Introduction

The Indian subcontinent, with its rich natural vegetation, is home to a wide variety of medicinal herbs. Upgrading knowledge about such extra-pharmacopeial drugs through research is essential to transform

traditional folk uses into scientifically validated information beneficial for humanity. Owing to its diverse climate, topography, and habitats, India possesses one of the richest floras in the world. Since ancient times, plants have been an integral source of medicine in Indian tradition. Despite this vast wealth, many medicinally valuable species are not mentioned in classical Ayurvedic treatises. Ayurveda emphasizes that any natural substance can serve as medicine if used judiciously. Acharya Charaka himself noted that it is impossible to describe all herbal medicines in a single text and stressed that physicians must rely on careful observation and their own judgment to understand the properties of undocumented drugs.

In earlier times, traditional healers (Vaidyas) often learned about unknown plants from cowherds, shepherds, hermits, and forest-dwelling communities. These groups, being close observers of nature, possessed valuable knowledge about plant uses. While many such herbs were used in practice by ethnic communities, a large number remain scientifically unstudied even today. In the modern era of evidence-based medicine, systematic research and documentation are essential. Current herbal research focuses on uncovering the medicinal value of these lesser-known plants. Research on extra-pharmacopeial drugs is crucial to validate traditional folk practices and convert them into evidence-based knowledge beneficial for humanity. However, applying them in Ayurveda poses challenges because Ayurvedic treatment depends on specific principles of drug action—Rasa, Guna, Virya, Vipaka, and Prabhava.

In Ayurveda, a drug's potency is described through these five factors. Rasa (taste) and Vipaka (post-digestive effect) reflect the drug's chemical composition, while Guna (qualities) and Virya (potency/energy) represent its physical and pharmacological properties. Each substance has a unique Panchabhautika (five-elemental) constitution that determines its Rasa. After digestion and metabolism, a substance undergoes transformation, producing its Vipaka. Gunas are inherent qualities, while Virya refers to active qualities that persist even after digestion and drive the drug's effects. Prabhava is the unique or specific action of a drug that distinguishes it from others with similar tastes or properties. In general, a drug acts through its Rasa and Guna, while Vipaka and Virya account for specific actions.

Blepharis is a genus of the family Acanthaceae, comprising approximately 126 species[2]. Blepharis maderaspatensis Linn. is a perennial plant. The plant commonly found in regions such as Shriwan, Veraval to Sasan, Deccan Peninsula, Sri Lanka, Myanmar, Bangalore, Belgaum, Bellary, Bijapur, Chikmangalur, Chitradurga, Coorg, Dharwar, Hassan, Kolar, Mysore, Raichur, Western ghats, Kerala. The leaves of these plants have traditionally been employed in the treatment of wounds, boils, ulcers, eye diseases, and related ailments[3].Swarasa obtained by pounding leaves are heated with ginger oil and externally smeared on an area to heal the excision wound and used for disorders of the Central Nervous System. Traditionally, Ash of the plant was utilised in dropsy, swellings, oedema and gout, also dry alcoholic extract of the plant is a potent diuretic. It possesses anti-microbial, anti-oxidant, anti-hyperlipidaemic properties.The acute toxicity study was completed before this investigation. Although a comprehensive scientific review of this genus is still lacking, its medicinal value is well recognized in traditional systems of medicine, with various tribal claims further highlighting its therapeutic potential. The present review specifically focuses on one of the lesser-known species of this genus, Blepharis maderaspatensis (L.) B. Heyne ex Roth.

The Ayurvedic basis of a drug lies in its Rasa, Vipaka, and Virya, which collectively determine its medicinal action. To enable the further application of this plant in Ayurveda, the present comprehensive study has been undertaken to assess these attributes.

2. Materials and Methods

Collection and Authentication of the plant

Blepharis maderaspatensis Linn. is commonly distributed throughout Kerala and in Western Ghats. The sample were collected from their natural habitat and the plant material was authenticated by Dr. Silambarasan, Taxonomist, Pankajakasthuri Ayurveda Medical College and PG Centre, Killy, Kattakkada, Trivandrum.

Preparation of swarasa of study drug.

Freshly collected leaves of Blepharis maderaspatensis Linn. was taken after proper cleaning, crushed and squeezed to get swarasa of leaves.

1. Assessment of RASA

Rasa refers to the sensory property of a substance that is perceived through the Rasanendriya (tongue). Thus, taste can be evaluated both by its direct effect on the tongue and by its systemic effect within the body.

Procedure

For the assessment of Rasa, 30 healthy volunteers were instructed to rinse their mouths with water before receiving the drug in swarasa form, up to a dose of 5 ml. Following administration, they were asked to record the sensory characteristics they experienced using a structured questionnaire. The responses were systematically compiled and analysed, and any associated biological changes were noted for further examination[4].

2. Assessment of virya (potency)

Virya refers to the inherent force or energy present in the matter responsible for the pharmacological action of a drug. It represents the essence of the Panchamahabhoota (five fundamental elements) present in the substance, without which no therapeutic activity can occur[5].

Assessment of Virya was conducted through two approaches:

1. **In-vitro method** – for preliminary evaluation of Virya.
2. **In-vivo method** – for assessment of Virya using experimental animal models.

1. In-vitro Method

3. Methodology:

A conical flask containing 100 ml of distilled water was taken, and the initial temperature was recorded using an industrial thermometer. Subsequently, 10 g of powdered drug was added, and the immediate

change in temperature was noted. Thermal variations were further observed at one-hour intervals and again after 24 hours. Drugs exhibiting Ushna Virya (hot potency) showed an exothermic reaction, whereas those with Sheeta Virya (cold potency) demonstrated an endothermic reaction.

2. In-vivo Method

To evaluate Virya experimentally, Wistar albino rats were observed for the following parameters:
a) **Appetite-related changes** – variations in food and water consumption.
b) **Excretory changes** – monitoring of urine and faecal output.

The Virya of the drug was determined based on these observations, interpreted in conjunction with classical Ayurvedic references.

3.Assessment of vipaka

Vipaka is the final outcome of digestion and metabolism of a substance where biotransformation of rasa (taste) occurs[6]. Drug which is formed by a composition of panchamahabhoota undergoes transformation. At the end, composition of drug may remain same or change depending which action of the drug may differ. Hence vipaka is assessed by the action of the drug in the body. Guna is qualities or properties of drug which is difficult to be assessed by a single parameter due to its varied characteristics[7]. In this animal experimental study, vipaka and guna of the drug Blepharis maderaspatensis Linn. is assessed.

Experimental Model:

Six healthy Wistar albino rats of both sexes, weighing 150–250 g, were obtained from the animal house of Pankajakasthuri Ayurveda Medical College and PG Centre, Killy, TVM. The animals were kept in cages for seven days to acclimatize to laboratory conditions before dosing. Afterwards, each rat was transferred to an individually labelled metabolic cage for proper identification and monitoring.

The experiment was conducted by observing the effect of the drug on the following factors:

1. Food consumption
2. Water intake
3. Urine output
4. Fecal output
5. Change in body weight.

Method:

Twelve Wistar albino rats were selected for study and are divided into 2 groups of six rats each in each group (control group and trial group).

The study was performed in two phases:

A. Preliminary phase: Duration – First 5 days

B. Experimental phase: Duration – 10 days

Preliminary phase:

This phase was carried out before the experimental study to obtain baseline information on each rat's normal food intake, water consumption, and urine and faecal output. During this period, the rats were housed individually in metabolic cages, and their initial body weights were recorded. The cages were specially designed with separate compartments for food and water to avoid contamination with faecal matter. Urine was collected in plastic containers placed beneath the cages, while faecal matter was collected separately with ease. No drug administration was performed during this phase.

Experimental phase:

In this stage, the test drug was administered to the animals in calculated doses. All the previously described parameters were carefully monitored and recorded daily for a period of 10 consecutive days.

- The control group rats received distilled water in proportion to their body weight throughout the experimental period.
- The trial group rats were given the Swarasa (fresh juice) of Blepharis maderaspatensis Linn. leaves, with doses adjusted according to their body weight during the experimental phase.

Experimental Procedure:
12 Wistar strain albino rats were selected, which were divided into 2 groups. The rats were weighed and group was named as, Group A- Control; Group B -Test group. Each rat from two groups was kept in separate metabolic cages provided with constant amount of water and food per day. To each rat 200 ml of water & 50 g of food were provided in the food hopper and bottle holder per day. After 24 hour the amount of leftover water and food was measured to obtain the quantity of water and food consumed per day, this was recorded for consecutive 5 days without administering the drug to the rats in both groups. Sixth day onwards the test drug was administered at the dose of 200 mg/kg body weight to the test group and the same observation procedure was repeated for 10 more days in both groups. Quantity of stool and urine was measured every day. On every alternative day, the weight of each rat from all the groups was noted down. The parameters recorded for each rat on a day were, food consumption, water ingestion, faecal output (wet faecal-immediate after collection and dry faecal-after keeping in hot air oven for 105°C temperature for 4 hours), faecal water (wet faecal weight - dry faecal weight), urine output and food conversion ratio [Food consumption (divided by) dry faecal weight per day] both in Absolute value and Relative value.

4. Assessment of Parameters:

1. **Estimation of weight change:**

   The variation in body weight was determined by comparing the weight of each animal before the start of the experimental phase with its weight after treatment. This difference reflected the actual

change due to metabolic activity. Weight variation was calculated, and the change per 100 g body weight was expressed as a percentage.

2. **Estimation of food consumption:**

   Each rat was provided with 200 g of dry pellets daily to allow maximum possible intake. The leftover food was collected and weighed the following day. The amount of food consumed in 24 hours was obtained by subtracting the residual weight from the original 200 g. This gave the absolute food consumption in grams. To calculate relative food intake, this value was expressed in grams as a percentage of the animal's body weight per day.

3. **Estimation of water intake:**

   Each rat was given 200 ml of water in bottles. After 24 hours, the remaining water was measured, and the intake was calculated by subtracting this value from 200 ml. The daily water consumption was then expressed as ml per 100 g body weight, giving the relative water intake.

4. **Estimation of faecal matter:**

   The faecal output of each rat was collected separately and weighed. Samples were then dried in an oven at 80°C for 8 hours, and the dry weight was recorded. The amount of dry faecal matter was expressed as grams per 100 g body weight per day, representing the relative faecal output.

5. **Estimation of urine output:**

   Urine excreted over 24 hours was collected in plastic containers and measured using a graduated test tube. The daily urine output was expressed as ml per 100 g body weight, providing the relative urine output.

Statistical Calculations

The values noted were expressed as MEAN±SEM (Standard Error of Mean). The data were analyzed by one-way ANOVA followed by Dunnet's post hoc test.

Animal ethical committee clearance

Experimental study was carried out at Department of Research and Development, Pankajakasthuri Ayurveda Medical College and PG Centre, Killy, Kattakkada, Thiruvananthapuram,Approval no: PKAMC/IAEC/NOC/ 08 / 2024 by 19/01/2025.

5. Result

1. Result of Assesment of Rasa

The observations which found in the assessment of Rasa are tabulated.

Table 36: Pradhana Rasa and Anurasa of the test drug expressed by volunteers.

	Swarasa of leaves of Blepharis maderaspatensis Linn.	
RASA	**PRADHANA RASA**	**ANURASA**
MADHURA	**0**	**5**
AMLA	**0**	**0**
LAVANA	**0**	**0**
KATU	**0**	**0**
TIKTA	**4**	**21**
KASHAYA	**26**	**4**

2. Result of Assessment of virya

1. Result based on In-vitro method for Virya Analysis:

The initial temperature of the Distilled water – 32^0c

The temperature immediately after adding the test Drug – 32^0c

Temperature after one Hour – 27^0c

Temperature after 24 hours – 26^0c

Result: After adding the powdered drug temperature of the distilled water decreased, indicates the endothermic reaction.

2. Result based on In-vivo method for Virya analysis using experimental animals.

a) Changes in Food and Water intake:

i) Change in food intake: Significantly increased

ii) Change in water intake: Significantly decreased

b) Changes in Output of Urine and Fecal matter:

i) Changes in urine output: Significantly increased.

ii) Changes in Fecal output: Non-significant decrease.

3. Results of Assessment of Vipaka

Result obtained from the experiment study are summarized in tables 1– 8

Table1: Effect of swarasa of Blepharis maderaspatensis Linn. on body weight of albino rats.

Effect on body weight	
Percentage change /100g body weight	
Control	2.899±2.010
Test	3.37±1.41

Table 1 depicts the following; After administering the test drug, food intake in gm/day was increased by 10.89% in test group when compared to the control group; however that increased data was statistically not significant. Table 1 depicts the following; After administering the test drug, food intake in gm/day was increased by 10.89% in test group when compared to the control group; however that increased data was statistically not significant.

Table 1: There was increase in weight in therapeutic phase of the test drug group, when compared to the therapeutic phase of the control group, the observed increase was found to be statistically non-significant with $p>0.05$.

Table 2: Effect of swarasa of Blepharis maderaspatensis Linn. on Relative food intake of albino rats.

Effect on relative feed intake			
Groups	**Preliminary phase**	**Therapeutic phase**	**Percentage change**
Control	3.47±0.12	3.312±0.138	-4.55
Test	4.876±0.295	5.170±0.067	6.02

Table 2: An increase in relative feed intake during the therapeutic phase of the test drug with high statistical significance of $p<0.001$ while compared to the control group. Furthermore, the percentage change in relative feed intake per 100gram of body weight supports the effect of Blepharis maderaspatensis on enhancing feed intake in Wistar Albino rats.

Table 3: Effect of swarasa of Blepharis maderaspatensis Linn. on relative feed conversion ratio (FCR).

Effect on relative feed conversion ratio (FCR)			
Groups	**Preliminary phase**	**Therapeutic phase**	**Percentage change**
Control	5.85±3.246	3.97±3.565	-62.01
Test	7.180±2.438	7.64±2.760	6.40

Table 3: The test group showed a slight increase in feed conversion ratio during therapeutic phase of the study. However, the increase was found to be statistically nonsignificant with $p>0.05$; suggesting that the test drug did not produce substantial change in feed utilising efficiency. Moreover, as compared to control the mean values of test group expressed greater feed conversion ratio as compared to control group during both phases.

Table 4: **Effect of swarasa of Blepharis maderaspatensis Linn. on relative water intake**

Effect on relative water intake			
Groups	**Preliminary phase**	**Therapeutic phase**	**Percentage change**
Control	3.47±0.128	3.512±0.097	4.2
Test	4.926±0.208	4.744±0.154	-3.69

Table 4: Comparing to the preliminary phase, data generated during the therapeutic phase of the test group expressed decrease in water intake with high statistical significance of $p<0.001$. The percentage change in relative water intake further supports reduction in water intake during the therapeutic phase of the test drug group; indicating the possible role of swarasa obtained from Blepharis maderaspatensis Linn. on regulation of water homeostasis in test group as compared to the control group.

Table 5: Effect of swarasa of Blepharis maderaspatensis Linn. on relative faecal output (Dry)

Effect on relative faecal output (Dry)			
Groups	**Preliminary phase**	**Therapeutic phase**	**Percentage change**
Control	5.019 ± 0.606	5.691±0.385	13.38
Test	4.275±0.160	4.334±0.105	1.38

Table 6: Effect of swarasa of Blepharis maderaspatensis Linn. on relative faecal output (Wet)

Effect on relative faecal output (Wet)			
Groups	**Preliminary phase**	**Therapeutic phase**	**Percentage change**
Control	7.034±0.014	7.598±0.288	8.07
Test	7.587±0.434	7.293±0.034	-3.87

Table 5,6: The control group generated an increase in both dry and wet faecal output. In contrast, the test group expressed slight reduction in both dry and wet faecal output during the therapeutic phase of the current study. However, the reduction was found to be statistically nonsignificant with $p>0.05$. The results suggest that the test drug might had stabilised the faecal output particularly by regulating dry matter consistency and water content.

Table 7: Effect on relative water content in faeces

Effect on relative water content in faeces			
Groups	**Preliminary phase**	**Therapeutic phase**	**Percentage change**
Control	5.019 ± 0.606	4.691±0.385	-6.5
Test	7.034±0.014	7.598±0.288	8.01

Table **7**: The test group showed increase in water content in both preliminary and therapeutic phase as compared to control group. Although, the increase detected in therapeutic phase was small, it was found to be statistically nonsignificant. The increase in moisture content in faeces detected in test group might be due to the influence of test drug.

Table 8: Effect on relative urine output

Effect on relative urine output			
Groups	**Preliminary phase**	**Therapeutic phase**	**Percentage change**
Control	3.12±0.009	3.074±0.113	-1.47
Test	3.36±0.492	4.21±0.101	25.3

Table 8: The test group expressed significantly increased relative urine output during the therapeutic phase with high statistical significance of $p<0.0001$ while compared to the control group.

Table 1 depicts the following; After administering the test drug, food intake in gm/day was increased by 10.89% in test group when compared to the control group; however that increased data was statistically not significant. Table 1 depicts the following; After administering the test drug, food intake in gm/day was increased by 10.89% in test group when compared to the control group; however that increased data was statistically not significant.ipaka is defined by the Ayurvedic scholars as the final transformation of substances after digestion. Even though the Shadvidha (six types), Trividha (three types) and Dwividha (two types) Vipaka vadas (different opinions) are discussed in classical Ayurvedic texts, the most accepted one is Trividha vipakavada (three types of Vipaka). This includes Madhura vipaka (sweet metabolic transformation), Amla vipaka (sour metabolic transformation) and Katu vipaka (pungent metabolic transformation). The action of Vipaka takes place at the level of Dosha, Dhatu and Mala (Dhyani S.C, 2003). During the experimental study significant increase in faecal output and urine output was observed. Also the water content in the faecal matter was significantly increased. This helps in the easy evacuation of faeces. This total effect may be considered as Sristavinmutrata (loose & easy evacuation of bowel) which is the action of both Madhura vipaka and Amla vipaka. Madhura vipaka is Guru and Shukrala i.e responsible for increase in body weight and Shukra dhatu (increased spermatogenesis). On the other hand Amla vipaka is just the opposite of it, responsible for decreased spermatogenesis and body weight.

Here after giving the drug in test group, body weight was decreased. Also one study (Jain SK Srivastava et al., 2005) has reported the drug, F. strobilifera used as an anti fertility agent by traditional healers. On a preliminary analysis of rasa (taste) and veerya (active potency) as per available method (Dhyani S.C, 2003), it was observed that F.strobilifera has tikta, kashaya rasa (bitter, astringent taste predominant) & ushna veerya (hot potency). These data

6. Discussion

1.Determination of RASA

Rasa is a specific sensory perception experienced through the Rasanendriya (tongue). The taste that is perceived immediately upon contact of a substance with the tongue is termed Pradhana Rasa (primary taste), while the taste perceived subsequently is referred to as Anurasa or Uparasa (secondary taste).

For the analysis of Rasa, 30 healthy volunteers were selected. Observations revealed that 86.6% of participants identified Kashaya Rasa and 13.4% identified Tikta Rasa as the Pradhana Rasa. In terms of Anurasa, 70% reported Tikta Rasa, 16.6% noted Madhura Rasa, and 13.4% identified Kashaya Rasa.

From these findings, it may be inferred that the predominant Rasa of Blepharis maderaspatensis Linn. is Kashaya–Tikta Rasa.

2.Determination of Virya by study of exothermic and endothermic action

According to Charaka, the Virya of a drug is determined by its effects on the body, beginning from its contact with the tongue and continuing until excretion. In the present study, Virya was assessed through both in-vitro and in-vivo methods, following the criteria outlined in the textbook of Dr. S.C. Dhyani, which are based on specific pharmacological parameters and drug actions.

In the in-vitro evaluation, the temperature of distilled water decreased upon the addition of powdered leaves of Blepharis maderaspatensis Linn., indicating an endothermic reaction. This suggests that the drug possesses Sheeta Virya (cold potency).

In the in-vivo study, experimental observations revealed an increase in food intake along with a decrease in water consumption. Faecal output was reduced, with stools being smooth in consistency and retaining moisture, while urine output showed a marked increase.

As the majority of these findings are consistent with Sheeta Virya, it can be concluded that the leaves of Blepharis maderaspatensis Linn. likely possess Sheeta Virya.

3.Determination of VIPAKA

The results of the experimental study on Vipaka have been presented in consolidated tables for easier comparison and discussion.

Table 9: shows the outcome of experimental study for vipaka

Parameters of Test Drug	
Relative Food intake	HSI
Relative water intake	HSI
Relative urine output	HSI
Relative Faecal wet	NSI
Relative Faecal Dry	NSI
Relative Food conversion Ratio	NSI
Relative Faecal water	NSI
Body weight	NSI

HSI-Highly significant, NSI-non-significant.

a) **Effect on Body Weight:** A slight, non-significant increase in body weight was observed in the test group at the end of the experimental phase compared to the preliminary phase, whereas the control group showed a decrease during the therapeutic phase.

b) **Effect on Feed Intake:** The test group demonstrated a significant increase in food consumption during the therapeutic phase compared to the control group. This suggests that the test drug supported proper digestion, indicating enhanced Agni.

c) **Effect on Water Intake:** The test group showed a significant reduction in water intake during the therapeutic phase compared to the control group. This suggests that the Swarasa of Blepharis maderaspatensis Linn. contributed to the regulation of water homeostasis.

d) **Effect on Faecal Output:** A slight reduction in both dry and wet faecal matter was noted in the test group during the therapeutic phase compared with the control group. Although water content in faeces increased slightly, the change was not statistically significant. These findings indicate that the test drug helped stabilize faecal output by regulating both dry matter consistency and water content.

e) **Effect on Urine Output:** A significant increase in urine output was recorded in the test group during the therapeutic phase compared to the control group.

f) **Food Conversion Ratio:** The test group showed a minor, non-significant increase in feed conversion ratio. This observation suggests the presence of Deepana-Pachana properties, which enhanced food consumption.

Based on these findings, the test group showed an increase in appetite, with a food conversion ratio of 6.40% and a body weight gain of 3.37%. Food intake increased significantly by 6.02%, while dry faecal matter was recorded at 1.38%. This indicates that faecal output was proportionally lower compared to

food intake, accompanied by a minimal, non-significant increase in body weight and reduced faecal output. These results support the view that the drug possesses Pachana,vrana ropana and vrana shodhana properties. According to Acharya Charaka, Katu Vipaka is associated with a reduction in stool quantity. Hence, from this assessment, it can be inferred that the leaves of Blepharis maderaspatensis Linn. likely exhibit Katu Vipaka.

7. Conclusion

The present study was undertaken to evaluate the Ayurvedic pharmacodynamic properties (Rasa, Virya, and Vipaka) of Blepharis maderaspatensis Linn. through systematic experimental methods.

The present study establishes that Blepharis maderaspatensis Linn. exhibits Kashaya–Tikta Rasa, Sheeta Virya, and Katu Vipaka, suggesting Pachana, vrana-ropana, vrana – shodhana, Stambhana, and Mutrala properties with potential Pitta–Kapha pacification. These results provide preliminary evidence, warranting further pharmacological and clinical validation. Further clinical trials in humans are necessary to draw more definitive conclusions.

Additionally, this study highlights the need for more experimental research on Ayurvedic principles to generate evidence-based data, particularly concerning drugs of extra-pharmacopeial origin.

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