



FROM COSMIC PRINCIPLES TO SCIENTIFIC EVIDENCE: VALIDATING ASTROLOGY IN AYURVEDA

Dr. Vikas Bhardwaj^{*1}, Dr. Pankaj Sharma², Dr. Sahana C.³

¹Professor and HOD, Department of Ayurveda Samhita Evum Siddhanta, Shri Dhanwantry Ayurvedic College and Hospital, Chandigarh, India.

²Assistant Professor, Department of Kaya Chikitsa, Government Ayurvedic College and Hospital, Patiala, Punjab, India.

³Professor, Department of Ayurveda Samhita Siddhanta, Sushruta Ayurvedic College and Hospital, Bengaluru, India.



***Corresponding Author: Dr. Vikas Bhardwaj**

Professor and HOD, Department of Ayurveda Samhita Evum Siddhanta, Shri Dhanwantry Ayurvedic College and Hospital, Chandigarh, India. DOI: <https://doi.org/10.5281/zenodo.23036166>

How to cite this Article: Dr. Vikas Bhardwaj^{*1}, Dr. Pankaj Sharma², Dr. Sahana C.³. (2026). From Cosmic Principles To Scientific Evidence: Validating Astrology In Ayurveda. European Journal of Biomedical and Pharmaceutical Sciences, 13(10), 293–297.

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Article Received on 30/08/2026

Article Revised on 20/09/2026

Article Published on 01/10/2026

ABSTRACT

Loka–Purusha Samya Vada emphasizes the interrelationship between Kaala, Rtu, Nakshatra and biological processes. Classical Ayurvedic texts describe specific periods for medicinal plant collection, including Pushya Nakshatra, indicating that the timing of collection may influence drug quality. The present study aims to explore the scientific relevance of Kaala and Nakshatra in drug collection by comparing medicinal plants collected during Pushya and other selected Nakshatras. The study evaluates the association of Pushya Nakshatra-based collection with variations in the phytochemical composition of selected medicinal plants in comparison with collection during other Nakshatras. It was observed that Vata, Pipal, Jambu and Arka collected during Pushya Nakshatra demonstrated measurable variations in phytochemical constituents compared with samples collected during other Nakshatras. Phenolic, flavonoid and alkaloid contents varied among the plants, with species-specific patterns. Results showed Pushya-collected samples generally exhibited higher phenolic and flavonoid contents. Alkaloid content was higher in Pushya samples of Vata, Pipal and Jambu, whereas Arka showed higher alkaloid content in the Other Nakshatra group. Overall, the findings suggest an association between collection period and phytochemical composition, while seasonal and environmental factors should also be considered.

KEYWORDS: Ayurveda, Astrology, Loka Purusha Samya Vada, Nakshatra, Pushya, Kaala.

INTRODUCTION

Ayurveda emphasizes the importance of Kaala (time) in the collection, processing, and therapeutic utilization of medicinal plants. The Sanskrit word ‘Kaala’ (also spelled as ‘kaala’ or Kaala) means time.^[1] Kaala has a role in drug collection^[2], preparation^[3], preservation and administration of a drug.^[4] Classical Ayurvedic texts describe specific Nakshatra and Rtu periods as appropriate for the collection of different medicinal drugs, suggesting that the time of collection may influence their inherent medicinal properties.^[5] Among the Nakshatras, Pushya Nakshatra is traditionally regarded as an auspicious and therapeutically significant period for the collection and utilization of medicinal substances.^[6,7] In Ayurveda literature, drug collection has

been stated according to various parts of the plant in respective seasons^[8], Nakshatras^[9], desha^[10] on the basis of therapeutic uses.

From a contemporary pharmacognostic and phytochemical perspective, the therapeutic potential of medicinal plants is closely associated with their content of biologically active secondary metabolites. Alkaloids, phenolic compounds, and flavonoids constitute important classes of phytoconstituents and contribute to several pharmacological activities, including antioxidant, anti-inflammatory, antimicrobial, and metabolic effects. Their concentration may vary according to environmental and physiological factors such as season, temperature,

rainfall, photoperiod, plant maturity, geographical conditions, and time of harvesting.^[11]

In this context, the present study was undertaken to investigate whether the Nakshatra at the time of collection is associated with measurable variations in the phytochemical profile of selected medicinal plants. Four plants described for their medicinal importance in Ayurveda—*Ficus benghalensis* (Vata), *Ficus religiosa* (Pipal), *Syzygium cumini* (Jambu), and *Calotropis procera* (Arka)—were selected for the study. Plant materials were collected during the specified Rtu periods under two collection conditions: Pushya Nakshatra and other Nakshatras, while maintaining comparable collection and processing conditions as far as practicable.

The phytochemical evaluation focused on the estimation of total alkaloid content (TAC), total phenolic content (TPC), and total flavonoid content (TFC) in samples collected during Pushya Nakshatra and those collected during other Nakshatras. These parameters were selected as measurable indicators of variations in major groups of secondary metabolites and as a means of providing quantitative evidence for examining the classical concept of time-specific medicinal plant collection.

Comparison of these phytochemical parameters between the Pushya Nakshatra and other-Nakshatra groups may help determine whether collection during Pushya is associated with differences in the concentration of these important phytoconstituents. Such an approach provides a scientific framework for examining the classical Ayurvedic concept of Nakshatra-specific drug collection through reproducible modern analytical methods.

Thus, the present investigation attempts to bridge the classical Ayurvedic concept of Nakshatra-based

medicinal plant collection with contemporary phytochemical evaluation, by assessing variations in total alkaloids, total phenols, and total flavonoids in four selected medicinal plants collected during Pushya and other Nakshatra periods.

MATERIAL AND METHODS

Fresh plant materials of Vata (*Ficus benghalensis* L.), Pipal (*Ficus religiosa* L.), Jambu (*Syzygium cumini* (L.) Skeels), and Arka (*Calotropis procera* (Aiton) W.T. Aiton) were collected from the vicinity of Shri Krishna AYUSH University, Kurukshetra, Haryana, India.

Based on the time of collection, the samples were divided into two groups

1. Pushya Nakshatra Group: Plant materials collected during Pushya Nakshatra.
2. Other Nakshatra Group: Plant materials collected during Nakshatras other than Pushya.

The collection of plant materials was carried out with consideration of the classical Ayurvedic principles concerning Nakshatra- and Rtu-specific drug collection. The respective plant parts were collected using a standardized procedure. Care was taken to maintain uniformity in the method of collection, handling, cleaning, processing, and storage of samples belonging to both groups.

The botanical identity of the collected plant materials was authenticated by the Department of Dravyaguna, Shri Krishna Government Ayurvedic College, Kurukshetra, Haryana, India. Representative specimens were preserved and deposited in the Research and Innovation Department, Shri Krishna AYUSH University, Kurukshetra, for future reference.

Plant Material and Collection Schedule

Drug	Botanical name	Part collected	Pushya Nakshatra	Other Nakshatra
Vata	<i>Ficus benghalensis</i> L.	Leaf bud/Shunga	15.02.2022, 14.03.2022, 10.04.2022, 04.06.2022	20.09.2022, 06.12.2022, 12.02.2023
Pipal	<i>Ficus religiosa</i> L.	Bark/Tvak	15.02.2022, 14.03.2022, 10.04.2022, 04.06.2022	20.09.2022, 06.12.2022, 12.02.2023
Jambu	<i>Syzygium cumini</i> (L.) Skeels	Bark/Tvak	15.02.2022, 14.03.2022, 10.04.2022, 04.06.2022	20.09.2022, 06.12.2022, 12.02.2023
Arka	<i>Calotropis procera</i> (Aiton) W.T. Aiton	Leaves and flowers	15.02.2022, 14.03.2022, 10.04.2022, 04.06.2022, 01.07.2022, 08.01.2023	20.09.2022, 06.12.2022, 12.02.2023

A common geographical source was selected and the botanical identity of all samples was authenticated to minimize variation arising from geographical, environmental, and taxonomic differences.

Processing and Ethanolic Extraction

The collected plant materials were initially cleaned to remove adhering soil and extraneous matter. The samples were subsequently freeze-dried at -54°C for 72 hours. The dried materials were pulverized into a suitable coarse/fine powder as required and subjected to

extraction using absolute ethanol in a Universal Extractor. Following extraction, the extracts were filtered and concentrated under reduced pressure at 40–50°C using a rotary evaporator. The concentrated extracts were further dried and transferred into airtight amber-coloured containers. The extracts were stored at 4°C until further phytochemical analysis.

All samples were subjected to identical processing and extraction conditions to minimize analytical variation attributable to sample preparation. Standardization of drying, pulverization, extraction, concentration, and storage conditions ensured comparability of phytochemical parameters between the Pushya Nakshatra and Other Nakshatra groups.

Phytochemical Analysis

The ethanolic extracts obtained from the selected medicinal plants were subjected to qualitative and quantitative phytochemical analysis. Particular emphasis was placed on the quantitative estimation of total

alkaloids, total flavonoids, and total phenolic compounds, as these constitute important classes of secondary metabolites associated with the biological properties of medicinal plants.

Qualitative Phytochemical Analysis

Preliminary qualitative phytochemical screening of the ethanolic extracts was carried out using standard chemical tests for the detection of major phytoconstituent groups.

Phytoconstituent	Qualitative test
Alkaloids	Dragendorff's test
Flavonoids	Alkaline reagent test
Phenolic compounds	Ferric chloride test

The observations obtained from the qualitative screening were used to establish the presence or absence of the respective phytochemical groups before quantitative estimation.

Quantitative Phytochemical Analysis

Quantitative estimation of total alkaloids, total flavonoids, and total phenolic content was performed using established spectrophotometric/colorimetric methods.

Parameter	Method	Standard	Wavelength	Expression of result
Total alkaloid content	BCG colorimetric method	Atropine	470 nm	mg AE/g extract
Total flavonoid content	Aluminium chloride (AlCl ₃) colorimetric method	Rutin	510 nm	mg RE/g extract
Total phenolic content	Folin–Ciocalteu method	Gallic acid	765 nm	mg GAE/g extract

Where: AE = Atropine equivalent, RE = Rutin equivalent, GAE = Gallic acid equivalent

The absorbance of the test samples was measured spectrophotometrically at the respective wavelengths. Calibration curves were prepared using the corresponding reference standards, and the concentration of the respective phytochemical constituents was calculated from the regression equation of the standard curve. The results were expressed as milligrams of standard equivalent per gram of extract (mg equivalent/g extract).

Comparative Assessment

The quantitative phytochemical data obtained for each medicinal plant were compared between the Pushya Nakshatra and Other Nakshatra groups. The comparative assessment was undertaken separately for:

- Total alkaloid content;
- Total phenolic content; and
- Total flavonoid content.

This comparison was intended to determine whether the time of collection, particularly Pushya Nakshatra in

comparison with other Nakshatras, was associated with measurable variation in the selected phytochemical constituents. Quantitative estimation of total alkaloids, phenolics, and flavonoids provides objective and reproducible biochemical parameters for assessing differences in the phytochemical profile of plant materials collected under different Nakshatra conditions. This facilitates scientific evaluation of the classical Ayurvedic concept of time-specific medicinal plant collection using contemporary analytical methods.

RESULTS AND DISCUSSION

Qualitative screening confirmed alkaloids, flavonoids and phenolic compounds in Vata, Pipal, Jambu and Arka. Quantitative analysis showed differences between Pushya and Other Nakshatra groups, with generally higher flavonoid and phenolic contents in Pushya samples. Alkaloids were higher in Pushya samples of Vata, Pipal and Jambu but higher in Other Nakshatra samples of Arka.

Quantitative Phytochemical Content

Drug	Alkaloids (mg AE/g)	Flavonoids (mg RE/g)	Phenolics (mg GAE/g)
Vata – Pushya	19.30	49.20	122.25
Vata – Other	12.05	44.82	112.57
Pipal – Pushya	5.57	5.57	316.00
Pipal – Other	5.02	5.14	281.64
Jambu – Pushya	2.88	2.88	213.00
Jambu – Other	2.11	1.97	187.52
Arka – Pushya	0.90	5.10	174.82
Arka – Other	1.32	5.02	165.43

The quantitative phytochemical analysis demonstrated noticeable differences in the concentrations of alkaloids, flavonoids and phenolic compounds between the Pushya and Other Nakshatra collection groups. Total flavonoid and phenolic contents were consistently higher in the Pushya-collected samples of all four medicinal plants, whereas the pattern for alkaloids varied among the species.

Vata showed the highest total alkaloid content among the studied plants, with 19.30 mg AE/g in the Pushya group compared with 12.05 mg AE/g in the Other group. Its flavonoid and phenolic contents were also higher in the Pushya group (49.20 vs. 44.82 mg RE/g and 122.25 vs. 112.57 mg GAE/g, respectively). Pipal exhibited a marked phenolic content, increasing from 281.64 to 316.00 mg GAE/g in the Pushya group, while flavonoids showed a comparatively smaller increase (5.14 to 5.57 mg RE/g).

Jambu similarly demonstrated higher values for all three phytochemical parameters during Pushya collection. Phenolic content increased from 187.52 to 213.00 mg GAE/g, while flavonoids increased from 1.97 to 2.88 mg RE/g and alkaloids from 2.11 to 2.88 mg AE/g. In Arka, phenolic and flavonoid contents were slightly higher in the Pushya group (174.82 vs. 165.43 mg GAE/g and 5.10 vs. 5.02 mg RE/g, respectively); however, alkaloid content was higher in the Other group (1.32 vs. 0.90 mg AE/g).

The consistent increase in phenolic and flavonoid contents during Pushya collection is noteworthy because these phytochemical classes are widely associated with antioxidant and other biological activities. This pattern may partly correspond with the greater antioxidant activity observed subsequently in the Pushya samples. Nevertheless, total phytochemical estimation provides information about broad compound classes and does not establish which individual constituents are responsible for the observed biological effects.

The variation in alkaloid content, particularly the opposite trend observed in Arka, indicates that the response was not uniform across all phytochemical classes or plant species. Such differences may arise from species-specific metabolism and variations in environmental and physiological conditions associated with collection time, including temperature, rainfall,

photoperiod, developmental stage and seasonal changes. Overall, the findings demonstrate measurable variation in phytochemical composition between the predefined collection groups.

CONCLUSION

The study demonstrated measurable differences in phytochemical composition between Pushya and Other Nakshatra collection groups. Pushya samples generally showed higher flavonoid and phenolic contents, while alkaloid variation was species-specific. These findings suggest that collection time may influence medicinal plant quality; however, further controlled studies are required to distinguish Nakshatra-associated effects from seasonal and environmental influences.

ACKNOWLEDGEMENT

The authors sincerely acknowledge the support and guidance received from Shri Krishna AYUSH University, Kurukshetra, Haryana, India. The authors are grateful to all faculty members, research scholars, and colleagues for their valuable assistance and cooperation during the study.

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