iJRASET
International Journal For Research in Applied Science and Engineering Technology



# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

**Volume:** 14 **Issue:** XI **Month of publication:** November 2026

**DOI:** https://doi.org/10.22214/ijraset.2026.85634

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538*
*Volume 14 Issue XI Nov 2026- Available at www.ijraset.com*

# Comparative Pharmacognostic and Phytochemical Analysis of *Nava* and *Purana Vidanga (Embelia ribes* burm.f.) by using HPLC Method

Dr. Mallikarjuna[1], Dr. Dharani[2], Dr. Shivananda B Karigar[3]
[1]*Post Graduate Scholar, Department of PG Studies in Dravyaguna, Taranath Government Ayurvedic Medical College and Hospital Ballari*
[2]*Professor, Department of PG Studies in Dravyaguna, Government Ayurvedic Medical College, Bangalore.*
[3]*Assistant professor, Department of PG Studies in Dravyaguna, Taranath Government Ayurvedic Medical College and Hospital Ballari.*

***Abstract: Introduction: Vidanga (Embelia ribes Burm.f.) is an important medicinal plant widely employed in Ayurvedic practice for the management of Krimi and various other ailments. Classical Ayurvedic texts, particularly Sharangadhara Samhita, Mentioned the use of Purana Vidanga over Nava Vidanga, suggesting that the process of ageing enhances its therapeutic efficacy. However, limited scientific data is available to substantiate this traditional claim. Hence, the present study was undertaken to evaluate and compare the Pharmacognostical, Physicochemical, Phytochemical, and Antibacterial profiles of Nava and Purana Vidanga.***
***Methods: Samples of Nava and Purana Vidanga collected from the same geographical source were subjected to detailed organoleptic examination, powder microscopy, physicochemical analysis, phytochemical screening, ICP-OES analysis, and RP-HPLC studies. Quantification of embelin, the major active constituent of Vidanga, was carried out using RP-HPLC. Antibacterial activity against Bacillus subtilis (MTCC 441) was evaluated by the agar well diffusion method using different concentrations of the extracts.***
***Results: Pharmacognostical observations confirmed the authenticity of both samples. Purana Vidanga exhibited lower moisture content and higher extractive values, indicating improved stability and extractability. Both samples contained important phytoconstituents such as alkaloids, flavonoids, tannins, glycosides, phenols, phlobatannins, and terpenoids. RP-HPLC analysis revealed the presence of embelin in both samples, with marginally higher concentrations in Purana Vidanga. Antibacterial studies demonstrated better inhibitory activity of Purana Vidanga against Bacillus subtilis, particularly at higher concentrations.***
***Conclusion: The findings suggest that ageing causes qualitative and quantitative changes in Vidanga that may improve its therapeutic efficacy. Both Nava and Purana Vidanga showed better extraction in alcohol than in water, with Purana Vidanga showing the highest extractive values. Purana Vidanga also exhibited better antibacterial activity than Nava Vidanga, indicating greater availability of active constituents and enhanced therapeutic potential. These findings provide scientific support for the Ayurvedic principles of Kalaprakarsha and Saveeryata Avadhi and support the classical use of Purana Vidanga in Preparations such as Asavaristas, where the alcoholic medium helps in better extraction of active principles.***
***Keywords: Vidanga, Embelin, Antibacterial Activity, RP-HPLC, Phytochemical Analysis.***

## I. INTRODUCTION

Ayurveda world's oldest traditional systems of medicine and relies extensively on the use of medicinal plants for the prevention and management of various diseases. It possesses a rich repository of herbal drugs with diverse therapeutic properties[1]. Despite the extensive use of these medicinal plants in clinical practice, many of them still require comprehensive scientific evaluation and standardization to establish their quality, safety, and efficacy. Therefore, systematic Pharmacognostical, Physicochemical, Phytochemical and Pharmacological investigations are essential for validating the traditional claims and promoting the evidence-based utilization of Ayurvedic medicinal plants.

*Vidanga*, botanically identified as Embelia ribes Burm.f., is one such important medicinal drug described extensively in Ayurvedic classics. In Charaka Samhita, *Vidanga* has been mentioned as "*Agraya*" for the treatment of Krimi and is therefore popularly known

as "*Krimighna.*" In Bhavaprakasha Nighantu, *Vidanga* is described with the synonym "Chitratandula.[2]" The fruits of *Vidanga* are globose, smooth, succulent, black when ripe, and resemble peppercorns when dried, with a persistent calyx at the apex.

Ayurveda, the ancient system of medicine, describes several unique pharmaceutical and therapeutic concepts which require scientific exploration and revalidation for better understanding and wider applicability. One such important concept is explained in Sharangadhara Samhita, where it is stated that most drugs should be used in their fresh form, except certain drugs such as *Pippali, Vidanga, Dhanyaka, Makshika, Guda* and *Ghrita,* which are considered therapeutically superior in their old or matured state[3].

This classical reference indicates that aged *Vidanga* possesses enhanced therapeutic utility compared to the fresh drug as it undergoes beneficial Physico chemical transformations during storage, thereby enhancing its potency naturally over time. The scientific basis behind this traditional recommendation remains insufficiently explored and therefore necessitates detailed Pharmacognostical and Phytochemical evaluation.

*Embelia ribes* Burm.f. (*Vidanga),* commonly known as False Black Pepper, is an important medicinal plant of the family Myrsinaceae, widely distributed in India. It contains bioactive constituents such as embelin, fixed oils, saponins, tannins and phenolic compounds. Traditionally, *Vidanga* is used for digestive disorders, constipation, fungal infections, obesity and helminthic infestations. Pharmacological studies have reported antibacterial, anti-inflammatory, antioxidant, anti-fertility and anti-protozoal activities.

Modern pharmaceutical science considers shelf life as the period during which a drug maintains its quality and active constituents under suitable storage conditions. In herbal drugs, storage factors such as temperature, humidity, contamination and chemical degradation may influence phytoconstituents. Therefore, stability studies are important for assessing changes during storage. In Ayurveda, the therapeutic importance of *Purana Vidanga* has been described, but its scientific basis requires further evaluation. Comparative studies of physicochemical properties, phytoconstituents and active constituents can help understand the changes occurring during ageing and provide scientific support for its traditional use.

Hence, the present study was undertaken to evaluate and compare the Pharmacognostical, Physicochemical and Phytochemical characteristics of *Vidanga* samples collected from the same geographical region. The study aims to assess the possible changes occurring in Phytoconstituents during storage and to scientifically validate the Ayurvedic concept of *Saveeryata-avadhi* and *Kalaprakarsha* enhanced potency of *Purana Vidanga.* The findings of the study may contribute toward better understanding, standardization and rational therapeutic utilization of *Vidanga* in Ayurvedic practice.

## II. REVIEW OF LITERATURE

### A. *Vedic Period*

Direct botanical identification of *Vidanga* in Vedas is not very clear and universally accepted by scholars. However, Ayurvedic historians commonly associate *Vidanga* with references found in Atharvaveda, where herbs used for Krimi (worms/parasitic infestations) are described. *Krimis* are classified into two; one is *Drishta* and Adrishta and the second one as *Durnama* and *Sunama Krimi* which may be considered as visible, invisible, pathogenic and non-pathogenic organisms[4].

### B. *Samhita Period*

Vidanga finds its reference in both Bruhatrayis[7,8,9] and Laghutrayis[10], widely used as Shirovirechana, Krimighna and Kushtaghna. In Sharangadhara Samhita,[11] it is mentioned that fresh drugs are preferred for therapeutic use; however, substances such as *Vidanga,* Pippali, Guda, Ghrutha, Dhanyaka and Madhu exhibit superior therapeutic efficacy in their aged (*Purana*) state.

### C. *Nighantu Period*

Reference of Vidanga and its Paryayas, Guna and Karmas are available in almost all the Nighantus[12,15,16,18,19].

NIRUKTI OF *VIDANGA*[20]

**विडति भिनत्ति इति विहंगम्।**

That which pierces, breaks, or destroy diseases is called *Vidanga*.

**विडति भिनत्ति वहिनमान्द्यम् शूलाध्मानविबन्धादींश्चेति वा विडंगः।**

It destroys diseases like *Agnimandya, Shula, Adhmana* and *Vibandha*

MISHRAKA VARGA[21]:
Vidanga is grouped under ***Trimada*** along with *Chitraka* and *Musta*.
Part used[22:] Fruits, Seeds
Dose : Churna 5-10 g
Controversy [23]
*Vidanga* is widely accepted as *Embelia ribes* Burm.f. belonging to the family Myrsinaceae. Various regional names such as Vavding (Gujarati and Marathi), Biranga (Bengali), Vayu Vidangama (Telugu), and Vayu Vilangam (Tamil) indicate its traditional usage throughout India and support its identification as *Vidanga*. The synonym "*Krimighna*" mentioned in Ayurvedic literature denotes its potent anthelmintic activity.
However, controversy exists regarding its substitution and botanical identity. Some scholars considered *Dikamali* (*Gardenia gummifera*) to be superior as a vermifuge and suggested its use in place of *Vidanga* (*Embelia ribes* Burm.f). Nevertheless, they did not directly identify *Dikamali* as *Vidanga*. Further controversy arose due to the presence of another related species, *Embelia tsjeriam -cottam* A.D(syn. *Embelia robusta*), commonly known as Bayabaranga, which belongs to the same family and resembles *Embelia ribes* Burm.f morphologically. This similarity may lead to confusion in identification and adulteration in the crude drug market.

### *D. Morphology of Embelia ribes burm.f.*

Table no [1]: Showing the morphology of Embelia ribes burm.f.

| | |
|---|---|
| Habit | Embelia ribes is a large scandent woody climber or evergreen climbing shrub belonging to the family Myrsinaceae. The plant commonly grows in tropical and subtropical forests and climbs over surrounding vegetation. |
| Stem | The stem is slender, woody, branched, and brittle in nature. Young branches are smooth and cylindrical, while older stems become hard and brownish. The climbing stem may extend for several meters over trees and shrubs. |
| Leaves | Leaves are simple, alternate, elliptic to lanceolate, and glabrous with entire margins. They are dark green above and lighter beneath, having short petioles and acute or acuminate apex. Venation is reticulate and clearly visible on the lower surface. |
| Flowers | Flowers are small, numerous, greenish white to yellowish, and arranged in axillary racemes or panicles. They are bisexual, regular, and aromatic. Flowering generally occurs during spring and early summer. |
| Fruits | The fruits are globose berries, initially red and becoming dark brown or black on ripening. They are smooth, wrinkled on drying, and resemble black pepper, hence commonly called "False Black Pepper." Fruits are the chief medicinally useful part of the plant. |
| Seeds | Seeds are single, hard, smooth, and brown in colour, enclosed within the berry. They are oily and contain the important active constituent embelin. |
| Root | The root system is well developed with woody roots and root bark. Roots are brownish externally and are occasionally used medicinally in traditional systems of medicine. |

### *E. Chemical Constituents24*
Embelin, Christembine, Quercitol, Vilangin, Embelicacid. Tannins,Volatile oil, Resinoid substances, Potassium embelate, Alkaloids Phenolic compoundsFlavonoids, Glycosides

## III. MATERIALS AND METHODS

### *A. Study design and sample collection*
The study was designed as a comparative analytical study to evaluate the pharmacognostical, physicochemical and phytochemical differences between *Nava* and *Purana Vidanga* (Embelia ribes Burm.f.). *Vidanga* fruits were collected from the Bhima Shankar Forest, Pune District, Maharashtra, during the beginning of December. Both samples were obtained from the same geographical source. Freshly collected fruits were considered *Nava Vidanga*, while a portion of the collected fruits was shade-dried and stored in

a clean glass container protected from direct sunlight for one year to obtain *Purana Vidanga.* The collected material was authenticated by experts in Dravyaguna. The samples were subsequently dried, powdered and subjected to pharmacognostical, physicochemical, phytochemical, RP-HPLC and antibacterial evaluation.

*B. Pharmacognostic evaluation*

Pharmacognostic evaluation included macroscopic and powder microscopic examination of both samples. Macroscopic characteristics such as colour, odour, taste, texture and fracture were recorded. Powder microscopy was performed to identify diagnostic anatomical characters.

*C. Physicochemical evaluation*

The powdered samples were evaluated for foreign matter, loss on drying, total ash, acid-insoluble ash, water-soluble extractive value, alcohol-soluble extractive value and pH.

*D. Phytochemical and inorganic evaluation*

Preliminary phytochemical screening and inorganic evaluation was carried out using standard qualitative chemical tests.

*E. RP-HPLC estimation of embelin*

Embelin was quantitatively estimated using RP-HPLC. A C18 column was used with acetonitrile: water (7:3) as the mobile phase at a flow rate of 1.0 mL/min. Detection was performed using a UV detector at 291 nm, with an injection volume of 20 µL. The samples were filtered through a 0.45 µm membrane filter before injection.

*F. In Vitro antibacterial activity*

The antibacterial activity of *Nava* and *Purana Vidanga* was evaluated against Bacillus subtilis (MTCC 441) using the agar well diffusion method. A fresh 18-hour culture was standardized to an optical density of 0.6. Mueller–Hinton agar was used as the culture medium, and wells of 6 mm diameter were prepared. Test samples were evaluated at concentrations of 25, 50 and 75 mg, while ciprofloxacin 0.005 was used as the standard control. The plates were incubated at 37°C for 24 hours, after which the zones of inhibition were measured in millimetres.

## IV. OBSERVATION AND RESULTS

Pharmacognostic evaluation of both samples showed characteristic microscopic features, including numerous thick-walled stone cells occurring singly and in groups, seed-coat fragments, mesocarp fragments and endosperm containing oil globules. The microscopic characteristics were comparable between *Nava* and *Purana Vidanga,* indicating that one year of storage did not cause major changes in the diagnostic anatomical features.

*A. Organoleptic Study*

Table [2] Showing weight of drug before and after collection

| Sample | Fresh weight (g) | Weight after shade Drying (g) |
|---|---|---|
| *Nava Vidanga* | 1000 | 650 |
| *Purana Vidanga* | 1000 | 640 |

Table [3] Showing Organoleptic Parameters of *Vidanga* (*Embelia Ribes* Burm. F) Fruit Samples

| Characteristics | *Nava Vidanga* | *Purana Vidanga* |
|---|---|---|
| Colour | Green | Dark Brown |
| Odor | Intense Spicy | Spicy |

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

| | | |
|---|---|---|
| Taste | Intense Pungent | Pungent |
| Texture | Smooth | Smooth |
| Size | Fruits are larger. | Fruits were shrunken, smaller and lighter |

Table [4] Showing Organoleptic Parameters of *Vidanga* (*Embelia Ribes* Burm. F) Powder Samples

| Sr. No. | Parameters | Nava *Vidanga* | Purana *Vidanga* |
|---|---|---|---|
| 1 | Texture | Fine powder | Fine powder |
| 2 | Colour | Brownish red | Dark brown |
| 3 | Taste | Pungent | Pungent |
| 4 | Odour | Characteristic, Pungent | Characteristic, Pungent |

*B. Comparative Powder Microscopy*

Table no [5] Showing Comparative Powder Microscopic characteristics between Nava and Purana Vidanga (*Embelia ribes* burm. f*)* samples

| CHARACTERISTICS | NAVA *VIDANGA* SAMPLE | PURANA *VIDANGA* SAMPLE |
|---|---|---|
| Stone cells | Numerous thick-walled stone cells occurring singly and in group | Numerous thick-walled stone cells occurring singly and in group |
| Seed coat | Brownish yellow to dark brown seed coat fragment present | Brownish yellow to dark brown seed coat fragment present |
| Mesocarp | Few mesocarp fragments observed | Few mesocarp fragments observed |
| Endosperm embedded with oil globule | Numerous | Numerous |

*C. Physichochemical Parameters: NAVA AND PURANA VIDANGA (Embelia ribes burm. f) SAMPLES*

Table No [6] Showing Physicochemical Characteristics of *Nava* and *Purana Vidanga* Samples

| Sl. No | Test | Nava Vidanga | Purana Vidanga | Standard value |
|---|---|---|---|---|
| 1. | Foreign matter | 0.8% | 0.9% | - |
| 2. | Loss on drying | 2.31% | 1.48% | < 5% |
| 3. | Ash value | 5.5% | 4.7% | < 6% |
| 4. | Acid insoluble ash value | 0.9% | 0.7 % | < 1.5% |
| 5. | Water soluble extract value | 15.2% | 17.6% | > 9% |
| 6. | Alcohol soluble extract value | 19.1% | 22.8% | > 10% |
| 7. | pH | 6.42 | 6.37 | - |

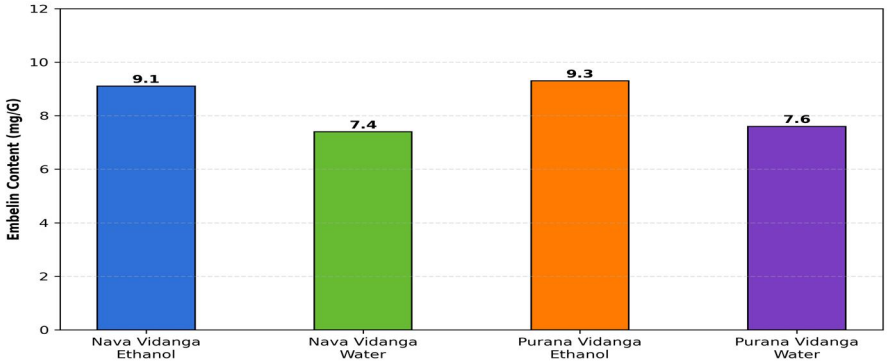
©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

*D. RP-HPLC estimation of embelin*

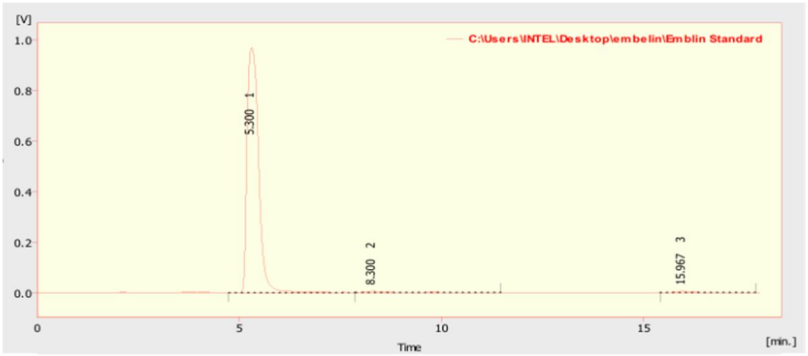
The standard embelin showed a retention time of 5.300 min with a peak area of 19088.711 mV·s. Embelin was detected in both aqueous and ethanolic extracts of *Nava* and *Purana Vidanga*. The ethanolic extracts showed higher embelin content than the corresponding aqueous extracts, with the highest value observed in *Purana Vidanga* ethanolic extract.

Table [7] HPLC Quantification of Embelin in *Nava* and *Purana Vidanga* (Embelia ribes burm. f)

| SL. No | Sample | Result mg\G |
|---|---|---|
| 1 | *Nava Vidanga* Ethanol | 9.1 |
| 2 | *Nava Vidanga* Water | 7.4 |
| 3 | *Puran Vidanga* Ethanol | 9.3 |
| 4 | *Purana Vidanga* Water | 7.6 |

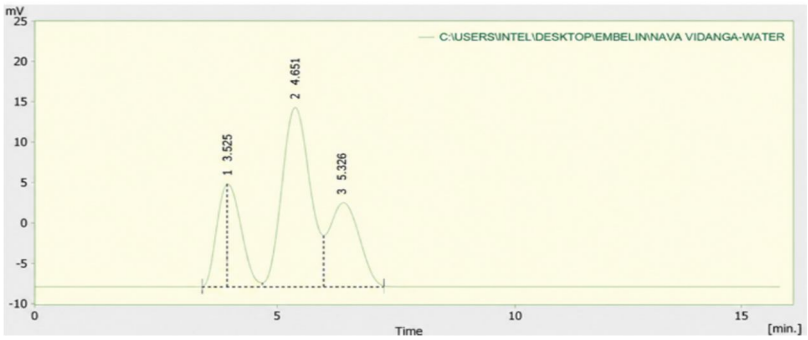



GRAPH 1: HPLC PROFILE OF STANDARD EMBELIN



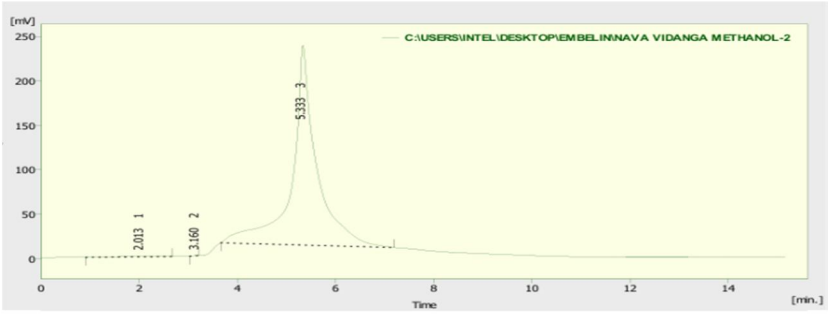

- Retention time of standard Embelin is 5.300 min and area under peak is 19088.711mV s (98.5%)

GRAPH 2: HPLC PROFILE OF EMBELIN IN *NAVA VIDANGA* WATER EXTRACT



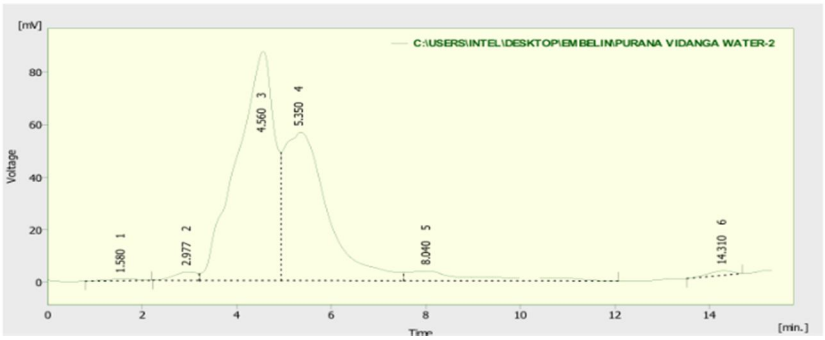

- Retention time of Embelin in *Nava Vidanga* water extract is 5.326min (most closed to the standard) and area under peak is 305.782 mV, with Embelin concentration 7.40 of mg/g.

GRAPH 3: HPLC PROFILE OF EMBELIN IN *NAVA VIDANGA* ETHANOL EXTRACT



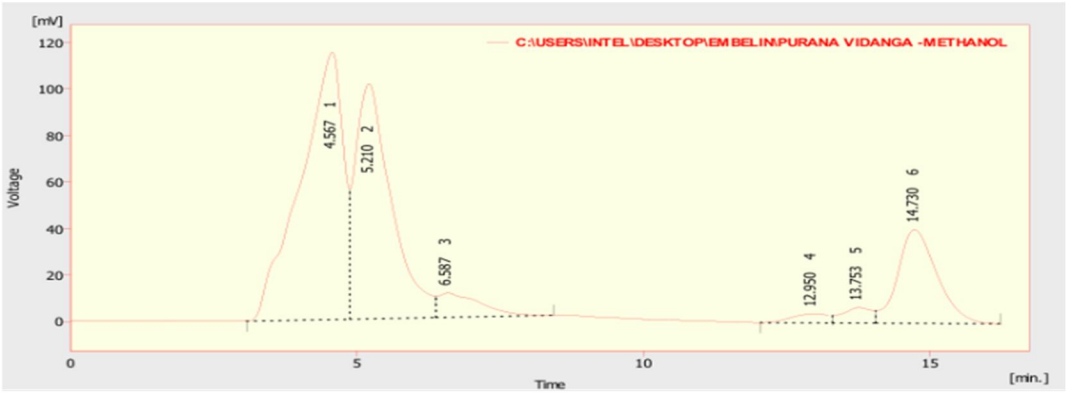

- Retention time of Embelin in *Nava Vidanga* Ethanolic extract is 5.330min (most closed to the standard) and area under peak is 1204.042 mV, with Embelin 9.10 mg/g.

GRAPH 4: HPLC PROFILE OF EMBELIN IN *PURANA VIDANGA* WATER EXTRACT




- Retention time of Embelin in *Purana Vidanga* Water extract is 4.560min (most closed to the standard) and area under peak is 4783.480 mV, with Embelin 7.6 mg/g.

GRAPH 5: HPLC PROFILE OF EMBELIN IN *PURANA VIDANGA* ETHANOL EXTRACT




- Retention time of Embelin in *Purana Vidanga* Ethanolic extract is 4.567min (most closed to the standard) and area under peak is 5904.489 mV, with Embelin 7.6 mg/g.

*E. In vitro antibacterial activity*

No inhibition was observed at 0 mg concentration. At 25 mg, both *Nava* and *Purana Vidanga* produced a zone of inhibition of 11 mm. At 50 mg, the zones were 16 mm for *Nava* and 20 mm for *Purana Vidanga*, while at 75 mg, the zones increased to 18 mm and 23 mm, respectively. Ciprofloxacin produced zones of 43–44 mm under the study conditions.

Table 5. In vitro antibacterial activity against Bacillus subtilis (MTCC 441)

| Sample | 0 mg | 25 mg | 50 mg | 75 mg |
|---|---|---|---|---|
| *Purana Vidanga* | — | 11 mm | 20 mm | 23 mm |
| *Nava Vidanga* | — | 11 mm | 16 mm | 18 mm |

## V. DISCUSSION

The comparative study demonstrated that ageing was associated with observable changes in the external characters of *Vidanga* while the principal diagnostic microscopic features remained preserved. The green and larger fresh fruits changed to darker, smaller and shrunken fruits after one year of storage. This pattern is consistent with the reduction in loss on drying observed in *Purana Vidanga.* The physicochemical profile showed that both samples remained within the recorded standards for loss on drying, ash, acid-insoluble ash and extractive values. *Purana Vidanga showed* lower loss on drying and higher water and alcohol soluble extractive values than *Nava Vidanga.* The higher alcohol-soluble extractive value is relevant to the study's chromatographic findings, because embelin was detected in both aqueous and ethanolic extracts and the final quantitative table showed the higher embelin value in the ethanolic extract of *Purana Vidanga.*

Preliminary phytochemical screening demonstrated that ageing did not result in a qualitative disappearance of the major tested phytochemical groups. Carbohydrates and oils/fats were present in both samples, while proteins and amino acids were absent. Tannins, alkaloids, flavonoids, glycosides, phlobatannins, phenols and terpenoids were detected in both samples, whereas sterols, oxalates and quinones were not detected. Thus, the main observable difference between *Nava* and *Purana* was more apparent in the physicochemical and quantitative parameters than in the qualitative phytochemical profile.

ICP-OES demonstrated the presence of copper, zinc, calcium and potassium in both samples, indicating retention of the evaluated inorganic constituents after one year of storage.

RP-HPLC was used to quantify embelin, the major marker constituent selected in the study. The standard embelin showed a principal retention time of 5.300 minutes. The final quantitative table reported 9.3 mg/g in the *Purana* ethanolic extract, 9.1 mg/g in the *Nava* ethanolic extract, 7.6 mg/g in the *Purana* aqueous extract and 7.4 mg/g in the *Nava* aqueous extract. These results indicate that ethanol gave higher embelin recovery than water in both samples, with only a small difference between the two ethanolic samples. The antibacterial assay showed activity against B. subtilis in both samples. At 25 mg both samples produced an 11-mm zone of inhibition. At 50 and 75 mg, *Purana Vidanga produced* 20 and 23 mm, respectively, compared with 16 and 18 mm for *Nava Vidanga.* The higher zones observed for *Purana Vidanga at* the higher concentrations suggest an ageing-associated difference in antibacterial response under the conditions of this assay. Because only one bacterial strain was examined, these findings should be interpreted as preliminary in vitro evidence rather than as proof of clinical superiority.

Taken together, the lower moisture content, higher extractive values, slightly higher embelin value in the final HPLC table and greater antibacterial activity at higher test concentrations provide analytical findings that are consistent with the traditional rationale for considering *Purana Vidanga an* important, aged form of the drug. The study therefore contributes to the scientific discussion of *Kalaprakarsha* and *Saveeryata Avadhi*, while further stability, pharmacological and clinical investigations remain necessary.

## VI. CONCLUSION

Comparative evaluation of *Nava* and Purana *Vidanga showed* preservation of the characteristic pharmacognostic and qualitative phytochemical profile with measurable differences in physicochemical, extractive, embelin and antibacterial parameters. *Purana Vidanga showed* lower loss on drying and higher water and alcohol soluble extractive values. Embelin was detected in both aqueous and ethanolic extracts, with the highest value reported in the *Purana* ethanolic extract (9.3 mg/g). *Purana Vidanga also* showed greater antibacterial zones at higher concentrations against B. subtilis. These findings provide analytical support for further investigation of the traditional concepts of ageing and drug potency in *Vidanga.*

## VII. LIMITATIONS

*1)* Antibacterial activity was evaluated against only one bacterial strain, Bacillus subtilis (MTCC 441).
*2)* Only embelin was quantitatively estimated by RP-HPLC; other potentially relevant constituents were not quantified.
*3)* Long-term stability under different storage conditions was not evaluated.
*4)* Seasonal, geographical and environmental variation was not assessed.
*5)* The sample size and duration of the comparative study were limited.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

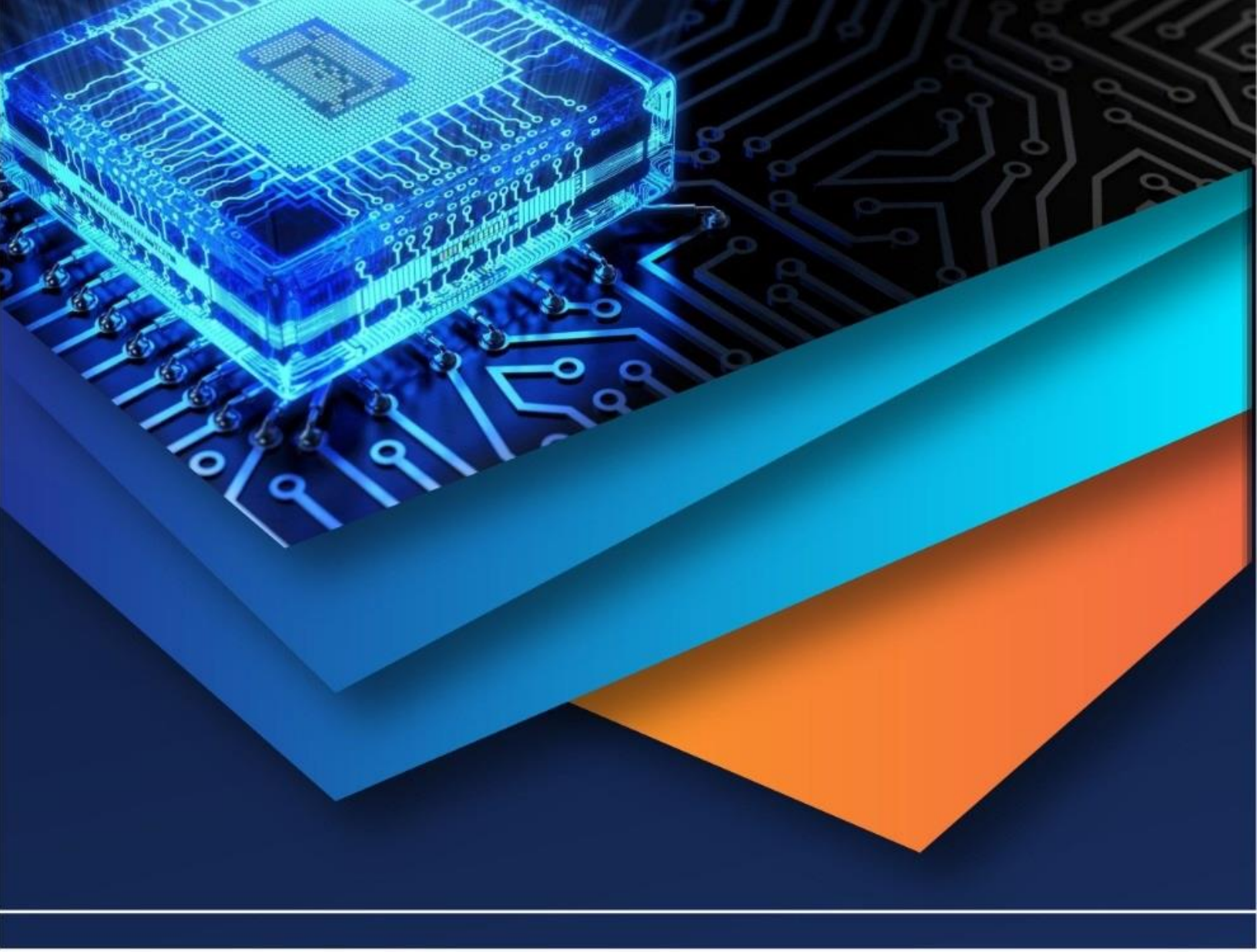
## VIII. ACKNOWLEDGEMENT

I would like to express my sincere gratitude to Dr. Dharani, Dr. Rajasekhara S Ganiger, Dr. Shivananda B Karigar, Dr. Sampath Kumar Bellamma Dept. of Dravyaguna TGAMC Ballari for their support, guidance, and encouragement.

## REFERENCES

[1] Ministry of Health and Family Welfare, Government of India. The Ayurvedic Pharmacopoeia of India. Department of Indian System of Medicine and Homoeopathy, New Delhi; 2016.
[2] Acharya Bhavamishra. Bhavaprakasha. Commentary by Dr. Bulusu Sitaram. Varanasi: Chaukhamba Orientalia; Reprint 2020. Vol. 1, p. 144.
[3] Sharangadhara Samhita by Pandita Sharangadharacharya, with the commentaries Adhamalla's Dipika and Kashiram's Dipika, edited with footnotes by Pt. Parashuram Shastri Vidyasagar. Varanasi: Krishnadas Academy, Chaukhambha Press. Sha. Sam. 1/44, p. 36.
[4] Acharya Vagbhata. Ashtanga Hridayam with the commentaries Sarvangasundara of Arunadatta and Ayurveda Rasayana of Hemadri; annotated by Dr. Anna Moreshwara Kunte and Krishna Ramachandra Shastri Navare. Varanasi: Chaukhamba Surbharati Prakashan; Reprint 6th ed.
[5] Loftsson T. Drug Stability for Pharmaceutical Scientists. 1st ed. Amsterdam: Elsevier Academic Press; 2014. p. 31–33.
[6] Bairagi P, Abhishek S, DappaNavar A, Shukla A. Concept of Krimi and its scientific understanding. J Ayu Int Med Sci. Available from: https://share.google/4kdocS7uFSjTi7CJJ
[7] Acharya Agnivesha. Charaka Samhita, revised by Charaka and Dridhabala; edited by Vaidya Jadavji Trikamji Acharya. Varanasi: Chaukhambha Orientalia; Reprint 2015.
[8] Acharya Sushruta. Sushruta Samhita with the Nibandhasangraha Commentary of Sri Dalhanacharya; edited by Vaidya Jadavji Trikamji Acharya. Varanasi: Chaukhamba Surbharati Prakashan; Reprint 2003.
[9] Acharya Vagbhata. Ashtanga Hridayam with the commentaries Sarvangasundara of Arunadatta and Ayurveda Rasayana of Hemadri; annotated by Dr. Anna Moreshwara Kunte and Krishna Ramachandra Shastri Navare. Varanasi: Chaukhamba Surbharati Prakashan; Reprint 6th ed.
[10] Vagbhata. Ashtanga Sangraha with Hindi commentary by Kaviraj Atridev Gupta. Vol. 1. Varanasi: Chaukhamba Krishnadas Academy; 2017.
[11] Sharangadhara Samhita by Pandita Sharangadharacharya, with the commentaries Adhamalla's Dipika and Kashiram's Dipika, edited with footnotes by Pt. Parashuram Shastri Vidyasagar. Varanasi: Krishnadas Academy, Chaukhambha Press. Sha. Sam. 1/44, p. 36.
[12] Dhanwantari Nighantu. By Dr. Zarand Khan and Dr. Umapati Mishra. Published by Chaukhambha Surbharati, Varanasi; 2004. Shatpushpadi Varga 2/11, p. 96.
[13] Shodhal Nighantu of Vaidyacharya Sodhala, edited by Prof. Priya Vrat Sharma. Published by Oriental Institute, Baroda; 1978. p. 30.
[14] Raja Madanapala. Madanapala Nighantu. Hindi commentary by Prof. Gyanendra Pandeya. Varanasi: Chaukhambha Orientalia; Reprint 2020. p. 276.
[15] Kaidev Nighantu (Pathyapathya Vibodhakah) edited and translated by Prof. Priyavrata Sharma and Dr. Guru Prasada Sharma, published by Chaukhambha Orientalia, Varanasi; 1976. Aushadhavarga, p. 219.
[16] Acharya Bhavamishra. Bhavaprakasha. Commentary by Dr. Bulusu Sitaram. Varanasi: Chaukhamba Orientalia; Reprint 2020. Vol. 1, p. 144.
[17] Raj Nighantu of Pandit Narhari, edited with "Dravyaguna Prakashika" Hindi commentary by Dr. Indradev Tripathi, introduction by Acharya Vishwanath Dwivedi. Published by Krishnadas Academy, Chaukhambha Press, Varanasi; 1994. Pippalyadi Varga, p. 144.
[18] Shodhal Nighantu of Vaidyacharya Sodhala, edited by Prof. Priya Vrat Sharma. Published by Oriental Institute, Baroda; 1978. p. 30.
[19] Priya Nighantu along with the author's Hindi Commentary entitled "Padma" by Prof. Priya Vrat Sharma, published by Chaukhamba Surbharati Prakashana, Varanasi; 1995. Haritakyadi Varga 54–55, p. 15.
[20] Bapalal G. Vaidya. Nighantu Adarsha. Vol. I. 3rd ed. Varanasi: Chaukambha Bharati Academy; 2002. p. 771.
[21] Acharya Bhavamishra. Bhavaprakasha. Commentary by Dr. Bulusu Sitaram. Varanasi: Chaukambha Orientalia; Reprint 2020. Vol. I, p. 144.
[22] CCRAS, Department of AYUSH, Ministry of Health and Family Welfare, Government of India. Database on Medicinal Plants Used in Ayurveda. Vol. 5. Reprint 2007. New Delhi; Vol. 5, p. 483.
[23] Vaidya B. Some Controversial Drugs in Indian Medicine. Foreword by P.V. Sharma. Varanasi: Chaukambha Orientalia; 2014. p. 148–149.
[24] Gowda B, Chandrika K. AFLP authentication of Embelia ribes Burm.f. and Embelia tsjeriam-cottam A. DC. Bangalore: Department of Forestry and Environmental Science, University of Agricultural Sciences, GKVK Campus.
[25] CCRAS, Department of AYUSH, Ministry of Health and Family Welfare, Government of India. Database on Medicinal Plants Used in Ayurveda. Vol. 5. Reprint 2007. New Delhi; Vol. 5, p. 481.
[26] CCRAS, Department of AYUSH, Ministry of Health and Family Welfare, Government of India. Database on Medicinal Plants Used in Ayurveda. Vol. 5. Reprint 2007. New Delhi; Vol. 5, p. 480.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)