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# Pharmacognostic Characterization of Rarely Used Herbs Described in Nighantus with Comparative Microscopy of *Haritaki* (Terminalia chebula) from Distinct Geographical Origins -A Comprehensive Review

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## Abstract

**Background:**

*Nighantus* represent the advanced evolution of Ayurvedic Materia Medica, expanding beyond *Bruhatrayi* with elaborate descriptions of *dravya rasa–guna–veerya–vipaka–prabhava* and morphological identifiers. Several drugs recorded in *Dhanvantari, Raja, Kaiyadeva, Madanpala,* and *Bhavaprakasha Nighantu* remain underutilized today despite historically documented therapeutic potency (1)(2). Scientific pharmacognostic profiling enables revitalization of such rare herbs through botanical authentication, quality assurance, and standardization.

**Aim & Objectives:**

1. To critically compile and analyse pharmacognostic traits of lesser-used Nighantu herbs.
2. To perform a comparative pharmacognostic evaluation of *Haritaki* fruits collected from the Western Ghats, Himalayas, & Eastern India.
3. To correlate classical morphological descriptors with modern anatomical microscopy and powder analysis.

**Materials & Methods:**

An Ayurvedic review was conducted using *Nighantu* databases, *Bruhatrayi*, *Nighantu* commentaries, and modern pharmacognostic indexes. Microscopy of authenticated *Haritaki* samples included TS, maceration, powder microscopy under normal & polarized light, and histochemical staining using safranin–fast green dual mode (3)(4). Comparisons were made based on stone cell clusters, vessel structure, epidermal cuticle, tannin localization, and rosette crystals (5)(6).

**Key Review Findings:**

*Parpat, Ajagandha, Surasa, Shyonaka,* and *Svadupami/Swaduparni* demonstrate specific micro-characters such as prismatic crystals, glandular trichomes, unicellular hairs, parenchymal mucilage and porous pith that enable unambiguous authentication.

*Haritaki* samples varied significantly: Western Ghats fruits contained abundant stone cells and tannin masses; Himalayan fruits showed thin pericarp and sparse trichomes; Eastern region fruits had dense sclereids and high rosette crystal population (7)(8)(9).

These differences validate the Ayurvedic doctrine *Desha-Bheda* (regional variations) and influence potency, stability, and formulation value.

**Conclusion:**

Pharmacognostic standardization bridges ancient textual ethnobotany with modern scientific validation. Rare *Nighantu* herbs warrant reintegration into clinical practice after histological authentication. *Haritaki* demonstrates strong geoclimatic phytovariation, necessitating source-specific monograph development for future pharmacopeial inclusion.

**Keywords:** *Nighantu dravyas,* Pharmacognosy, *Haritaki* microscopy, rare herbs, tannin content, Terminalia chebula, stone cells, histochemical analysis

## Introduction

### . Significance of *Nighantu* Literature

*Nighantus* expanded Ayurvedic pharmaceutical knowledge post-*Samhita* era by systematically arranging synonyms, botanical traits, morphological keys, *rasa-guna-veerya-vipaka, prabhava,* therapeutic uses & household knowledge of herbs. The transition from *Charaka–Sushruta* to *Nighantu* tradition reflects a shift from medical textual theory to practical botanical ethnography (10)(11).

Yet many herbs detailed in these texts are currently underused due to:
Lack of field identification knowledge, no standard pharmacognostic monographs, missing commercial cultivation & procurement systems, poor documentation of micro-diagnostic criteria. Reviving such herbs expands Ayurvedic drug diversity & research.

### 2. Importance of *Haritaki* Standardisation

*Haritaki* (Terminalia chebula Retz.) is exalted as *Abhaya*- remover of disease fear, placed at the apex of *Rasayana dravyas* (12). It is one of *Triphala*, indicated in *Jirna Jwara, Pandu*, *Grahani, Kasa, Vibandha* and post-*shodhana* recovery (13).
However, adulteration with *T. belerica / T. catappa* is common, and regional climatic influence alters tannin profiles. Pharmacognostic differentiation thus becomes mandatory.

## MATERIALS & METHODS

### Study Design

- Qualitative Nighantu review and laboratory pharmacognostic comparison.
- Three regional samples of *Haritaki* collected & authenticated by standard taxonomy keys

### Ayurvedic Source Material Reviewed

- *Dhanvantari Nighantu (Pūrvārdha–Uttarārdha)*
- *Raja Nighantu – Shatpushpadi, Guduchyadi Varga*
- *Kaiyadeva Nighantu – Oshadhi Varga*

- *Bhavaprakasha Nighantu – Haritakyadi Varga*
- *Madanpala Nighantu, Charaka Samhita, Sushruta Samhita*

## Modern Sources

PubMed, Scopus, ScienceDirect, AYU, AJP, Pharmacognosy Journal, ICP Monographs

## Search Terms

*Nighantu herbs, pharmacognostic features, Haritaki microscopy, stone cells, tannins, Terminalia chebula histology*.

## Inclusion Criteria

1. Mentioned in ≥2 Nighantu
2. Rarely used clinically
3. Uncommon in supply chains
4. Complete micro-character data possible



## REVIEW & OBSERVATIONS

### A. Rare *Nighantu* Herbs - Classical vs Pharmacognostic Traits

| Herb | Classical Description | Pharmacognostic Identifiers | Nighantu Evidence |
|---|---|---|---|
| ***Parpat* (Oldenlandia corymbosa)** | *Sheeta, Krimihara* | Branched stem, opposite leaves, unicellular trichomes | (14) |
| ***Ajagandha* (Cleome viscosa)** | *Tikshna*, *Go-gandhi* | Pungent odour, stalked glandular hairs, yellow seeds | (15) |
| ***Surasa* (Ocimum sanctum / tenuiflorum)** | *Kapha–Vatahara* | Peltate glandular trichomes, aromatic oil droplets | (16) |
| ***Shyonaka* (Oroxylum** | *Shothahara, Shoolaprasamana* | Porous pith, prismatic calcium | (17) |

| | | | |
|---|---|---|---|
| **indicum)** | | oxalate crystals | |
| ***Swaduparni* (Glycyrrhiza glabra identified group)** | *Sheeta, Madhura, Rasayana* | Thick cortex, mucilage cells, starch grains | (18) |

**B. Detailed Pharmacognostic Comparison of *Haritaki***

**1. Macroscopic Variation**

| **Region** | **External Morphology** |
|---|---|
| **Western Ghats** | Larger fruits, deep brown, thick epicarp |
| **Himalayas** | Small to medium fruit, light brown, thin pericarp |
| **Eastern India** | Irregular wrinkles, dark blackish, prominent ridges |

**2. Microscopy**

| **Parameter** | **Western Ghats** | **Himalayas** | **Eastern India** |
|---|---|---|---|
| Stone Cells | Dense clusters (~30–45%) | Sparse (~15–22%) | Very dense (~40–55%) |
| Tannin Content | High (+++) | Low (+) | Moderate to High (++) |
| Rosette Crystals | Moderate | Few | Numerous |
| Trichomes | Simple unicellular abundant | Very few | Moderate density |
| Vessels | Wide lumen | Narrow lumen | Thickened border pits |

Stone cell percentage & tannin concentration correlate with ecological humidity, elevation & temperature gradient.

## DISCUSSION

Rare herbs of *Nighantus* represent unutilised pharmaco-therapeutic wealth. Pharmacognostic

documentation creates a bridge for:

- Preservation of traditional knowledge
- Prevention of adulteration
- Raw drug standardisation
- Research revival & cultivation interest

Comparative microscopy proves *Haritaki* varies *desha-bheda* wise, affirming Ayurvedic doctrine *"Desha-Kaala-Bhava-Prabhava"* (19).

Future directions include:

- HPTLC fingerprinting
- DNA barcoding
- Tannin quantification correlation with *Rasayana* activity
- Regional monograph development

## CONCLUSION

Pharmacognostic authentication is the foundation for revival of underused *Nighantu* herbs.

Comparative microscopy confirms structural variations in *Haritaki* across geographical locations, influencing potency and suitability in formulations.

Further integration of Ayurvedic textual classification and modern microscopic & molecular techniques can restore these forgotten *dravyas* to therapeutic mainstream.

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