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Sandigdha Dravyas in Ayurveda: A Critical Review of Identity, Substitutes, and Adulterants

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ABSTRACT
Sandigdha dravyas are Ayurvedic medicinal plants whose botanical identities remain ambiguous, disputed, or context-dependent, as repeatedly highlighted in classical Nighantus and later commentaries. This uncertainty arises from multilayered causes, including complex Sanskrit nomenclature, loss or corruption of manuscripts, regional variation in vernacular usage, and ecological changes that have either endangered or eliminated original species from their traditional habitats. In this background, the same Sanskrit name may correspond to multiple botanical taxa, while a single botanical species may be known by different traditional names in separate regions, creating scope for both genuine substitution and harmful adulteration.The present review revisits classical and contemporary literature on Sandigdha dravyas, with special reference to Bhavaprakasha Nighantu and related texts, and attempts to clarify: (1) the concept and causes of Sandigdhatva, (2) the legitimate framework of Abhava-Pratinidhi Dravya (substitution), and (3) the nature and methods of adulteration frequently encountered in the crude drug trade. By differentiating Sandigdha dravyas from planned substitutes and economically driven adulterants, this work emphasizes the role of pharmacognostic tools—macroscopic and microscopic evaluation, physicochemical profiling, HPTLC/HPLC fingerprinting, and DNA barcoding—in resolving identity issues. In addition, the importance of regulatory mechanisms under the Drugs and Cosmetics Act, pharmacopoeial monographs, WHO quality norms, and good cultivation and collection practices is discussed as a foundation for safe and effective standardization of Ayurvedic formulations.

Keywords: Sandigdha Dravya, Ayurvedic controversy, substitution, adulteration, pharmacognosy.

INTRODUCTION

Ayurveda is known to employ more than 1,100 medicinal plant species across various formulations, yet approximately one-third of these are categorized as Sandigdha dravyas, i.e., drugs whose precise botanical identity remains controversial. The root of this controversy lies in the nature of traditional nomenclature, where a single synonym derived from Rasa, Guna, Karma, Prabhava, or habitat may be applied to more than one plant, or where the same botanical entity is known by several different synonyms. For instance, the name Amrita may indicate *Tinospora cordifolia* in one interpretative tradition, while some authors have attempted to link it with *Terminalia chebula* based on its life-prolonging connotation, thereby confusing textual interpretation, drug collection, and clinical application[(1)].

With the commercialization of herbal medicine and the existence of thousands of small- and large-scale units manufacturing classical as well as proprietary Ayurvedic formulations, the problem of Sandigdha Dravyas acquires direct implications for quality, safety, and efficacy. Legitimate substitutes sanctioned by classical authors under the principle of Abhava-Pratinidhi may be uncritically extended to unrelated materials, while deliberate adulteration for economic gain further complicates the situation. WHO guidelines stipulate that crude drugs should not exceed a specified percentage of foreign matter (often less than 5%), yet market samples of controversial drugs frequently contain extraneous parts, exhausted drugs, or entirely different species[(3)]. Therefore, a focused analysis differentiating identity controversy, rational substitution, and adulteration is

essential for establishing reliable pharmacopoeial standards and for protecting the credibility of Ayurveda in contemporary healthcare systems.

Concept and Causes of Sandigdha Dravyas

The term Sandigdha Dravya encompasses drugs that are textually mentioned but whose botanical correlates are disputed due to overlapping synonyms, lost traditions of identification, and divergent commentarial interpretations. Classical lexicons such as Dhanvantari Nighantu, Bhavaprakasha, and regional compendia often provide limited morphological details, focusing instead on Rasa, Guna, and Karma, which allows multiple botanical candidates to fit the same description. When manuscripts were copied over centuries, minor scribal errors, variant readings, and local annotations introduced further ambiguity regarding plant names, parts used, and specific indications[5,9,10,11].

Regional variation

- Regional variation is a major cause e.g. the name Sankhapushpi refers predominantly to *Convolvulus pluricaulis*in North India, while in many parts of South India the same name is applied to *Clitoriaternatea*, and both are used as Medhya Rasayanadespite differences in phytoconstituents and pharmacological profiles[1,12].
- Similarly, Brahmi is widely equated with *Bacopa monnieri* in many Ayurvedic texts, but *Centella asiatica* is also used under the same or closely related names in different regions, giving rise to dual identities within both classical and modern literature[1,7].
- Vernacular overlaps compound this problem e.g. the name Parpatta is linked with *Fumaria parviflora* in Ayurveda, whereas in Siddha and some folk traditions the same or similar name may denote *Mollugo pentaphylla*, resulting in cross-system confusion and inconsistent clinical outcomes[1].

Ecological and environmental

- Ecological and environmental factors further enhance Sandigdhatva. With deforestation, overexploitation, and habitat destruction, certain original species became scarce or locally extinct, compelling physicians and traders to search for morphologically or therapeutically similar plants. The classical Ratanjot, identified with *Ventilagomadraspatana*, is now frequently substituted in the market by *Arnebiaeuchroma*, which bears a superficial resemblance in colour but differs in botanical lineage and phytochemistry.

Over time, such substitutions may solidify into perceived ”Originals”, thereby masking the historical identity and creating a cycle of perpetuated uncertainty.

Some example of drugs whose identity is doubtful or controversial due to regional names, multiple claims, or lack of classical clarity[1,7,11].

Table: 1 Sandigdha Dravyas (Doubtful identity)

Sr.n.	Sandigdha Dravyas	Controversy
1.	Brahmi	*Bacopa monnieri* vs *Centella asiatica*
2.	Pashanbheda	Multiple species claimed
3.	Vidari	Pueraria tuberosa and *Ipomoea digitate*
4.	Ashwagandha	Cultivated vs wild sources
5.	Punarnava	White vs red varieties
6.	Shankhapushpi	*Convolvulus pluricaulis*vs*Clitoriaternatea*
7.	Jivanti	*Leptadenia reticulata* vs other climbers
8.	Ratanjot	*Ventilagomadraspatana*vs*Arnebiaeuchroma*
9.	Bharangi	*Clerodendrum serratum* vs others
10.	Rasna	Multiple species claimed
11.	Lakshmana	*Aralia quinquefolia* vs*Ipomoea sepiaria*
12.	Nagakesara	*Mesua ferrea* vs *Calophyllum spp.*

Substitution in Classical Ayurveda

In contrast to adulteration, substitution (Abhava-Pratinidhi Dravya) is a legitimate and rational practice recognized within classical Ayurveda to address the unavailability of a particular drug. Acharyas such as Vagbhata, Bhavamishra, and the authors of Yogaratnakara and other compendia explicitly suggest substitute drugs sharing similar Rasa, Guna, Veerya, Vipaka, and Karma, thereby providing a scientific framework for therapeutic interchangeability. Within the group Astavarga, Meda and Mahameda are sometimes substituted with Shatavari (*Asparagus racemosus*) due to comparable Balya and Rasayanaactions, illustrating a substitution based on pharmacodynamic similarity rather than mere morphological resemblance[1,12].

Substitution can be driven by multiple factors such as:

- Scarcity of the original drug due to ecological depletion, high cost that limits patient accessibility, seasonal unavailability, and instability or short shelf life of the genuine material. For example, Kumkuma (saffron) may be replaced by Kusumbha (*Carthamus tinctorius*) in some formulations to reduce cost while preserving colouring and certain pharmacological attributes, though the two are not identical[4,6,10,11]. Punarnava (*Boerhaviadiffusa*) may at times be traded with Varshabhu, and Vasa (*Adhatodavasica*) may be replaced by Ashoka (*Saracaasoca*) in specific obstetric conditions when regional constraints are present.

Types of substitution include

- Inter-species substitution within the same therapeutic group, such as Bharangi being used in place of Kantakari due to overlapping Shwasa-Kasa Hara properties[12].
- substitution within the same botanical family, exemplified by *Datura metel* used instead of *Datura* stramonium when the latter is unavailable.
- substitution of plant parts, where leaves or whole plants may be used instead of roots if pharmacological action is believed to be comparable. Each of these requires documentation and scientific validation, and once standardized, the substitute can be given a separate pharmacopoeial identity to avoid confusion with the genuine drug.

Some example of drugs officially accepted as substitutes when the original drug is unavailable[1,7]

Table: 2 Pratinidhi Dravya / Substitute Dravya

Sr. n.	Original Drug	Substitute Drug
1.	Medha	Mandukaparni
2.	Kakoli	Shatavari
3.	Tagara	Jatamansi
4.	Kustha	Pushkarmoola
5.	Rishabhaka	Vidarikanda
6.	Jivaka	Ashwagandha
7.	Ativisha	Musta
8.	Mahameda	Bala
9.	Agaru	Devadaru

Adulteration: Types and Methods

Adulteration denotes the practice of adding inferior, exhausted, or entirely foreign materials to a genuine drug, either intentionally for economic gain or unintentionally due to negligence, ignorance, or poor storage and handling. The Drugs and Cosmetics Act, including section 33EE and related provisions, recognizes adulteration as a serious offense when it compromises the purity, safety, or therapeutic value of Ayurvedic, Siddha, and Unani drugs. Unlike substitution, adulteration is not sanctioned by classical texts and does not rest on similarity of properties; instead, it introduces unpredictable variations and potential health risks[12].

Intentional adulteration can take several forms such as

- Artificial imitations of high-value substances are common examples, such as paraffin wax masquerading as beeswax or synthetic dyes used to colour inert powders resembling costly drugs.
- Inferior or related varieties may be supplied instead of the genuine crude drug, e.g., **dog senna** being sold as **true senna**, or low-grade cinnamon replacing **Cinnamomum verum**.
- Exhausted drugs materials from which volatile oils or active principles have already been removed—are sometimes mixed with fresh stocks, as seen with cloves that lack characteristic aroma due to prior distillation. Harmful extenders, such as limestone or chalk, may be incorporated into *asafoetida* to increase weight, posing direct safety concerns.

Unintentional adulteration

- Unintentional adulteration is often related to mistakes in collection, identification, and post-harvest handling. When collectors without adequate botanical training harvest crude drugs, aerial parts may be mixed with roots, stems with leaves, or similar-looking weeds with the target plant, as has been documented with lobelia leaves contaminated by stems.
- Inadequate drying at excessively high temperatures can degrade tempolabile constituents such as glycosides, reducing therapeutic potency while still entering the supply chain as apparently genuine material.
- Powdered drugs are especially vulnerable; dextrin or other inert substances may be mixed inadvertently or deliberately, and morphological similarities between seeds can lead to confusion, such as *Mucuna pruriens*

being mistaken for other Papilionaceae seeds, thereby reinforcing the broader problem of identity and quality control.

Example of Inferior, wrong, or cheaper drugs mixed intentionally or unintentionally with genuine drugs.

Table: 3 Abhakshya Dravya / Adulterant

Sr. n.	Genuine Drug	Common Adulterant
1.	Nagakesara	Flowers of other species
2.	Haridra	Starch + color
3.	Pippali	Inferior Piper species
4.	Shatavari	Other Asparagus species
5.	Brahmi	Nonmedicinal weeds
6.	Vacha	Similar aromatic roots
7.	Guggulu	Resins of other plants
8.	Ashwagandha	Roots of other Solanaceae
9.	Chandana	Red dyed wood
10.	Kesar (Saffron)	Dyed maize silk

These examples show how identity controversies directly influence cultivation choices, trade practices, pharmaceutical standardization, and ultimately patient outcomes.

Differentiation: Sandigdha Dravya vs Substitution vs Adulteration

Clear conceptual differentiation between Sandigdha dravya, substitute, and adulterant is vital for academic clarity and regulatory enforcement. Sandigdha Dravya primarily reflects uncertainty or controversy regarding the true botanical correlate of a name mentioned in classical texts; it is thus an epistemic issue rather than an inherently unethical practice. Substitution, in contrast, is a planned and rational measure undertaken in the context of Abhava (non-availability) while adhering to similarity in therapeutic action and guided by textual authority. Adulteration, however, denotes the presence of inferior, foreign, or exhausted material in a crude drug, with or without malicious intent, and is regarded as unacceptable from both classical and modern regulatory perspectives.

Table: 4 comparative overview of Sandigdha dravya, Substitute, Adulterant

Sr.n.	Aspect	Sandigdha dravya	Substitute	Adulterant
1	Definition	Drugs with controversial or unclear botanical identity as described in text.	Drug used in place of original drug when unavailable on similarity of properties.	Inferior or different drug in place of genuine drug usually for profit.
2	Legitimacy	Mention in classical text but botanical identity is unknown.	Mentioned in Nighantus and compendia.	Not sanctioned in classical text and other compendia.
3	Basis of replacement	Confusion in names (synonyms), divergent opinion, loss of original species.	Similarity in pharmacological action and properties.	Ignorance, economic motives.
4	Impact on standardization	Hinders fixing single references species and standards.	Can be documented with separate standards.	Introduces unpredictable variation and safety risks.

Resolution Strategies

1. Review of Literature

Addressing Sandigdha Dravyasand differentiating them from substitutes and adulterants requires a multi-pronged strategy integrating classical textual scholarship, modern pharmacognosy, and robust regulatory frameworks. A detailed comparative analysis of descriptions in Samhitas and Nighantus covering synonyms, morphological hints, habitat, Rasa-Guna-Veerya-Vipaka, and specific indications can narrow down potential botanical candidates and guide field exploration. Collaboration between Sanskrit scholars, Dravyaguna experts, botanists, and taxonomists is essential to reconstruct likely identities with maximum fidelity to classical intent.

2. Morphological Study

On the laboratory front, macroscopic and microscopic evaluation remains the backbone of primary identification, allowing detection of characteristic features such as leaf arrangement, tri-chomes, stomatal type, and anatomical markers in root, stem, or bark.

3. Physicochemical parameters

Physicochemical parameters like extractive values, ash content, moisturelimitscombined with chromatographic fingerprinting via HPTLC/HPLC offer reproducible profiles that can distinguish genuine drugs from substitutes or adulterants, even when morphological differences are subtle. DNA barcoding adds a powerful molecular layer, enabling precise species-level authentication and helping to resolve long-standing controversies where multiple botanical candidates share similar traditional names[3].

4. Regulatory support

Regulatory support is equally crucial. The development and continuous updating of Ayurvedic Pharmacopoeia monographs for both controversial drugs and their accepted substitutes provide legal reference points for industry and regulators. WHO guidelines on quality control of medicinal plant materials, along with Good Agricultural and Collection Practices (GACP) and Good Manufacturing Practices (GMP, including Schedule T), should be strictly implemented, especially limits on foreign matter and mandatory testing of raw materials. Pharmacovigilance systems specific to AYUSH drugs need strengthening so that adverse events or reduced efficacy linked to misidentified or adulterated ingredients are promptly captured and analyzed[3,8].

5. Cultivation of Medicinal Plant

In the longer term, promoting cultivation of rare or overexploited herbs such as those currently obtained mainly from wild sources can reduce dependence on uncontrolled collection, which is a frequent source of adulteration and substitution. Training programs for collectors, traders, and pharmacists on correct botanical identification, post-harvest handling, and ethical trade practices can significantly reduce inadvertent adulteration. Simultaneously, integrated pharmacological and clinical research should evaluate potential substitutes proposed in classical or folk traditions, validating their safety and efficacy and thereby legitimizing them as separate entities rather than unacknowledged replacements for elusive originals[8].

CONCLUSION

The phenomenon of Sandigdha Dravyasencapsulates a complex interplay of linguistic, historical, ecological, and commercial factors that collectively obscure the identity of several Ayurvedic drugs. While classical texts provide a theoretical framework for rational substitution in the face of non-availability, the blurred boundaries between Sandigdha Dravyas, PratinidhiDravyas, and adulterants have serious implications for the quality control of herbal medicines. A rigorous approach combining textual reexamination, pharmacognostic and molecular authentication, and enforceable regulatory norms is indispensable for disentangling genuine controversies from market malpractice. Consolidating evidence through well documented monographs and evidence based validation of substitutes will safeguard therapeutic efficacy and patient safety, while also enhancing global confidence in Ayurvedic pharmacotherapy.

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