

The Role of Botanical Names in the Sourcing and Distribution of Ayurveda Raw Drugs for Better Efficacy of Treatment

Review Article

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Abstract

Ayurveda, a traditional system of medicine, relies heavily on medicinal plants for therapeutic efficacy. However, linguistic and regional diversity can lead to confusion in sourcing the right plant materials, compromising treatment effectiveness. This article emphasizes the crucial role of botanical names in accurate identification, quality control, and distribution of Ayurveda raw drugs. A qualitative review of classical texts, herbal pharmacopeias, and expert interviews reveals the challenges associated with traditional names, including ambiguity, regional variations, and adulteration. Standardized botanical nomenclature mitigates these risks, ensuring consistent identification across regions and supply chains. Case studies illustrate the consequences of misidentification, highlighting the importance of accurate botanical identification. Regulatory guidelines from WHO and Ayurvedic Pharmacopoeia of India reinforce the necessity of botanical names for quality control. This study underscores the imperative of adopting botanical names in Ayurveda practice, education, and trade. By prioritizing accurate identification and standardized nomenclature, the Ayurveda industry can enhance treatment efficacy, safety, and quality. Integration of traditional knowledge with modern scientific methods and collaboration among stakeholders are essential for promoting confidence in this ancient system of medicine. This research contributes to the ongoing efforts to standardize and legitimize Ayurveda, ensuring its continued relevance in modern healthcare.

Keywords: Raw drugs, Botanical names, Adulteration, Quality control, Efficacy, Supply chain.

Introduction

Ayurveda, one of the world's oldest systems of medicine, relies heavily on medicinal plants for treatment. Over centuries, knowledge of these medicinal plants has been passed down through oral traditions, classical texts, and vernacular references (1). The identification and use of correct plant species are crucial for the effectiveness and safety of Ayurveda therapies. However, in the modern context, linguistic and regional diversity can lead to confusion in sourcing the right plant materials, leading to substitutions or adulterations that may compromise the efficacy of treatments. However, traditional names for herbs can vary significantly across regions and languages, leading to potential errors, confusion, and even adulteration of raw drugs (2). In this context, botanical names provide a standardized method of identifying medicinal plants, ensuring that the right plant is used in Ayurveda formulations. This article focuses on the importance of botanical names for sourcing, quality control, and distribution of Ayurveda raw materials and discusses the

challenges associated with relying solely on traditional names.

Methodology

This study examines the role of botanical names in the sourcing and distribution of Ayurveda raw drugs, focusing on their contribution to treatment efficacy. The research is primarily based on a qualitative approach, involving the review of classical Ayurveda texts (such as Charaka Samhita, Various Nighantu etc.) and modern herbal pharmacopeias (Ayurvedic pharmacopeia of India). A comparative analysis was performed between vernacular and botanical nomenclature, to assess the accuracy and consistency of raw drug identification. Data was also collected from Ayurveda practitioners, suppliers, and pharmacists through semi-structured interviews to understand the challenges they face in sourcing raw drugs based on local names versus botanical names.

Result

Importance of Botanical Names in Ayurveda

Importance of botanical name can be explained by following points -

Accurate Identification

Botanical names follow a globally accepted system of nomenclature known as binomial nomenclature, developed by Carl Linnaeus. This system

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assigns each plant a unique scientific name that helps in the precise identification of plant species. This is particularly important in Ayurveda, where different species can have varying therapeutic properties (3). For instance, the herb “Shankhapushpi” in Ayurveda refers to *Convolvulus pluricaulis* other species like *Evolvulus alsinoides* may be confused for the same herb when relying on vernacular names (4). Botanical names eliminate this confusion, ensuring that the correct species with the intended medicinal properties is sourced and used.

Standardization Across Regions

Ayurveda herbs often have multiple names in different regions or languages, which can create discrepancies during sourcing and distribution (5). For instance, the herb “Ashwagandha” is widely used in Ayurveda and is known scientifically as *Withania somnifera*. In different parts of India, it might also be called “Asgandha” or “Indian Ginseng,” but the botanical name remains the same, offering clarity across regions (6). Botanical nomenclature enables uniformity in the trade and distribution of Ayurveda herbs. It helps manufacturers, suppliers, and regulatory authorities ensure that the same plant species is being sourced and distributed, regardless of the local vernacular names used.

Enhancing the Safety and Efficacy of Treatments

In Ayurvedic treatments, the therapeutic effectiveness of an herb is closely tied to the specific species used and the plant part utilized (e.g., root, leaf, bark). The correct botanical identification of plants is vital to ensure that the active compounds responsible for the therapeutic effects are present (7). For example, the herb “Vacha” is used for cognitive enhancement in Ayurveda and traditionally refers to *Acorus calamus*. However, it is essential to distinguish between *Acorus calamus* and other species like *Acorus gramineus*, which do not have the same pharmacological activity (8). Using botanical names minimizes the risk of such misidentifications and ensures better clinical outcomes.

Reducing Adulteration in the Supply Chain

One of the major issues faced by the Ayurvedic industry is the adulteration and substitution of herbs. This can happen either intentionally or due to misidentification when relying on traditional names. Botanical names help prevent such adulteration by providing a scientific and verifiable identity for each plant (9). For instance, *Embelia ribes* (*Vidanga*) is a highly valued medicinal plant in Ayurveda, but other species in the same genus, such as *Embelia tsjeriamcottam*, are often used as substitutes (10).

Botanical names help avoid these confusions, thereby reducing the risk of adulteration and ensuring that the correct raw material is used.

Challenges of Using Traditional Names in Ayurvedic Herbs

There are multiple challenges being faced of using traditional name of herbs, ambiguity of synonyms

by various Nighantus create complexity, can be understand by following points -

Ambiguity and Misidentification

Traditional names for herbs often vary widely between different regions, even within the same country. This creates ambiguity, as the same name may refer to different species of plants in different areas (11). For example, the herb “Rasna” refers to *Pluchea Lanceolata*, but in some parts of India, it is used to describe plants from different species like *Alpinia galanga* (South India) and *Vanda roxburghii* (Bengal region) (12). This ambiguity increases the risk of sourcing incorrect herbs, which may not only reduce the efficacy of the treatment but also lead to adverse effects. Botanical names provide clarity and help in the accurate identification of herbs.

Regional Variations in Vernacular Names

India is a diverse country with numerous languages and dialects, each of which may have a different name for the same medicinal plant (13). For example, “Bala” (Country Mallow) is a common herb in Ayurveda and is known as *Sida cordifolia*. However, in different parts of India, it is also called “Bariyara” or “Kharainti” (14). When Ayurveda raw drugs are sourced from multiple regions, this variation in vernacular names can lead to confusion and result in the wrong species being supplied. Botanical names eliminate this confusion by providing a universally accepted identity for the herb.

Adulteration Due to Confusion with Traditional Names

The reliance on traditional names, without proper botanical identification, can lead to both intentional and unintentional adulteration. Suppliers may substitute cheaper, readily available herbs for those that are more expensive or difficult to source, often due to confusion arising from similar traditional names. This practice compromises the quality and efficacy of Ayurvedic medicines (15). For example, “Aralu” is an important Ayurvedic herb used for Anti inflammatory and anti-arthritis activity. Traditionally, it refers to *Oraxylum indicum*, but due to similarities in vernacular names, it is often adulterated with other species like *Ailanthus excelsa*, which do not have the same pharmacological effects (16).

Lack of Standardization in Trade and Regulation

Traditional names, while culturally significant, do not meet the requirements of international trade and regulatory standards. Different countries and regulatory bodies have their own standards for the quality and safety of medicinal plants, which may conflict with traditional classifications (17). Botanical names, on the other hand, are recognized by pharmacopoeias and regulatory bodies worldwide, making them essential for ensuring that Ayurvedic raw materials meet global standards of quality and safety. They are also crucial for navigating the increasingly globalized trade in medicinal plants.

Case Studies of Misidentification and Adulteration

Substitution of “Giloy” - *Tinospora cordifolia* (Giloy) is a highly valued herb in Ayurveda for its immunomodulatory and anti-inflammatory properties. However, it is often adulterated with species like *Tinospora crispa* and *Tinospora sinensis*, which do not have the same therapeutic effects (18). This adulteration occurs because local suppliers may not distinguish between these species due to similar traditional names.

Confusion Over “Sarpagandha”

Rauvolfia serpentina (Sarpagandha) is used in Ayurveda to treat hypertension and mental disorders. Due to its high demand, it is often substituted with other species like *Rauvolfia tetraphylla*, which do not have the same therapeutic properties (19). Botanical names help in preventing such substitutions and ensuring the correct species is used.

The Role of Regulatory Bodies and Guidelines

Role of key regulatory authority and their guidelines related botanical name explained briefly.

WHO Guidelines on Good Agricultural and Collection Practices (GACP)

The WHO's GACP guidelines emphasize the need for proper identification of medicinal plants using botanical names to ensure the quality, safety, and efficacy of herbal medicines (20). These guidelines recommend that medicinal plants be scientifically identified before they are processed or traded.

Ayurvedic Pharmacopoeia of India (API)

The API, published by the Ministry of AYUSH, is the official document for the standardization of Ayurvedic herbs in India. It includes detailed descriptions of medicinal plants, their botanical names, and the plant parts used in Ayurvedic formulations (21). The API helps prevent adulteration and misidentification of herbs in the industry.

Discussion

The use of botanical names plays a pivotal role in the accurate sourcing and distribution of Ayurveda raw drugs, directly influencing treatment efficacy. Ayurveda formulations depend on the precise identification of medicinal plants, as even minor variations in plant species can significantly alter the pharmacological profile and therapeutic outcomes. Standardized botanical nomenclature helps mitigate these risks by ensuring consistent identification across regions and supply chains, reducing the chance of adulteration or substitution, which are common when relying on local or vernacular names (22). For instance, research indicates that the substitution of plants with similar vernacular names but different species often results in reduced potency and therapeutic failure (23).

Conclusion

In conclusion, botanical names play an essential role in the sourcing and distribution of Ayurveda raw drugs. They provide a standardized system for the accurate identification of medicinal plants, ensuring that the right species are used in formulations. This is crucial for maintaining the efficacy, safety, and quality of Ayurveda treatments. The challenges of using traditional names, such as ambiguity, regional variations, and the risk of adulteration, further underscore the need for adopting botanical nomenclature in the Ayurveda industry. To safeguard the integrity of Ayurveda medicines, regulatory bodies, suppliers, and practitioners must prioritize the use of botanical names in sourcing and distribution practice.

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