Ayurvedic Pharmacopoeia Databases in the Context of Revitalization of Traditional Medicine

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Traditional medicine in India includes 'codified' systems like Ayurveda, Siddha, Unani, and Tibetan medicine and the 'non-codified' oral traditions. Codified systems are grounded in a theory of physiological functioning, disease aetiology and clinical practice. They have formal traditions of training and possess a vast array of written documents recording the *materia medica,* specialized subjects related to medicine and surgery, clinical procedures and medical ethics. The non-codified or folk traditions, such as those represented by bonesetters, birth attendants, paediatric specialists, veterinary healers, poison healers, healers specialized in specific diseases like jaundice, eye diseases, gastro-intestinal diseases etc., have been transferred as oral traditions for generations through a person-to-person process. Another feature of folk traditions is that they are ethnic community and eco system specific, and thus embody tremendous geo-cultural diversity. Folk medicine also includes what is popularly known as grandmothers' remedies, the household knowledge about primary healthcare, different health food recipes, seasonal health regimens and health customs, rituals etc.

Though local health practices have evolved in parallel with the codified knowledge system they have closely interacted and have been influenced mutually. Ayurvedic texts have many examples stating this relationship. At times one can find detailed explanations for a local health practice in the classical texts. One could say that local health practices are living expressions of the theories and concepts mentioned in the texts. However since this relationship is a complex issue only a detailed study of this would give exact nature of it.

Historical Context

Folk and the classical systems of medicines have had two different ways of historical evolution in India. In the post independence period Ayurveda and other systems of medicines such as Siddha and Unani were professionalized with the establishment of university programs and medical and research councils. Where as the folk medicine did not find their mention in the policies till recently as the year 2002. Except for some stray, vain attempts to integrate the traditional birth attendants (TBAs) to the national health program, folk practitioners were being completely neglected in the past. Nationalistic and pluralistic ideology of the independence movement has contributed to assuring a respectable place for Ayurveda and other medical systems in India today. However even with more than fifty years of government support, though marginal, the situation of Ayurveda is still not very healthy at present (Shankar 2004). Let us look at some of the historical aspects that have led to this state of affairs.

During the independence movement there was an ideological debate regarding approach of revitalising Ayurveda, which had its roots in the "Swadeshi" movement. This led to two distinct ideological positions such as a classical or *suddh* approach as well as an integrated approach. Those who were overwhelmed by the advancement of modern science and had a pragmatic and liberal view, held the position that the tradition has to be enriched by the modern technology and methods where as the other group held a purist view. However no systematic study of the influence of modern concepts and methods on the epistemology of traditional medicine was carried out. This has led to changes in the nature of basic aspects such as

education, research and clinical practice (Shankar 2004). Even today this foundational ideological confusion exists in Ayurveda and other traditional medical systems.

Till late 19th century the education of Ayurveda was purely through guru-sishya parampara i.e. an experiential learning where the student stays with the teacher. But around the period of Indian independence Ayurvedic university programs were established. At present there are more than 300 Ayurveda colleges in the country for graduate and post-graduate courses with a syllabus, which is designed on similar lines to that of modern medical education. At present there are Indian medicine councils in every state that give registration to graduates and only those who are licensed by these councils are allowed to practice. Even though the institutionalization was thought to improve the quality of medical education, it has deteriorated after the introduction of formal courses (Shanker & Manohar 1995). For example *nadi pariksa* (pulse examination), a method of diagnosis acquired through an experiential learning process, is widely practiced even today by the traditional physicians, yet in the university system many such fascinating methods and practices are not being taught. Many Ayurvedic graduates consider Ayurvedic education as an entry to privately practise allopathy.

In the area of research, after the independence, Indian Council of Medical Research (ICMR) was responsible for the pharmacological and clinical evaluation of Indian Systems of Medicine (ISM) drugs. After the formation of Central Council for Research in Ayurveda and Siddha (CCRAS), this responsibility was handed over to them. Today most Ayurvedic research programs are based on modern medical methods and parameters. Even after 30 years of research in ISM, these bodies have not come out with any comprehensive publication that can advise Indian medical professionals on how and what aspects of ISM can be integrated with mainstream Indian medical practice (Shankar 2004). In the area of research for want of a proper intercultural research methodology Ayurveda is loosing itself in the struggle of proving itself to the modern science. Lack of peer reviewed publications on Ayurveda meeting international standards is yet another lacuna in the area of research.

With respect to economic resources ISM still suffers from government neglect. During the Seventh, Eighth and Ninth National Plan periods, ISM (including Homeopathy, Naturopathy and Yoga) received around 3 per cent of the national health budget. State allocations varied, with only the government of Kerala allocating 13 per cent of its medical budget for ISM and Bengal allocated less than 0.5 per cent. ISM health delivery services in rural and urban areas are not in any way linked to the national primary health care services. There are around 23,000 Ayurvedic, Unani, and Siddha dispensaries, fully funded by state governments operational in various parts of the country. However they are effective and popular in some states like Kerala and Tamil Nadu, in other states their impact is negligible. They function without any orientation to national health goals, and there has been no review in post-independent India of how to make the ISM health services sector more effective (Shankar 2004).

On the whole, as described above, development in the field of Ayurveda and other traditional medical systems is facing an epistemological crisis along with a social and political disregard. Poor quality of education, research and clinical practice, lack of appropriate political and social support, loss of self esteem among the practitioners, marginalization by mainstream knowledge systems, issues related to intellectual property rights, lack of serious efforts to the fundamental as well as collaborative research, large scale depletion of the natural resources are some of the major issues confronted by the traditional medicine in India today.

In this context, Foundation for Revitalisation of Local Health Traditions, a nongovernmental

organization was set up with two broad objectives such as revitalization of Indian medical heritage and conservation of natural resources used by traditional medical systems. Over the last ten years, FRLHT has established an effective medicinal plant conservation program through public-private partnership in many states in India. It has also developed a number of comprehensive multidisciplinary databases of medicinal plants of India and the related traditional knowledge. Partnering with the government organizations in each of the projects FRLHT has been able also play a key role in advocacy for traditional medicine. It has been involved in training, extension activities as well as development of products to serve various interests groups of traditional medical community (i.e. practitioners, professors and students) as well as scientists, public health workers and the common public. The following section illustrates one of the successful projects such as the Ayurvedic databases.

Ayurvedic Pharmacopoeia Databases

It is estimated that traditional medicine in India uses around 7,500 medicinal plants in various health practices (AICRPE report). Out of this, Ayurveda uses around 1,750 medicinal plants and around 880 are in trade. According to a study, nearly 300, plants used in traditional medicine have some threat status (rare, endangered, threatened etc.) due to over exploitation, unsustainable harvest etc.

A project for to in-situ and ex-situ conservation of medicinal plants was launched in three Southern states of India in 1993. As part of the conservation project, to prepare a comprehensive checklist of medicinal plants, and their related information, a database project was initiated. This database project included various topics like distribution mapping, trade, threat status, propagation, traditional medical information and so on. Under the traditional medicine databases Ayurvedic, Siddha, Unani databases were built. A number of challenges were faced while building these databases, some of which remain unsolved even today. One of the major challenges was the nomenclature correlation i.e. developing linkage between Sanskrit plant names and their botanical equivalents. Another major challenge was related to identity of certain percentage of plants used in Ayurveda. Following pages highlight some of the experiences and the insights gained during this process.

The objective of the traditional medicine database was to understand which are the medicinal plants according to the codified medical traditions such as Ayurveda, Siddha and Unani. In the Ayurvedic database, first effort was to build a database on a state of the art correlation of Sanskrit names with botanical names mentioned in the secondary literature (non-classical). The textual sources for this database included 21 books belonging to last 100 years of works by Ayurvedists, botanists and pharmacognosists that correlated Sanskrit names with botanical names. This work culminated in a correlation of more than 20,000 Sanskrit names to 1,750 Species belonging to 830 genera. Following were the Ayurvedic sources selected.

A number of nomenclature correlation related issues were understood during the building up of the Ayurvedic part of this database. Ayurveda follows polynomial system of nomenclature where a plant is described with multiple names. Each of these names pertains to a specific character or feature of the plant. By grouping the names together (as usually found in the *nighantu* Sanskrit verses), an indicative picture of the identity and uses of a plant can be arrived at. For example, *Guduci* which is correlated to *Tinospora cordifolia* has around 70 names described in the classical literature. *Amrta, somavalli, somalatika* (climber with nectar like properties), *cakralaksana* (having wheel like appearance in cross section), *mandali* (circular), *kundali* (with an entangled nature), *nagakumari* (young snake like appearance), *tantrika* (spreading nature), *cchinnaruha, cchinnodbhava, cchinnangi* (grows when cut and put in soil), *syama* (with a bluish black colour), *rasayani* (rejuvenative), *vayastha* (age regulating), *jivanti* (life promoting),

No	Name of the work	Author	Year
1	Pharmacognosy of Ayurvedic drugs vol 1,2, 3, 10	K.N.Iyer, A. N.Namboodiri and M.Kolammal	1951 1957 1979
2	La-Harita Samhita	Alix Raisom	1974
3	Astanga Hrdaya Kosha	Anonymous	1936
4	Ayurvedic Pharmacopoeia of India vol 1	Ministry of Health and Family Welfare	
5	Ayurvedic Formulary of India Part 1	Controller of publications	1978
6	A Dictionary of Economic Products of India	George Watt	1889
7	Indian Medicinal Plants 4 volumes	Kirtikar and Basu	1935
8	Handbook of Medicinal plants	P.N.V.Kurup	1968
9	A Catalogue of Indian Synonyms	Moodeen Sheriff	1988
10	Single Drug Remedies	N.S.Moos	1976
11	Ganas of Vahata	N.S.Moos	1980
12	Indian Pharmaceutical Codex vol 1	B.Mukherji	1953
13	Indian Materia Medica 2 vols	K.M.Nadkarni	1954
14	Indian Medicinal Plants 1-5 vols	S.Raghunath Iyer	1993-96
15	Dravyagunavijnana vol 2&5	P.V.Sharma	1994
16	Ayurvedic Drugs and their Plant Sources	Sivarajan and I.Balachandran	1994
17	Glossary of Vegetable Drugs in Brhattrayi	Thakur Balwant Singh & Chunekar	1972
18	Nighantu Adarsha vol 1 & 2	Vaidya Bapalal	1968
19	Some Controversial Drugs of India	Vaidya Bapalal	1982
20	Studies on Medicinal Plants in Dhanvantariya Nighantu vol 1	Vaidya D.K.Kamat	1972
21	Materia Medica	Whitelaw Ainslie	1984

jvarari (pacifying fever) etc. (Manohar 1994).

Another peculiarity of this system is that the same names are used for different plants as well. For example, krsna is a name for *pippali* (*Piper longum*) as well as *arjuna* (*Terminalia arjuna*). As there are multiple names and common synonyms there are certain advantages as well as problems. It is difficult to decide the basic name for a plant. The textual sources that we used did not address this issue. Thus, we found that many of the correlation between Sanskrit and botanical names were casual and non-critical without having sufficient substantiating references or voucher specimens. Confirming the identity through textual descriptions was also not done in majority of these works.

Plants that are in contemporary use in different regions are correlated to the Sanskrit names by these authors. For example for the plant Sankhapuspi, a Kerala author gives *Clitoria ternatea* as the candidate where as a North Indian author correlates to *Convolvulus microphyllus*. Thus, there is a problem of multiple botanical species correlated to a single plant. It is estimated that nearly 50 % of the plants used currently have multiple botanical sources. The following are two examples of multiple numbers of botanical species correlated to the same name. Various reasons for these multiple correlations were identified.

Another problem was relating to transliteration of Sanskrit names. Different authors spelled/transliterated the Sanskrit names differently. For example the entry for botanical name *Acalypha indica* L. reads like this:

> Aristamanjari (VB), Arittamanjarie (KM),
> Arittamunjariye (KB), Arittamunjari (IP),
> Arittamunjayrie (GW, WH),
> Haritamanjari (VA), Manshinka (WH),
> Muktavarcca (VB).

At times, slight variation caused a completely

✣ *Sankhapuspi*	✣ *Pasanabheda*
1. *Clitoria ternatea*	1. *Aerva persica*
2. *Evolvulus alsinoides*	2. *Aerva lanata*
3. *Convolvulus microphyllus*	3. *Ammania baccifera*
4. *Canscora decussata*	4. *Bergenia ciliata*
5. *Canscora diffusa*	5. *Bergenia stracheyi*
6. *Lavendula bipinnata*	6. *Bridelia montana*
7. *Cannabis sativa*	7. *Bridelia retusa*
8. *Xanthium stumarium*	8. *Didymocarpus pedicellata*
	9. *Homonoia riparia*
	10. *Kalanchoe pinnata*
	11. *Nothosaerva brachiata*
	12. *Ocimum basilicum*
	13. *Plectranthus amboinicus*
	14. *Rotula aquatica*

different entity. There needed some standardization in the transliteration. This was possible only by checking the classical literature, contextual variation in description, *nirukti* of each names etc.

In general, an in-depth understanding of Ayurvedic plant nomenclature was lacking among these authors. Thus, we understood that a detailed study of classical texts with their chronological linkages was necessary to address issues related to nomenclature correlation and multiple identity. This led us to building of a primary literature source based database.

Nomenclature Correlation Database Based on Primary Sources

The effort followed was to develop a nomenclature database based on primary sources i.e. from the classical texts of Ayurveda. For this purpose, 20 classical texts covering a chronological period of around 2,200 years were selected. The texts that are major milestones in the area of *dravya guna* (Ayurvedic pharmacology) and are in contemporary use, belonging to various geographical locations were choosen. This also covered various types of texts like *samhita* (treatises), *samgraha* (compendiums), *nighantu* (lexicons). The purpose of this selection was to get maximum variation in the usage of plants.

Structure of the Classical Nomenclature (*Namajnana*) Database

Though this was primarily a plant database, it covered animals, minerals and metals from select texts.

Following are the fields in the database.

- Sanskrit name
- Plant/animal/mineral/metal
- Gender
- Whether plant, plant part, product, group, relation with time, space
- Chapter
- *Sthana* (Section)
- Verse

The field "Sanskrit names" pertain to resource name, which is classified into plant, animal and minerals and metals. Gender of the Sanskrit name is important as some names in female gender pertain to tender climbers and the same name in male gender meant trees. For example, *amrta* (*Terminalia chebula*), *amrtaa* (*Tinospora cordifolia*). To differentiate this, "gender" is taken as a separate field. Plant part, products, groups are differentiated by tags. Similarly, time relation, for example *kadali phalam - ama* (unripe) *pakva* (ripe), or space relation for example *jalam - sahyaja* (water from Western ghats) etc. are classified.

At present, this consists of around 23,000 Sanskrit names mentioned in 122,000 references across 20 texts. Tentative botanical correlation with pictures based on the earlier database and interface facility of searching references from individual texts, across texts, synonym and basionym search

have been created.

This database now helps in analyzing and searching the data for various research purposes. For example, through an analysis of nighantus between 8th and 19th Century it was found that around 70% of the materials used in Ayurveda are plants 20 % animals and 10% minerals during this period (Unnikrishnan 1997).

One of the challenges for building this classical text based database was selection of classical texts. It was difficult to define a classical text. There are many regional language texts those are in high contemporary use. For example the Kerala tradition uses *Cikitsa manjari, Sahasrayogam, Yogamrtam, Vaidyamanorama, Arogyaraksakalpadrumam* etc., which are not used elsewhere in India. These are either in Sanskrit or in a mixture of Sanskrit and regional language. As a first phase, we selected only Sanskrit texts that have not incorporated modern views or botanical correlation. Another criterion was that the text has to be in mainstream and used or known in different parts of the country. This also tried to cover major chronological milestones (to incorporate various temporal ideas) and different geographical locations (to cover variations spatial ideas).

Ascertaining chronology of these classical texts was difficult, as there are differences of opinion. Another issue is the lack of critical editions. Different publications of these texts have variations in *sloka* numbers or there are even differences in the verses. For standardization purpose, *mula granthas* (text with only verses) or those with Sanskrit commentaries and widely accepted publications were selected.

There were grammatical issues that needed to be solved. As mentioned earlier, slight variations in the word, gender or a *pratyaya* (suffix or prefix) changed the identity of the plant name completely. For example *pippali, pippala, mrnala, mrnali, amrnala, venu, veni, madhuka, madhooka, patanga, pattanga, padma, padmaa, arishta, arishtaka, nygrodha, nygrodhee, parpata, parpatakee, palasa, palaasaa, sarala, saralaa, sala, Sali* are some of the typical examples.

Same plant names are used in different variant forms. For example *yasti, yastika, yasteeka, yastiahvika, yastimadhuka, yasteemadhuka, madhuka, madhuyastika, madhuyasti* etc. All these pertain to the same name *yastimadhu.* These variations had to be considered.

Differences of names across different time periods, was another problem. For example *kokilaksa* is the name used for *iksuraka* by Susruta, *bhumyamalaki* is the name for *tamalaki* and *caksusya* for *kulathika* by nighantu authors. Yet another issue was collecting commentators` views on a plant in case of doubt. In number of instances, there are differences of opinion among commentators and there are scant descriptions, which made the issue complex.While compiling the references contextual differences had to be considered. For example, in some context *kustha* means a skin disease where as elsewhere it means a plant. Similarly the name tikta means bitter as well as the plant *katuka* and *kiratatikta.* So these references had to be screened carefully.

There were a number of synonyms used in the same text in different contexts. Since the effort of this database was to prepare a unique list of plant names from each of these texts, it was necessary to group the variants and synonyms of each plant and link it with a basic name. This had to be done by grouping the number of references. This was found difficult without having complete descriptions and commentators' view on each plant.

In grouping, another difficulty was that of classification of the parts used. At times the part used has a different name altogether which is considered as a separate entity. For example - *mocarasa* is the exudate of *Salmali* (*Bombax* sp.) and it is mentioned as a different entity. *Kutaja* (

Holarrhena pubescens), *Indrayava* (Seed of the same plant) is another example. Similarly, there are differences of plant names in different stages of maturity. For example *ardraka* (fresh ginger) and *sunthi* (dry ginger). Such references had to be identified and grouped separately. As mentioned earlier, same names are used in the classical texts for denoting different plants. For example, *"usna"* is a name used for pippali and marica, *"krsna"* for *pippali* and *arjuna.* Similarly *"citra"* is used for three plants such as *urubuka, eranda* and *danti, "tikta"* for *katurohini* and *kakatikta*, *"amrta"* for *guduci* and *haritaki.* In this case each reference had to be searched for such common names and synonyms.

There are some broad general rules available in the texts for understanding the nomenclature. According to Dhanvantari nighantu, all these features are owing to the nomenclature system, which is designed based on *jatilinga* (reproductive characters), *akrti* (physicial characters), *varna* (colour), *virya* (potency), *rasa* (taste), *prabhava* (specific action) etc. It is mentioned that common synonyms have to be decided according to the meaning, context, tradition (*sampradaya. Parampara*) and reasoning (*tarka*). Thus each contextual reference became important.

The references selected for this work did not represent the regional literature in which a plethora of knowledge is available. Thus, this is not a comprehensive inventory yet. Thus some plants that are commonly used at present in Ayurveda did not appear in this database. For example - *saptacakra* (*Salacia oblonga*) is described in Kerala traditional literature but it did not appear in the database, as regional literatures were not included. Around 200 such materials that are unique in their usage in Kerala tradition is documented in Dhanvantari, a journal that was published from Arya Vaidya Sala, Kottakkal a few decades ago. But many of these materials may have not come in this database.

Lack of proper software in Sanskrit language also became a major hurdle. The GIST software for Sankrit language was not Windows compatible for database operations. Lack of good software for database operations in Sanskrit remains an unsolved issue even today.

Even after completion of this database, the major issue of critical nomenclature correlation remained unsolved. It was learned that the issue of nomenclature correlation could only be progressed by a combination of approaches such as in-depth studies of classical literature, documentation of the understanding of vaidyas/hakims (physicians) and pharmacognostic and pharmacological/clinical studies.

For such an in-depth study, a mere reference database was not sufficient. All the contextual details in each of the references were necessary. Thus detailed individual text databases were prepared. This included databases on brhatrayi - Caraka samhita, Susruta samhita, Astanga hrdaya, database of nighantus - Dhanvantari nighantu, Madanapala nighantu, Bhavaprakasa nighantu, Raja nighantu.

In this bilingual (Sanskrit and English) database, the references are grouped into *nama* (name), *rupa* (form/identity), *gunakarma* (quality and action), *varga, yoga, gana* (classification/formulation), *kalpana* (pharmacy preparation), *prayoga* (clinical application) groups. A section includes views of major commentators like Cakrapani, Dalhana. Nomenclature is classified into *svarupabodhaka* (revealing form), *gunabodhaka* (revealing quality), *karmabodhaka* (action) and so on. A glossary is prepared for the Sanskrit terms. As there are similar problems of nomenclature correlation in disease names, and as we have not attempted a detailed study in this area, secondary sources were used for preparation of this glossary. After building individual text databases, following methodology was used to group the synonyms and to find out the unique plants in each of these texts.

- Collection of plant references
- Collection of commentators' views on references
- Fix tentative basionym - based on commentary, frequently used names

- Mark grammatical variants linked to basionyms
- Mark synonyms based on suggestions of commentators
- Mark gender variations, if any
- Mark plant names which pertain to groups e.g. *triphala, dasamula*
- Mark plant names as basionyms, if the plant name correlated by the commentator is not found marked under synonym or variant name
- Mark tentative basionyms as basionyms if they are not linked to synonyms or variant names
- Compare botanical correlations done by subject experts
- Fix status of identification by giving flags like non-controversial, controversial or unidentified based on these studies

This analysis has now culminated in the following data in Caraka samhita. There are 12,870 references related to plants in Caraka samhita. After grouping the synonyms, there are 620 unique plant names. Out of this, 508 are identified and they are correlated to 630 botanical species. There were around 500 synonyms, 817 variants, and 56 group names in Caraka samhita (Venugopal 2001).

Out of this, 305 plant names are non-controversial, 203 are controversial and 112 are unidentified. There are around 1,630 formulations recorded in Caraka samhita. Now this has become a unique inventory of plants of Caraka samhita. Based on the conservation databases at the foundation, it is understood that 56 plants in Caraka samhita are having some threat status.

Now similar works are carried out in other texts also and it is expected that in a few years time we will be able to arrive at a better picture of plants of Ayurveda.

Apart from this, as part of this project, similar works are being done on Siddha and Unani systems of medicine. A number of other databases on traditional quality standards, malaria, home doctor,

Reference books:

S No.	Text name	Chronology	Author	Region	plant ref.No
1	Caraka Samhita	1500BC-400AD	Agnivesa Caraka Drdhabla	Himalaya Kashmir	12850
2	Susruta Samhita	1500BC-500AD	Susruta Nagarjuna	Kasi Sindhudesa	9650
3	Astanga Sangraha	500 AD	Vagbhata	Sindhudesa	20500
4	Astanga Hrdayam	600 AD	Vagbhata	Sindhudesa	9900
5	Astanga Nighantu	800 AD	Vagbhata		2100
6	Paryayaratnamala	900 AD	Madhava	Silahrda	1900
7	Dhanvantari Nighantu	200AD-1000AD	Unknown	Unknown	3250
8	Cakradatta	1075 AD	Cakrpanidatta	Vanga desa	12300
9	Dravyagunasangraha	1075 AD	Cakrapanidatta	Vangadesa	320
10	Madhavadravyaguna	1250 AD	Madhava	Unknown	750
11	Sarngadhara Samhita	1300 AD	Sarngadhara	Devagiri	4200
12	Nighantu Sesa	1200 AD	Hemachandra	unknown	2950
13	Siddhamantra	1210AD-1247AD	Kesava	Unknown	950
14	Hrdayadipaka Nighantu	1260AD-1271AD	Bopadeva	Unknown	820
15	Madanapala Nighantu	1374 AD	Madanapala	Kashthanagara	3000
16	Bhavaprakasa	1550 AD	Bhavamisra	Kasi Kanyakubja	11200
17	Bhavaprakasa Nighantu	1550 AD	Bhavamisra	Kasi Kanyakubja	2600
18	Raja Nighantu	1700 AD	Naraharipandita	Kasmira	7300
19	Saligrama Nighantu	1896 AD	Saligramvaisya	Muradabad	4200
20	Siddhabhesajamanimala	1896 AD	Krshnaramabhatta	Jayapura	620

clinically important plants of Ayurveda, rapid assessment of local health practices are also being developed. These are linked to the master nomenclature correlation database (secondary sources of Ayurveda, Siddha, Unani, Folk). Apart from supporting a detailed study on nomenclature correlation, these databases can serve purposes of conservation, education, research, clinical practice, pharmaceutical industry, intellectual property right aspects, and local health traditions assessment programs for primary health care.

Conclusion:

During the process of developing these databases it was understood that the nomenclature correlation of Sanskrit names of Ayurvedic classical literature to Botanical names is a complex task. Casual and non-critical approach in correlation has been one of the reasons for controversial and multiple botanical identities. Only a systematic approach taking into consideration the available classical textual literature, their critical commentaries, regional literature, experience of living traditions combined with pharmacognostic and pharmacological works can shed light on this and solve this issue to some extent.

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