Review Article

Fixing Basonym and Synonyms of *Guduci* (*Tinospora cordifolia*.(Thnub) Miers.) listed in early literature of Ayurveda - An approach to standardize Ayurvedic drug nomenclature

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ABSTRACT

Drug sources including plants have been codified using a polynomial system of nomenclature in the classical Ayurvedic texts. For this reason, a single plant is known by many names. Moreover, some of these names are also shared by other plants and this makes it quite challenging to fix the identity of a plant name mentioned in various formulations in different sections of the text.

Nighantus or drug lexicons attempted to compile and codify plant names by grouping synonyms of one plant together. However, the information in *Nighantus* are often in discordance with evidence gleaned from earlier texts, especially the *Samhitas*.

At present, synonymy of plant names is fixed by convention and with reference to the *Nighantus*. In this paper, we argue that internal evidence from the *Samhitas* should also be carefully examined and objective parameters should be used to fix synonymy of plant names.

An attempt has been made to standardize the nomenclature of *Guduci* to illustrate how synonymy of plant names can be fixed to reflect internal evidence from individual texts on the basis of objective criteria.

The paper demonstrates how this exercise will help to authenticate the drug source identity used in Ayurveda. It also illustrates how the proposed methodology will enable critical analysis and understanding of the historical evolution and developments made in the nomenclature pertaining to a particular plant.

Keywords: Plant Nomenclature;Polynomial Nomenclature;*Guduci*; Ayurveda

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Introduction

Polynomial system of nomenclature

In the Indian tradition, as also in Ayurveda, objects are given multiple names to the extent that it becomes impossible to identify the object without the knowledge of synonyms. *Amarakosa*(1), which is a compilation of synonyms and their meanings therefore becomes indispensable to read and understand Sanskrit literature in general. When it comes to drug names in ayurveda, the knowledge of *Nighantus* is indispensable to identify the drug sources. It is said that a physician not well versed with *Nighantus*can become an object of mockery due to this ignorance

about the drug identity (2).

The rationale behind using many names for a drug

In spite of the fact that the usage of numerous synonyms can lead to ambiguity, the ancient masters put forth many valid reasons to use a polynomial system of nomenclature. Synonyms convey multiple meanings related to the physical features or function of the drug which cannot be achieved with a single name. Multiple names reflect multidimensionality of the drug.When the meanings of the all the synonyms are stitched together, a descriptive sketch of the object can easily be generated. As clarified in the *Caraka samhita*, synonyms are used to elaborate the meaning of the objects(3). The synonym adds on to and expands the meaning of what was mentioned before. The *Dhanvantari nighantu* explains the rationale behind acceptance of multiple names for a single drug. In the opening verses of this lexicon, the author acknowledges that the names for drug substances in vernacular languages and Sanskrit that are secret or revealed cannot be counted and listed. Just like one takes water from a reservoir according to one's need, the lexicon is compiled with a handful of names for facilitating effective communication. Even though some names are common to more than one drug, this is acceptable because such conventions are well established in the world. When a name common to more than one drug is used in a particular text, one has to take a call on the identity by considering the meaning, context, convention, tradition of use and logical reasoning. Vernacular names are also acceptable because they serve the purpose of communication(4). It is important to preserve the use of multiple names for a single drug because the same drug is known by different names by different people. Without the accurate knowledge of drug nomenclature, one fails to properly identify drugs. Therefore, the study of drug nomenclature opens the third eye of the physician as it were. Indeed, cure of a disease depends on the treatment and success of treatment depends on the choice of the right drug. The *Rajanighantu* spells out seven criteria for naming of the drugs namely - 1. By convention, 2. By regional usage, 3. By unique characteristics, 4. By comparison, 5. By potency of the drug, 6. By contrasting with other drugs and 7. By substitution. Further, the *Nighantu* mentions that the vernacular nomenclature of Karnataka and Maharashtra have been compiled to facilitate easy identification of drugs(2).

Common Names, Unique Names and Basonyms

Some names are common to more than one plant. Common names are used to indicate that some properties are common to the plants they denote. Thus, the unique and common synonyms indicate differences and similarities between different plants and drugs.

Amongst the unique synonyms a particular name may be more frequently used, or may be morespecific, which can be considered as the basonym of the plant.

Context sensitivity of drug names

The polynomial system of nomenclature also serves the purpose of using plant names in a context sensitive manner. The most appropriate name can be used in a given context that highlights the relevant property of the plant. For example, in the context of discussion on longevity, the synonym *Amrita* becomes appropriate for *Tinospora Cordifolia* as this name means immortality.

Fixing synonymy, differentiating common synonym, unique names and basonyms on the basis of objective criteria

In this paper, we propose that the unique and common synonyms pertaining to one plant can be ascertained and enumerated on the basis of objective criteria and that one of these names can be fixed as a basonym also by applying some parameters. This methodology may be adopted for

all the plants mentioned in the classical texts of Ayurveda to codify a standardized system of nomenclature for drug sources mentioned in the classical texts of Ayurveda.

Materials and Methods

Sources for the information

The early classical texts of Ayurveda –*Bhelasamhita*(5), *Carakasamhita, Susrutasamhita*(6), *Ashtangas-angraha*(7), *Ashtangahrdaya*(8) (refer Table 1) are reviewed to enumerate all names related to *Guduci*. Five *Nighantus - Dhanvantarinighantu, Kayyadeva-nighantu*(9), *Rajanighantu, Bhavaprakasanighantu*(10), *Hrdayadipikanighantu*(11) representing major landmarks in the evolutionary history of Ayurveda are reviewed for supporting evidence.

The Glossary of Vegetable Drugs in *Brihattrayee*(12) was used to make a working list of synonyms. This book lists all the drug names mentioned in the *Brihattrayee* and suggest possible synonyms. The references were verified by cross checking manually with the original texts. Names and synonyms were directly compiled from the *Nighantus*.

Criteria to fix the basonyms

1. Frequency of occurrence of a name

To fix the basonym of a plant, we can apply certain criteria. The frequency of occurrence of a particular name across texts can be one important criteria to fix a basonym. Frequency of the occurrence of a plant name can objectively be calculated by the frequency index (FI) which is the number of occurrences of the name across texts the total number of citations of the plant using any name, divided by expressed as percentage. For example, if a plant has been cited 650 times in the selected text and if a particular name has been mentioned 400 times, then the frequency index of that name is 400 divided by 650, which is 0.6. Since other names will be mentioned les number of times, their frequency index will be lower and so the name with the hightest frequency index can be proposed as the basonym.

2. Commonality across texts

The second criteria is the commonality of the name across texts. In other words, the name should have been used in all the texts under consideration. Commonality Index can be objectively calculated by dividing the number of texts in which the name is mentioned by the total number of text books screened. For example, if a name is mentioned in all the 6 texts screened, then the commonality index will be 6 divided by 6, which is 1.

3. Specificity of the name

The third criteria is the specificity of the name. The name chosen as basonym should be exclusive to one plant and not applicable to any other plant. If the name is not applicable to any other plant, then the Specificity is 100%.

4. Usage as a basonym in the texts

The fourth criteria is usage as basonym in the texts. This is understood by studying the contexts in which the proposed basonym has been mentioned. If a particular name has been used when enumerating the properties of a plant in the classical texts, then it is preferred as a basonym. Similarly, the preference of a particular name when enumerating properties or naming a group of drugs in a *Nighantu* is given weightage when choosing a basonym.

Criteria 2 indicates mention of a name in many texts whereas criteria 4 indicates the use of a basonym in a particular text. Ultimately, the chosen basonym must be the most suitable on the basis of the above criteria in comparison with other names. The name that fulfils the maximum number of criteria is chosen as the basonym.

Criteria to fix synonyms in the present study

1. Evidence within the text

In few instances, classical texts have explicitly indicated the synonymy of drug names. For example, in the *Kalpasthana* of *Charaksamhita*, the synonym of *cassia fistula* - *Aragvadha* are listed together. This is strong internal evidence for synonymy of names.

2. Viewpoint of Commentators

The viewpoint of the commentators is given weightage in the absence of internal evidence in the text itself. Active Synonymy Index (ASI) is the number indicating total number of citations of the name where commentators have confirmed synonymy divided by total citations of the plant name in the text. Passive Synonymy Index (PSI) is the number indicating citations where commentators are silent divided by total citations of the plant name in the text. Commonality of Synonymy Index (CSI) is the number indicating citations where commentators have attributed synonymy of another plant for the name divided by total citations of the plant name in the text. ASI, PSI and CSI will always add up to 1.

Comman Synonym : If the CSI has a very high value, then the synonym is a comman synonym.

Primary Synonym : If CSI has a very low value compared to ASI, then the name is a primary synonym.

Secondary Synonym : If the CSI has a value higher than ASI, then the name is a secondary synonym.

Shared Synonym : If CSI and ASI are more or less equal, then the name is a shared synonym.

Unique Synonym : If CSI is 0, then the name is a unique synonym.

Controversial Synonym : A synonym becomes controversial if it does not fulfil any of the above criteria.

3. Viewpoint of *Nighantus*

The view of the *Nighantus* is given weightage in the absence of internal evidence from texts or view of commentators. *Nighantus*are reviewed to confirm synonymy of the name.

4. Appropriateness of the name

The etymology of the name is studied to understand its appropriateness and applicability to the plant.

For example, the name *dhara* indicates the ridges on the stem of *Tinospora Cordifolia*. The name *Chinnaruha* indicates that the plant grows from stem cutting.

5. Specificity of the name

Specificity of the name by meaning can be high (*asaadhaaranalakshana* or exclusive association to the plant) or low (fault of *ativyapti* or applicable by meaning to also other plants). For example, the name *Guduci* is highly specific to *Tinospora cordifolia*, whereas the name *Somavalli* is also applicable to other plants like *Sarcostemma brevistigma*.

6. Presence of contrary evidence

This refers to the presence of evidence contradicting the synonymy of the name for the given plant in textual sources. Sometimes *Nighantus* contradict the information in the classical texts. For example, in the *Nighantus, Lodhra* and *Tilvaka* are synonymus. However, in the classical text, they are two different plants.

In the paper, the basonym and synonyms of *guduci* have been fixed on the basis of the above mentioned criteria to illustrate the methodologies for standardizing the polynomial system of nomenclature for plants in Ayurveda on the basis of objective criteria.

Results

Tab.1 Enumeration of the names across *Samhitas*

Serial No.	Synonyms	Remark	*BS*	*CS*	*SS*	*AS*	*AH*	Total
1	*guduci*		7	56	43	68	38	212
2	*amrta*			13	20	68	47	148
2a	*amrta*	Gram. Var.						
2b	*amrtaka*	Gram. Var.						
3	*chinnaruha*		2	5	2	8	3	20
3a	*chinnodhbava*	Syno.Var.				1	1	2
4	*amrtavalli*			2	3	2	1	8
5	*somavalli*				2	3		5
6	*soma*		1		1	1		3
7	*madhuparni*		1	4				5
7a	*kshaudraparni*			1				1
8	*vatsadani*			1	2			3
9	*avyatha*			1				1
10	*abhaya*						1	1
	Total							409
1	*amrtadvaya*	Couplet Name			1	1	1	2
	GrandTotal							411

The above table tabulates all the names mentioned in the *Samhitas* for Tinosporacordifolia. BS is *Bhelasamhita*, CS is *Carakasamhita*, SS is *Susrutasamhita*, AS is *Ashtangasangraha* and AH is *Ashtangahrdaya*.

Fixing the basonym

Proposed Name: *Guduci*

1. Frequency of Occurrence

Frequency Index is 212/409; 51.83 %.

Out of every two names, one is likely to be *Guduci*.

2. Commonality across texts

Commonality index is 5/5 texts; 100%.

3.Specificity of the name

a. Specificity by usage - 100%, not used to denote another plant.

b. Specificity of meaning - Not specific, *gudatirakshatirogebhyaiti* - that which protects against

diseases, the meaning has universal application - *sarvaushadhavyaptidosha*.

4.Usage as basonym in the texts

a.Mentioned when listing *gunas* in *Ashtangahrdaya*

b.Preferred name in the *Nighantus* - eg. *Guducyadivargah*

5.Outweighs other contenders

The nearest contender for basonym status is the name *amrta*. *Amrta* has a frequency index

of 35.7% and a commonality index of 80%.

Type of basonym: UNIQUE BASONYM

Fixing the synonyms

1. *Guduci*

Fixed as unique basonym.

2. *Amrta* (including the grammatical variants *amrta* and *amrtaka*)

1. Evidence within the text

There is no direct evidence within the text confirming the synonymy of *amrta* and *guduci*.

2. Viewpoint of Commentators - ASI is high compared to CSI. PSI also has a high value. So the viewpoint of the commentators suggests that *Amrita* is a primary synonym.

Commentator	Correlation	Silent	Attributes other identity	Total Occurrences	ASI	PSI	CSI
Cakrapani	0	13	0	13	0/13 = 0	13/13 = 1	0/13 = 0
Dalhana	8	12	0	20	8/20 = 0.4	12/20 = 0.6	0/20 = 0
Arunadatta	11	36	0	47	11/47=0.23	36/47 = 0.77	0/47=0
Hemadri	6	41	0	47	6/47 = 0.13	41/47 = 0.87	0/47 = 0
Indu	9	58	1(*amalakaphala*)	68	9/68 = 0.13	58/68 = 0.85	1/68 = 0.014
Total	34	161	1	195	34/195= 0.17	161/195 =0.82	1/195 =0.005

3. Viewpoint of Nighantus

The Nighantus in which *amrta* and *guduci* have been mentioned as synonyms are listed below.

1. *Dhanvantarinighantu* (ch.1. *guducyadivarga*-1)

2. *Kayyadevanighantu* (ch1.*oshadhi varga*-7b)

3. *Rajanighantu* (ch.1. *guducyadi varga*.13-14)

4. *Bhavaprakasanighantu* (*guducyadivarga*. 6)

5. *Hrdayadipikanighantu* (*catushpadavarga*.22)

4. Appropriateness of the name

The name means undying and can refer to the ability of the plant to grow easily from stem cuttings. Also the plant enhances the immunity and helps in combating the effects of old age.

5. Specificity of the name

Specificity by usage: High, Specificity by meaning: Low (Fault of *ativyapti* or applicability by meaning to other plants). However, in actual usage the name amrta in feminine gender has been used exclusively for guduci. The variants *amrtaphala* and amrta can also indicate *amalaki* and *haritaki*.

6. Presence of contrary evidence

Contrary evidence contradicting the synonymy of *amrta* and *guduci* has not been observed.

Synonym Type: PRIMARY SYNONYM

3. *Chinnaruha* including *Chinnodbhava*

1. Evidence within the text

There is no direct evidence within the classical texts confirming the synonymy of chinnaruha and guduci.

2. Viewpoint of Commentators

The value of CSI is 0. So the view point of commentators suggest that *Chinnaruha* is a unique synonym.

Commentator	Correlation	Silent	Attributes other identity	Total Occurrences	ASI	PSI	CSI
Cakrapani	0	5	0	5	0/5=0	5/5=1	0/5=0
Dalhana	1	1	0	2	1/2= 0.5	1/2= 0.5	0/2=0
Arunadatta	3	1	0	4	3/4=0.75	1/4=0.25	0/4=0
Hemadri	1	3	0	4	1/4=0.25	3/4=0.75	0/4=0
Indu	4	5	0	9	4/9=0.44	5/9=0.56	0/9= 0
Total	9	15	0	24	9/24=0.38	15/24=0.625	0/24=0

3. Viewpoint of *Nighantus*

The *Nighantus* in which *chinnaruha* and *guduci* have been mentioned as synonyms are listed below.

1. *Dhanvantarinighantu* (ch.1. *guducyadivarga*-1)
2. *Kayyadevanighantu* (ch1.*oshadhi varga*-7)
3. *Rajanighantu* (ch.1. *guducyadi varga*.13-14)
4. *Bhavaprakasanighantu* (*guducyadivarga*. 6)
5. *Hrdayadipikanighantu* (*catushpadavarga*.22)

4. Appropriateness of the name

The name means undying and can refer to the ability of the plant to grow easily from stem cuttings. It can also indicate the ability of the plant to restore a person youth hood which has been cut by old age.

5. Specificity of the name

This name has the fault of *ativyapti* which means it does not indicate a unique identifying feature and may be applicable to many other herbs and does not indicate a unique characteristic of the plant.

6. Presence of contrary evidence

Contrary evidence contradicting the synonymy of *chinnaruha* and *guduci* has not been observed.

Synonym Type: UNIQUE SYNONYM

4. *Amrtavalli*

1. Evidence within the text

There is no direct evidence within the text confirming the synonymy of *amrtavalli* and *guduci*.

2. Viewpoint of Commentators

The value of CSI is 0. So the viewpoint of the commentators suggests that *Amritavalli* is a unique synonym.

Commentator	Correlation	Silent	Attributes other identity	Total Occurrences	ASI	PSI	CSI
Cakrapani	2	0	0	2	2/2=1	0/2=0	0/2=0
Dalhana	1	2	0	3	1/3=0.33	2/3=0.67	0/3=0
Arunadatta	0	1	0	1	0/1=0	1/1=1	0/1=0
Hemadri	0	1	0	1	0/1=0	1/1=1	0/1=0
Indu	1	1	0	2	1/2= 0.5	1/2= 0.5	0/2= 0
Total	4	5	0	9	4/9=0.44	5/9=0.55	0/9= 0

3. Viewpoint of *Nighantus*

The *Nighantus* in which *amrtavalli* and *guduci* have been mentioned as synonyms are listed below.

1. *Dhanvantarinighantu* (ch.1. *guducyadivarga* -1)
2. *Kayyadevanighantu* (X)
3. *Raja nighantu* (ch.1. *guducyadivarga*-13)
4. *Bhavaprakasanighantu* (*guducyadivarga*- 6)
5. *Hrdayadipikanighantu* (*catushpadavarga* - 22)

4. Appropriateness of the name

The name means undying and can refer to the ability of the plant to grow easily from stem cuttings. And it also additionally indicates that the plant is weak stemmed.

5. Specificity of the name

This name has the fault of *ativyapti* which means it does not indicate a unique identifying feature and may be applicable to many other herbs and does not indicate a unique characteristic of the plant.

6. Presence of contrary evidence

Contrary evidence contradicting the synonymy of *amrtavalli* and *guduci* has not been observed.

Synonym Type: UNIQUE SYNONYM

5. Somavalli

1. Evidence within the text

There is no direct evidence within the text confirming the synonymy of *somavalli* and *guduci*.

2. Viewpoint of Commentators

CSI has a higher value than both ASI and PSI. Thus the name could be a controversial synonym.

Commentator	Correlation	Silent	Attributes other identity	Total Occurrences	ASI	PSI	CSI
Cakrapani	0	0	1(*somalata*)	1	0/1= 0	0/1= 0	1/1=1
Dalhana	2	0	0	2	2/2= 1	0/2= 0	0/2= 0
Arunadatta	0	0	0	0	0/0= 0	0/0= 0	0/0= 0
Hemadri	0	0	0	0	0/0= 0	0/0= 0	0/0= 0
Indu	1	1	1 (*brahmi*)	3	1/3= 0.33	1/3= 0.33	1/3= 0.33
Total	3	1	2	6	3/6=0.5	1/6= 0.17	2/6= 0.33

3. Viewpoint of *Nighantus*

The *Nighantus* in which *somavalli* and *guduci* have been mentioned as synonyms are listed below.

1. *Dhanvantarinighantu* (ch.1. *guducyadivarga*-2)
2. *Kayyadevanighantu* (X)
3. *Rajanighantu* (X)
4. *Bhavaprakasanighantu* (*guducyadivarga* - 7)
5. *Hrdayadipikanighantu* (X)

4. Appropriateness of the name

The name indicates that the plant is weak stemmed apart from also indicating that the plant has a potent sap that can improve vitality and strength of the individual.

5. Specificity of the name

This name has the fault of *ativyapti* which means it does not indicate a unique identifying feature and may be applicable to many other herbs and does not indicate a unique characteristic of the plant.

6. Presence of contrary evidence

Contrary evidence contradicting the synonymy of *somavalli* and *guduci* has not been observed.

Synonym Type: CONTROVERSIAL SYNONYM

6. Soma

1. Evidence within the text

There is no direct evidence within the text confirming the synonymy of *soma* and *guduci*.

2. Viewpoint of Commentators

ASI and PSI are equal and CSI is 0. The criteria for primary, secondary, unique or shared synonyms are not fulfilled.

Commentator	Correlation	Silent	Attributes other identity	Total Occurrences	ASI	PSI	CSI
Cakrapani	0	0	0	0	0/0=0	0/0=0	0/0=0
Dalhana	1	0	0	1	1/1= 1	0/1= 0	0/1= 0
Arunadatta	0	0	0	0	0/0=0	0/0=0	0/0=0
Hemadri	0	0	0	0	0/0=0	0/0=0	0/0=0
Indu	0	1	0	1	0/1= 0	1/1= 1	0/1= 0
Total	1	1	0	2	1/2= 0.5	1/2= 0.5	0/2=0

3. Viewpoint of *Nighantus*

The *Nighantus* in which *soma* and *guduci* have been mentioned as synonyms are listed below.

1. *Dhanvantarinighantu* (X)
2. *Kayyadevanighantu* (ch1.*oshadhi varga*-7)
3. *Rajanighantu* (X)
4. *Bhavaprakasanighantu* (*guducyadivarga* - 7)
5. *Hrdayadipikanighantu* (X)

4. Appropriateness of the name

The name indicates that the plant has a potent sap that can improve vitality and strength of the individual.

5. Specificity of the name

This name has the fault of *ativyapti* which means it is applicable to many other herbs and does not indicate a unique characteristic of the plant.

6. Presence of contrary evidence

Contrary evidence contradicting the synonymy of *soma*

and *guduci* has not been observed.

Synonym Type: CONTROVERSIAL SYNONYM

7. *Madhuparni* including the synonymous variant *kshaudraparni*

1. Evidence within the text

There is no direct evidence within the text confirming the synonymy of *madhuparni* and *guduci*.

2. Viewpoint of Commentators

ASI and CSI are equal and this points to the possibility of a shared synonym.

Commentator	Correlation	Silent	Attributes other identity	Total Occurrences	ASI	PSI	CSI
Cakrapani	2	1	*2(vikankata/ madhuyashti)*	5	2/5=0.4	1/5=0.2	2/5=0.4
Dalhana	0	0	0	0	0/0=0	0/0=0	0/0=0
Arunadatta	0	0	0	0	0/0=0	0/0=0	0/0=0
Hemadri	0	0	0	0	0/0=0	0/0=0	0/0=0
Indu	0	0	0	0	0/0=0	0/0=0	0/0=0
total	2	1	2	5	2/5=0.4	1/5=0.2	2/5=0.4

3. Viewpoint of *Nighantus*

The *Nighantus* in which *madhuparni* and *guduci* have been mentioned as synonyms are listed below.

1. *Dhanvantarinighantu*, ch.1. *guducyadivarga* -3)
2. *Kayyadevanighantu* (ch1.*oshadhi varga*-7)
3. *Rajanighantu* (ch.1. *guducyadivarga*-13)
4. *Bhavaprakasanighantu* (*guducyadivarga*- 6)
5. *Hrdayadipikanighantu* (*catushpadavarga*-22)

4. Appropriateness of the name

The name could mean that the leaves have rich sap like honey. It could also indicate the bitterness of the leaf by way of contrary expression.

5. Specificity of the name

This name has the fault of *ativyapti* which means it is applicable to many other herbs and does not indicate a unique characteristic of the plant.

6. Presence of contrary evidence

Contrary evidence contradicting the synonymy of *madhuparni* and *guduci* has not been observed.

Synonym Type: SHARED SYNONYM

8. *Vatsadani*

1. Evidence within the text

There is no direct evidence within the text confirming the synonymy of *vatsadani* and *guduci*.

2. Viewpoint of Commentators

The value of CSI is 0 indicating the possibility of unique synonym.

Commentator	Correlation	Silent	Attributes other identity	Total Occurrences	ASI	PSI	CSI
Cakrapani	0	1	0	1	0/1=0	1/1=1	0/1=0
Dalhana	2	0	0	2	2/2=1	0/2=0	0/2=0
Arunadatta	0	0	0	0	0/0=0	0/0=0	0/0=0
Hemadri	0	0	0	0	0/0=0	0/0=0	0/0=0
Indu	0	0	0	0	0/0=0	0/0=0	0/0=0
total	2	1	0	3	2/3=0.67	1/3=0.33	0/3=0

3. Viewpoint of *Nighantus*

The *Nighantus* in which *vatsadani* and *guduci* have been mentioned as synonyms are listed below.

1. *Dhanvantarinighantu* (ch.1. *guducyadivarga* -1)
2. *Kayyadevanighantu* (ch1.*oshadhi varga*-8)
3. *Rajanighantu* (ch1. *guducyadivarga*-14)
4. *Bhavaprakasanighantu* (*guducyadivarga*- 7)
5. *Hrdayadipikanighantu* (*catushpadavarga*-22)

4. Appropriateness of the name

The name means that calves are very fond of eating its leaves.

5. Specificity of the name

This name has the fault of *ativyapti* which means it is applicable to many other herbs and does not indicate a unique characteristic of the plant.

6. Presence of contrary evidence

Contrary evidence contradicting the synonymy of *vatsadani* and *guduci* has not been observed.

Synonym Type: UNIQUE SYNONYM

9. Avyatha

1. Evidence within the text

There is no direct evidence within the text confirming the synonymy of *avyatha* and *guduci*.

2. Viewpoint of Commentators

Value of ASI is 1 and this indicates the strong possibility of a unique synonym.

Commentator	Correlation	Silent	Attributes other identity	Total Occurrences	ASI	PSI	CSI
Cakrapani	1	0	0	1	1/1=1	0/1=0	0/1=0
Dalhana	0	0	0	0	0/0=0	0/0=0	0/0=0
Arunadatta	0	0	0	0	0/0=0	0/0=0	0/0=0
Hemadri	0	0	0	0	0/0=0	0/0=0	0/0=0
Indu	0	0	0	0	0/0=0	0/0=0	0/0=0
total	1	0	0	1	1/1=1	0/1=0	0/1=0

3. Viewpoint of *Nighantus*

Avyatha and *guduci* have not been mentioned as synonyms in the *Nighantus* selected for review.

4. Appropriateness of the name

The name means that which has the ability to remove diseases. This indicates that the herb is very efficacious in management of diseases.

5. Specificity of the name

This name has the fault of *ativyapti* which means it is applicable to many other herbs and does not indicate a unique characteristic of the plant.

6. Presence of contrary evidence

Contrary evidence contradicting the synonymy of *avyatha* and *guduci* has not been observed.

Synonym Type: CONTROVERSIAL SYNONYM

Considering the fact that there is only one commentator correlating *Avyatha* with *Guduchi* once, and the absence of supportive evidence from *Nighantus*, the synonyms of *Avyatha* with *Guduchi* may be considered controversial.

10. *Abhaya*

1. Evidence within the text

There is no direct evidence within the text confirming the synonymy of *abhaya* and *guduci*.

2. Viewpoint of Commentators

The value of CSI is 1 suggestive of the status of common synonym.

Commentator	Correlation	Silent	Attributes other identity	Total Occurrences	ASI	PSI	CSI
Cakrapani	0	0	0	0	0/0=0	0/0=0	0/0=0
Dalhana	0	0	0	0	0/0=0	0/0=0	0/0=0
Arunadatta	0	0	1 (via *amrta*)	1	0/1=0	0/1=0	1/1=1
Hemadri	0	0	0	0	0/0=0	0/0=0	0/0=0
Indu	0	0	0	0	0/0=0	0/0=0	0/0=0
Total	0	0	1	1	0/1=0	0/1=0	1/1=1

3. Viewpoint of *Nighantus*

The *Nighantus* do not list *abhaya* and *guduci* as synonyms.

4. Appropriateness of the name

The name means that which gives refuge or removes fear. This indicates its ability to give relief from disease.

5. Specificity of the name

This name has the fault of *ativyapti* which means it is applicable to many other herbs and does not indicate a unique characteristic of the plant.

6. Presence of contrary evidence

Contrary evidence contradicting the synonymy of *abhaya* and *guduci* has not been observed.

Synonym Type: CONTROVERSIAL SYNONYM

Although the commentators suggest *Abhaya* as a common synonym, the abscence of further supportive evidence from the Nighantus points to the controversial status of the synonym of *Abhaya* with *Guduchi*.

Tab.2 Final Status of Synonymy of names of *Guduci*

Serial No.	Synonyms	Type of Name
1	*Guduci*	Unique Basonym
2	*Amrta* including variants	Primary Synonym
3	*Chinnaruha* incuding variants	Unique Synonym
4	*Amrtavalli*	Unique Synonym
5	*Somavalli*	Controversial Synonym
6	*Soma*	Controversial Synonym
7	*Madhuparni* including variants	Shared Synonym
8	*Vatsadani*	Unique Synonym
9	*Avyatha*	Controversial Synonym
10	*Abhaya*	Controversial Synonym

The final results of the analysis reveal that Tinospora cordifolia is known by ten names in the *Samhitas*. As shown in the table, there is one unique basonym, one primary synonym, three unique synonyms and one shared synonym and four controversial synonyms.

Discussion

In this paper, we have highlighted the importance of standardizing the nomenclature of Ayurveda by examining the internal evidence available in the classical texts of Ayurveda through the example of *Guduci* (*Tinospora cordifolia*). Supporting evidence has been culled from selected drug lexicons (*Nighantus*). For the first time, objective criteria have been put forth to enumerate and fix basonyms and synonyms of medicinal plants described in Ayurvedic texts with the polynomial system of nomenclature. Synonyms are classified as unique and common synonyms. Common synonyms can be primary synonym, secondary synonym or shared synonym. Standardization of the nomenclature of Ayurvedic plant names will help to authenticate identity of plants in specific contexts in the text. It will help to eliminate ambiguity in interpretation of the identity of plant names to a great extent. The present work can be developed further by including additional classical texts and drug lexicons. Similar exercise can be carried out with other plants.

Conclusion

In this study, objective criteria have been proposed and methodology illustrated with *Guduci* as example to standardize the polynomial system of nomenclature used in Ayurveda to codify information on medicinal plants.

The name *Guduci* has been fixed as basonym because it fulfills all the proposed criteria for acceptance of a name as basonym – Frequency of Occurrence, Commonality across texts, Specificity of the name, Usage as basonym in the texts and absence of other contending names. *Amrita*

is the other synonym that can be considered as a basonym but it does not fulfill all the criteria and only has a commonality index of 80% compared with *Guduci*, which as a commonality index of 100%.

Including the proposed basonym *Guduci*, Tinosporacordifolia has ten names in the *Samhitas*. *Guduci* is the unique basonym. *Amrta* is the primary synonym and there are three other unique synonyms. The synonymy of four names of*Guduci* is controversial and further studies are needed to arrive at a definite conclusion.

It is recommended that these criteria may be adopted and applied to develop a standardized compendium of medicinal plant names with standardized nomenclature used in the Ayurvedic literature highlighting the historical evolution of Ayurvedic pharmacopoeia through the centuries.

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