



PRATINIDHI DRAVYA (SUBSTITUTION): A BOON FOR AYURVEDA

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ABSTRACT:

Herbs, an effective source of Ayurvedic, traditional and modern medicine are the basic need in pharmaceutical area and are sometimes difficult to procure due to rapid depletion of resources with development of industrialization and civilization. In Ayurveda, single formulation is a combination of many drugs and out of them some were difficult to get while some got destroyed resulting in less availability and scarcity hence to fill the deficit, concept of substitution became more prevalent than before indirectly threatening the integrity of Ayurvedic system of medicine. Therefore ancient seers of Ayurveda introduced concept of *Pratinidhi Dravyas* or substitute drugs with similar properties which can be taken when original drug is rare/difficult to procure, unavailable for medicinal purpose eventually serving as support in their conservation and sustainability and to produce good quality herbal product. It is not new as it's enlisted in *Bhavprakash* under *Mishra varga prakaran* and *Yog ratnakar abhav varga, Laghutrayi and Bhaishajya ratnawali*. *Pratinidhi Dravya* refers to the drugs having similar pharmacological activities and might not have similar appearance as that of original drug. Its selection is based upon *Karma* (Action), *Rasa* (Taste), *Guna* (Property), *Virya* (Potency), *Vipaka* (effects on digestion). Present article explored ayurvedic concept of substitution (*Pratinidhi dravyas*), its types, reasoning and clinical utilization. Understanding the logic behind it might lead to newer methods of identifying alternatives of drug and solve shortage of crude drug.

Keywords: *Ayurveda, Substitution, Pratinidhi dravya, Drugs.*

INTRODUCTION

Ayurvedic medicines largely derived from herbal sources from Indian subcontinent have been considered as Indian system of medicine as we are blessed with richest floras in entire world. On the contrary, medicinal plants have been exploited indiscriminately leading to scarcity, extinction or unavailability. Medicinal plants are increasing in demand but its supply is difficult to deal with affecting safety & efficacy eventually giving rise to unwanted substitution. Therefore, concept of *Pratinidhi dravya* (substitution) is the need of the hour for documentation of ancient literary texts. Although medicinal herbs have disappeared/ extricated or threatened, hundreds of species still have highly medicinal properties which we can use as their substitutes. Detailed study of *Pratinidhi Dravyas* from ancient books like *Bhaishajya ratnavali* (authored by Govind Das, 14th century), *Bhavaprakasha* (authored by Bhavmishra, 16th century), *Yogaratanakara* (17th century) can be obtained.^[1,2]

Charaka and *Sushruta* did not mention *Pratinidhi Dravyas* directly while *Acharya Vagbhata* gave concept of substitution in later period and stated references for compound formulations preparation and also said that in case of lack/unavailability of original drug one should get its substitute drug having similarity in characteristics. *Bhavaprakasha nighantu*

detailed *Pratinidhi Dravyas* in the *Mishraka varga prakarana* and *Yogaratanakara* in *Abhava varga*

Pratinidhi dravya (Substitute) means partial/whole replacement of original drug with similar looking herb inferior in therapeutic properties. Substitute is said to have similar pharmacodynamic properties of *Rasa* (Taste of the herb), *Guna* (Qualities), *Veerya* (Potency), and *Vipaka* (Special effect) or *Karma* (Action) like genuine drug. While selecting drug substitutes, therapeutic action (*Karma*) is considered as prime factor. In general practice, *Pratinidhi Dravyas* are opted for the drugs which are less available in local area.^[3-6]

It is the addition of either totally different substance or morphologically similar/dissimilar but almost they have similar pharmacodynamics properties.

On the basis of Ayurvedic text, Substitute *dravya* must satisfy two criteria that are:

1. Main ingredient should not be interfered.
2. Substitute drug must meet the quality of the original product, for e.g. *Cyperus rotundus* can be taken in place of *Aconitum heterophyllum*.

Pharmacognostically, substitution refers to replacement with a totally different herb having same characteristics which can be

sold/used in place of desired drug like the roots, stem and stem bark of *Coscinium fenestratum* (Gaertn.) *Colebr.* (Menispermaceae) have been used as substitute for the same parts of *Berberis aristata DC* (Berberidaceae) since many years. [7]

In short, substitution involves the replacement of original drugs by analogous drugs having equivalent pharmacological and therapeutic activities.

MATERIAL AND METHODS:

The references of substitute drugs as mentioned in our Ayurvedic Literatures has been studied thoroughly and summarized in present article. The study of classical drugs with their substitutes has been done and accordingly a list has been prepared.

PRATINIDHI DRAVYA- A CONCEPT

“Pratinidheeyate Sadrusheekriyate iti”

According to Yogaratnakara, it is mentioned in Abhava varga that *Pratinidhi Dravya* / Substitute is the Substance that has similar pharmacological activities but may/may not have similar appearance like that of original drug.

QUALITY OF SUBSTITUTE [8]

- Substitutes (*Pratinidhi Dravyas*) should not cause harmful effects and also possess similar pharmacological actions as that of main drugs.

- It should be cheap, easily available as well as in large quantity.
- Substitutes should be easy to be used and prepared in the required formulations.

CRITERIA FOR SUBSTITUTION [9]

1. If any drug is unavailable due to scarcity or extinction, another drug having similar properties may be substituted like in case were due to any reason particular species of genus is not available, then it can be replaced by other species. For example, *Pinus nigra* at place of *Pinus roxburghii*. Sometimes drugs belonging to the same family can also be considered. For eg. *Berberis aristata* and *Berberis lysium* can act as substitutes for each other.

2. In a formulation, the *Pradhana Dravya* must not be substituted.

For Eg: *Trivrita* in *Avipattikar choornam*, *Nisha* and *Kataka* in *Nishakatakaadi Kashaya* and *Haritaki* in *Agastya haritaki*.

3. A drug should fulfill following criteria to be considered as substitute and exhibit;

- Similarity in *Rasapanchaka* (Pharmacodynamic Properties): if a drug possesses same *Rasa, guna, virya, vipaka and prabhava* as that of original drug then it can be taken as a substitute.

For example; *Gorakshaganja* (*Aerva lanata*) could act as substitute of *Pashanbheda* (*Bergenia ligulata*) because of similar

properties in *Raspanchaka* ^[10] and therapeutic effects.

Need/Reasons of Substitution ^[11-13]

1. Non availability of Original drug

Due to the non-availability of original drug, many drug manufacturing and pharmaceutical companies use their substitutes.

For Eg: In case of non-availability of *Talisa patra*, leaf of the *Taxus baccata* Linn. can be taken. *Ashtavarga Dravyas* having their natural habitats in Himalayas and difficult to procure, its substitutes are taken as they are important ingredient of *Chyavanaprasha*, *Jeevaniya gana Kashaya*. There are some reasons due to which these dravyas are hard to find such as difficulty in finding natural habitat, access and scarce availability, environmental changes, deforestation, lack of developmental programmes and knowledge about particular ecological conditions.

2. Uncertain Identity of the Drug

Due to uncertainty in the identity of the herb *Lakshmana*, different species like *Aralia quinquefolia*, *Ipomea sepiaria* are considered.

3. Cost of the Drug

When the required drug is expensive, it can be substituted with a cheaper drug having same qualities like it should possess similar *guna* and *karma*.

For example- *Kumkuma* (*Crocus sativus*) is substituted by *Kusumbha* (*Carthamus tinctorus*) as it is a costly herb. *Moola of Rasna* is very costly hence leaf of *Rasna* is used.

4. Shelf life of the drug

Dravyas like *Ativisha* (*Aconitum heterophyllum*) get easily infected by cankers and thus lose therapeutic potency therefore can be substituted by *Musta* (*Cyperus rotundus* Linn).

5. Preparation form of the drug

When the prepared material is not available, substitution can be done in the form of preparation in emergency conditions.

For Eg: In case of unavailability of aqueous extract of *Tinospora cordifolia* (*Guduchi Sattva*), its juice (*Guduchi Swarasa*) can be used.

6. Seasonal availability of the drug/part

^[14-16]

There are some drugs or parts of the drug which are available in specific season, therefore drugs having similar action can be considered.

For example: *Boerhavia diffusa* (*Punarnava*) is not available in some seasons and in its absence, *Trianthema portulacastrum* can be used. In the absence of *Sweta Punarnava*, *Rakta Punarnava* can be taken.

7. Extinction of herbs

Deforestation and climate change have laid negative impact on herbs resulting in devastating effect thus several herbs are either extinct/at the verge of extinction.

8. Geographical distribution of drug

As there is variance in geography, certain medicines that are known to exist in tropical region while others in high altitude leading to substitution of drug.

9. Doctrine of signature ^[16]

It correlates the drug that has standard active principle in it. If a drug is said to be a doctrine of signature, it relates to high yield quality of that particular drug.

10. Regional substitutes

As there are changes in vernaculars and false practices like adulteration, some drugs are used in various regions like *Pluchea lanceolata* *oliver* at place of *Rasna* and *Clitoria ternatea* *Linn.* for *Shankhapuspi* in Kerala.

11. Substitution on the basis of indications and contra indications

In some specific cases, few drugs are contraindicated like *Vasa* due to its abortifacient activity in pregnant women and *Ashoka* is taken as substitute and in *Pitta Prakruti* person, *Godambi* at place of *Bhallatka* in *Narsimha Churna*.

12. Synthetic substitute

Some of the natural drugs are very difficult to procure and in such cases their

synthetic forms can be opted like *Vamsalochana* & Camphor are available in synthetic forms.

SUBSTITUTION AND ITS TYPES ^[17,18]

1. Substitution with different drug

There are cases where similarity in therapeutic effect & *Rasapanchaka* can be used as a basis and totally different drug can be used for Substitution as in case of *Bharangi* (*Clerodendrum serratum*) and *Kantakari* (*Solanum xanthocarpam*). Both of them show anti-histaminic activity and are used in respiratory disorders associated with release of Autacoids and Histamines.

Bharangi – It is *Laghu* and has *Ruksha guna* and *tikta rasa* and also has *Kapha* and *Vatahara* property.

Kantakari – It has *ushna virya* and *katu vipaka*. *Verbascoside*, *solasurine*, *Solasonine* and *solamargin* are the glycosides in it.

2. Substitution of different Species of same drug

In some situations, different species of the same drug can be considered as in case of *Gokshura*. Its varieties named *Tribulus terrestris* (*Zygophyllaceae*) and *Pedaliium murex* (*Pedaliaceae*) are used as substitute to one another in clinical conditions such as *Mutrakruchra*, *Prameha*, *Mutraghata* and *Ashmari* and are proven to have

hepatoprotective, nephroprotective, diuretic and lithotriptic activities.

T. terrestris- like Chlorogenin, Rutin, Diosgenin, Rhamnose are present in it.

P. murex- Sitosterol, Vanilin, Ursolic acid, alkaloids and flavonoids are some of the chemical constituents present in it.

3. Substitution of Species of same family

Apart from different species belonging to different families, same family species can be considered as in case of *Datura metel* and *Datura stramonium*. Chemical constituents like Scopalamine, Hyocyanine, Atropine, Lyoscine and Alkaloids are present in them.

Both the species are well proven to be Bronchodilators because of the alkaloid present in them and inhibit the secretion of mucous membrane of the respiratory tract therefore both are extremely beneficial for respiratory tract disorders. *D.metel* would be better as *Krimihara* as its alcoholic extract is proven to be antihelmentic.

4. Substitution of Different parts of the plant

Sometimes, different parts of the same plant are also used as substitute.

For example- Root and whole plant of *Sida cordifolia*. Chemical constituents like Acylsteryglycoside and Sitoindoside are present in its root and Ephedrine, alkaloid, fatty acids, hydrocarbons are present in whole plant. Activities like Hepatoprotective, Hypoglycemic, anti-bacterial, cardio tonic and anti-oxidant are shown by various extracts of the whole plant. Although root is mentioned in the classics as officinal part of *S.cordifolia* having *Balya*, *Brimhana*, *Shothahara karma* but aerial parts are also equally effective as proven by modern researches.

List of common drugs and their respective *Pratinidhi dravyas*

Table 1: Herbs used as substitutes in Bhavaprakasha ^[19] and General Practice

Enlisted as substitutes in <i>Bhavprakash</i>		
S.No.	Original Drug	Substitute
1.	<i>Meda</i> (<i>Polygonatum verticilatum</i>)	<i>Shatavari</i> (<i>Asparagus racemosus</i>)
2.	<i>Mahameda</i> (<i>Polygonatum cirrhifolium</i>)	

3.	<i>Jivak</i> (<i>Microstylis wallichii</i>)	<i>Vidarikand</i> (<i>Puereria tuberosa</i>)
4.	<i>Rishbhak</i> (<i>Melaxis acuminata</i>)	
5.	<i>Kakoli</i> (<i>Roscoea procera</i>)	<i>Ashwagandha</i> (<i>Withania somnifera</i>)
6.	<i>Kshirkakoli</i> (<i>Paris polyphylla</i>)	
7.	<i>Ridhi</i> (<i>Hobernaria intermedia</i>)	<i>Varahikand</i> (<i>Dioscorea bulbifera</i>)
8.	<i>Vridhhi</i> (<i>Hobernaria acuminata</i>)	
Following drugs are being used as substitutes in practice:		
9.	<i>Chirayita</i> (<i>Swertia chirayita</i>)	<i>Kalmegha</i> (<i>Andrographis paniculata</i>)
10.	<i>Langali</i> (<i>Gloriosa superba</i>)	<i>Kembuka</i> (<i>Costus speciosus</i>)
11.	<i>Vidanga</i> (<i>Embelia ribes</i>)	<i>Vidanga</i> (<i>E. Robusta</i>)
12.	<i>Daruharidra</i> (<i>Berberis aristata</i>)	<i>Kalambak</i> (<i>Coscinium fenestratum</i>)
13.	<i>Sarpagandha</i> (<i>Rauwolfia serpentina</i>)	<i>Rauwolfia canescens</i>
14.	<i>Akarkara</i> (<i>Anacyclus pyrethrum</i>)	<i>Inferior quality Akarkara</i> (<i>Spilanthes acmella</i>)
15.	<i>Saral</i> (<i>Pinus roxburghii</i>)	<i>Pinus nigra</i>

Table 2 Following substitutes are mentioned according to PV Sharma in *Dravyaguna Vigyan Vol. 5*

[20]

S.No.	Original Drug	Substitute
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1.	<i>Pashanbheda</i> (<i>Berginia ligulata</i>)	<i>Gorakshaganja</i> (<i>Aerva lanata</i>)
2.	<i>Sthauneyaka</i> (<i>Taxus baccata</i>)	<i>Talisha</i> (<i>Abies webbiana</i>)
3.	<i>Kutaja</i> (<i>Holarrhena antidysentrica</i>)	<i>Strikutaja</i> (<i>Wrightia tinctoria</i>)
4.	<i>Priyangu</i> (<i>Callicarpa macrophylla</i>)	<i>Aglaia roxburghii</i>
5.	<i>Amlavetasa</i> (<i>Hippophae salcifolia</i>)	<i>Revandchini</i> (<i>Rheum emodi</i>)
6.	<i>Mulethi</i> (<i>Glycyrrhiza glabra</i>)	<i>Gunja</i> (<i>Abrus precatorius</i>)
7.	<i>Kutaki</i> (<i>Picrorrhiza kurroa</i>)	<i>Trayamana</i> (<i>Gentiana kurroa</i>)
8.	<i>Ativisha</i> (<i>Aconitum heterophyllum</i>)	<i>Prativisha</i> (<i>Aconitum palmatum</i>)
9.	<i>Rasna</i> (<i>Pluchea lanceolata</i>)	<i>Mahabharivacha</i> (<i>Alpinia galangal</i>)
10.	<i>Arjuna</i> (<i>Terminalia arjuna</i>)	<i>Kakubha</i> (<i>Terminalia myriocarpa</i>)
11.	<i>Nagkeshara</i> (<i>Messua ferrea</i>)	<i>Surpunaga/Rakta Nagkeshar</i> (<i>Mammea longifolia</i>)

Table 3: Herbs used as substitute according to *Bhaishajya Ratnavali* [21]

S.No.	Original Drug	Substitute
1.	<i>Pushkarmool</i> (<i>Inula racemosa</i>)	<i>Kushta</i> (<i>Saussurea lappa</i>)
2.	<i>Amlavetas</i> (<i>Hippophae salcifolia</i>)	<i>Chukra</i> (<i>Remax vesicarius</i>)
3.	<i>Kumkum</i>	<i>Kusumbha</i>

	<i>(Crocus sativus)</i>	<i>(Schlechera oleosa)</i>
4.	<i>Kasturi</i> <i>(Moschus moschiferus)</i>	<i>Gandhashati</i> <i>(Hedychium spicatum)</i>
5.	<i>Kasturi</i> <i>(Moschus moschiferus)</i>	<i>Nagarmotha</i> <i>(Cyperus rotundus)</i>
6.	<i>Kasturi</i> <i>(Moschus moschiferus)</i>	<i>Kankol</i> <i>(Piper cubeba)</i>
7.	<i>Atis</i> <i>(Aconitum hetrophylum)</i>	<i>Nagarmotha</i> <i>(Cyperus rotundus)</i>
8.	<i>Prishniparni</i> <i>(Uraria picta)</i>	<i>Shalparni</i> <i>(Desmodium gangeticum)</i>
9.	<i>Swetachanda</i> <i>(Santalum album)</i>	<i>Raktachandan</i> <i>(Pterocarpus santalinus)</i>
10.	<i>Swetachanda</i> <i>(Santalum album)</i>	<i>Karpura</i> <i>(Cinnamomum camphora)</i>
11.	<i>Mulethi</i> <i>(Glycyrrhiza glabra)</i>	<i>Chavya</i> <i>(Piper retrofractum)</i>
12.	<i>Mulethi</i> <i>(Glycyrrhiza glabra)</i>	<i>Dhatakpushpa</i> <i>(Woodfordia fruticosa)</i>
13.	<i>Chitraka</i> <i>(Plumbago zeylanica)</i>	<i>Danti</i> <i>(Baliospermum montanum)</i>
14.	<i>Rasna</i> <i>(Pluchea lanceolata)</i>	<i>Bandak</i> <i>(Dendrophthoe falcate)</i>
15.	<i>Nagkeshar</i> <i>(Mesua ferrea)</i>	<i>Kamalkeshar</i> <i>(Nelumbo nucifera)</i>
16.	<i>Javitri</i> <i>(Myristica fragrans)</i>	<i>Lavang</i> <i>(Syzygium aromaticum)</i>
17.	<i>Draksha</i> <i>(Vitis vinifera)</i>	<i>Gambhari</i> <i>(Gmelina arborea)</i>
18.	<i>Tagarmool</i>	<i>Singhalimool</i>

	<i>(Velerina jatamansi)</i>	<i>(Root of piper longum)</i>
19.	<i>Ajmoda</i> <i>(Carum roxburghianum)</i>	<i>Ajwain</i> <i>(Trachyspermum ammi)</i>
20.	<i>Murva</i> <i>(Marsdenia tenacissima)</i>	<i>Manjistha</i> <i>(Rubia cordifolia)</i>
21.	<i>Talamkhana</i> <i>(Asteracantha longifolia)</i>	<i>Gokshur</i> <i>(Tribulus terrestris)</i>
22.	<i>Jira</i> <i>(Cuminum cymimum)</i>	<i>Dhaniya</i> <i>(Coriandrum sativum)</i>
23.	<i>Dhaniya</i> <i>(Coriandrum sativum)</i>	<i>Saunf</i> <i>(Foenieulum vulgare)</i>

Table 4: Pratinidhi dravya for Minerals, Metals & Aahariya Dravya [22]

S.No.	Minerals & Metals	Pratinidhi dravya
1.	<i>Vajra</i>	<i>Vaikrant</i>
2.	<i>Parad bhasma</i>	<i>Rasa sindur</i>
3.	<i>Suvarnamakshik satva</i>	<i>Suvarna bhasma</i>
4.	<i>Abhrak satva</i>	<i>Kanta louha</i>
5.	<i>Moti</i>	<i>Mukta shukti</i>
6.	<i>Pukhraj bhasma</i>	<i>Abhrak bhasma</i>
7.	<i>Kanta louha</i>	<i>Tikshna louha</i>
8.	<i>Panna bhasma</i>	<i>Praval bhasma</i>
Aahariya Dravya		
1.	<i>Puran guda</i>	<i>Madhu</i>
2.	<i>Shweta khanda</i>	<i>Mishri</i>
3.	<i>Dugdha</i>	<i>Mudga yusha / masura yusha</i>

RELEVANCE & IMPACT IN CHIKITSA [14-16]

As per *Ayurveda Sarasangraha*, the formulations consist of one *pradhan* drug and other *apradhan* drugs and cannot be formed

without *pradhan* drug therefore it cannot be replaced while others can be substituted like in *Draksharishta*, an Ayurvedic formulation, *Draksha* is the chief ingredient which cannot

be substituted while *Lavang*, *Kushta*, *Supari* and *Nagkeshar* being the *apradhan* drugs can be replaced [23]. *Pratinidhi dravya* (substitute) shows similarity in indications and therapeutic activities which is the most important criteria. While selecting proper substitute, similarities in *Rasa panchaka* and therapeutic efficacy should be assessed clinically and it must not exert harmful effects. *Abhava dravya* are mentioned for supportive drugs in the formulation below:

1. *Balachaturbadra Choorna* [24]

Balachaturbadra choorna, used in the treatment of fever, asthma, diarrhoea, nausea, cough & cold, vomiting contains 10 g of each of *Musta* (*Cyperus rotundus*), *Pippali* (*Piper longum*), *Ativisa* (*Aconitum heterophyllum*), *Karkatasrngi* (*Pistacia integerrima*) out of which *Ativisha* is a red listed medicinal plant and *Musta* can be substituted double the quantity although it might not exert same effect but retains therapeutic property. It solely depends upon the concept of *Dravyaguna*.

2. *Rasna erandadi Kashayam* [25]

3. *Dashamoola* [26]

It is a combination of 10 medicinal roots for various systemic disorders as *Shothaghna*. Since it is a valuable ingredient in more than 200 formulations such as *Dashamoolarishtam*, *Chyavanaprasham*, *Dashamoolakatuthrayam*

kashyam, *Dashamoola rasayanam*, procuring it is a tedious task so substitution with its alternative parts is opted.

For example- *Bhaishajya Ratnavali* suggests using unripe fruits of *Bilva* (*Aegle marmelos*) instead of flowers. Likewise *Nigantu Adarsha* mentions that in absence of *Prshniparni* (*Uraria picta*), using root and its whole plant, use of *Salaparni* (*Desmodium gangeticum*), whole plant of *Brhati*, *Goksura*, *Kantakari* can be done.

Following are the researches carried out wsr to substitutes [27]

1. *Tilaparni* (*Cleome viscosa* Linn.) and *Ajagandha* (*Gynandropsis gynandra* Linn.) [28]

According to Charaka, *Ajagandha* and *Tilaparni* belonging to the same family *Capparidaceae* are two different plants pharmacognostically although similar therapeutically. These should be administered in wet form (*Kwath*, *Phanta* or *Hima Kalpana*) as they have more water soluble extractive. Separate identity and chemical nature is shown through different separation pattern in TLC. They have pharmacological properties like histamine potentiating activity but *Tilaparni* is more potent than *Ajagandha*. Although both of them do not modulate immunomodulation, analgesic & anti-inflammatory activity at significant level but are useful in *Kapha*

dominancy *Vicarcika*. Cleome is said to be more effective in treating *Vicharchika* as compared to Gynandropsis on the basis of study carried.

2. *Shweta Chitraka* (*Plumbago zeylanica* Linn.) & *Rakta Chitraka* (*Plumbago rosea* Linn.)^[29]

These two varieties of *Chitraka* having same texture, taste and irritant odour chemically showed presence of tannins, alkaloids, triterpenoids, anthraquinones, carbohydrates. *Shweta Chitraka* is said to be less irritant than *Rakta Chitraka* while the latter is said to have more percentage of inorganic components, salts and chemical constituents and also for the Rasayana purpose on the basis of the literature study.

Active principle named Plumbagin is present in them possessing highly irritant & cytotoxic property. The HPTLC study showed that in *Ashodhit Rakta Chitraka*, Plumbagin is maximum and reduces after *Shodhana* process. Both of the varieties lower the systolic and diastolic blood pressure, lymphocyte count correct and balance *Agni*. Although both the drugs provided similar results on statistical scale, *Rakta Chitraka* if used clinically as a single drug should be observed with extreme caution given for short period at the lowest desired dose. Its *shodhana* must be carried out for three

consecutive days with lime water which should be changed regularly. To lower its toxic potential with its alkaline nature, for clinical use it should be taken with *takra*.

3. *Hastishundi* (*Heliotropium indicum* Linn.) and *Heliotropium ovalifolium* Forsk^[29]

There are about 18 species having resemblance to *Hastishundi*. These two species

selected have mild anti-pyretic activity and have almost similar pharmacological activities but *H. ovalifolium* showed better results in anti-pyretic activity after 24hrs. The test drug was found sensitive to micro-organisms and resistance to the group of antibiotics was found in culture sensitivity test of the throat swab of the patients.

Tundikeri, a disease in Ayurveda has *Tridosha* involvement with predominance of *Kapha* but antibiotics fail to mitigate the disease and drugs *H. indicum* and *H.ovalifolium* have shown highly significant results statistically which confirm recommendation of use of any of them in its treatment.

4. *Berberis aristata* D.C. and *Berberis asiatica* Roxb^[30]

There is difference in morphology of leaves and inflorescences and in stem, microscopically in architecture of cortex, cork, medullary rays and presence of Rytidoma,

prismatic crystal of calcium oxalate of both the plants. The stem of *B. asiatica* is higher in berberine quantity as shown in analytical study of its aqueous extract. Although solidified aqueous extract of both species have anti-hyperglycaemic action in pharmacological study but *B. aristata* shows higher magnitude. Reduction in postprandial sugar levels and in chief complaints significant relief was seen but biochemical parameters changes and reduction in fasting blood sugar remain insignificant.

5. *Brihati* (*Solanum indicum* Linn.) and its substitutes^[31]

Brihati is a rare drug & on the basis of its synonyms, all its five varieties can be considered. Swartz (*Solanum torvum*) is considered as *Sweta Brihati*. Valli/Lata are synonyms of *Brihati* & are similar with *Solanum dubium* Fresen & *Solanum trilobatum* Linn. which have more alkaloid content in comparison with others. The study suggested that they have *Sothahara* and *Kashahara karma* and *Solanum incanum* is equally effective as *Solanum indicum*. All the varieties are equally effective like the original drug *S. indicum* if required for *kasahara karma*. *Brihati* is frequently not used as single plant therapeutically as mentioned earlier; generally it is used as component of

Dasamoolarista. Evaluation for diuretic, anti-inflammatory and antitussive activities can be done by preparing five samples of *Dasamoolarista* with five varieties and compare them.

6. *Shaliparni* [*Desmodium gangeticum* DC.] and other four species of *Desmodium* genus^[32]

According to API Part 1 Vol. 3, *Shaliparni* is considered as *Desmodium gangeticum* DC and comes under list of rare drugs. Although there is no reference regarding it in any of the Vedic literatures but *Atharvaveda* named it by mentioning "ANSHUMATI". *Desmodium* (*repandum, lexiflorum, diffusum, triflorum*) DC are its varieties with very minute differences. *Acharya Bhavmishra* mentioned *Shaliparni* (*Desmodium gangeticum* DC.) with *Triparni* synonym in *Guduchyadi varga* indicating that it has trifoliate leaves. Some synonyms of *Shaliparni* indicate its morphological character like its name indicates resemblance with *shalidhanya's* leaf, *Dirdhmoola* indicates that its root is very long, *Vreehiparni* indicates that the leaf is as *Vreehidhanya's* leaf, *Dirghapatra* indicates the elongated/long leaf while some indicate its action like *Shothaghni* & *Vataghni* indicate that it acts as *Vatahara* & *Shothahara* respectively, *Somya* indicates that it does not have *ushna* property *Pitta* indicates its *pittahara karma*. *Desmodium lexifloram* DC

and *Desmodium triflorum* DC have high alkaloid content as compared to *Desmodium gangaticum* DC while pH and TLC profile of all is almost same. Although tannins are not present in all five species but flavonoids, alkaloids & steroids are present. The study suggested that all have *Sothahara* and *Kashahara* property. *Desmodium lexiflorum* DC being better as moderate diuretic, anti-cough and sodium excretion properties can be opted for substitution in the absence of other three.

7. Prishniparni (*Uraria picta* Desv.) and *Alysicarpus longifolius* W. & A. Prodr.

[33]

Prishniparni (*Uraria picta* Desv.) is vulnerable species. *Uraria picta* and *Alysicarpus longifolius* are locally known as *Samervo* in Saurashtra region of Gujarat and these along with A. Prodr belong to same family i.e. Fabaceae and their morphological characters such as leaves, roots, stems and inflorescence are similar in structure, midrib portion of leaves show white stripes and microscopically, they show similarity in characters of root like cortex, xylem, phloem, yellowish brown content and prismatic crystals of calcium oxalate. They are differentiated by medullary rays and starch grains as *Uraria picta* shows medullary rays bi-multiseriate and starch grains without hilum while *Alysicarpus longifolius* shows medullary rays uni-

multiseriate and starch grains with hilum. Both possess *Madhura, Kashaya & Tikta rasa*. *Alysicarpus longifolius* has mild anti-inflammatory activity & *Uraria picta* has mild *pachana* activity.

CONCLUSION

Substitution and Counterfeiting are intertwined thus creating problems for standardization of herbal medicine. In the present scenario, with more than 300 medicinal plants on the red list and lack of indigenous medicines because of deforestation, lack of proper cultivation methods, global warming, endangered plant list is increasing hence implementation of *Pratinidhi dravya* (substitute) is needed. Substitution particularly regional substitution is the need of the hour on basis of homonym, synonym and its local usage (ethnomedicinal use). The *Pratinidhi Dravyas* are herbal substitutes having similar activities as that of genuine *Dravya* and are assessed and selected based on their *Rasa, Guna, Virya* and *Vipaka*, however *Karma* (action) is considered as prime factor in case of unavailability while selecting substitute. The most essential criteria for substitution is the pharmacological activity rather than phytoconstituents or morphology. Substitutes are of great importance and efforts must be done for their correct

evaluation & identification through phytochemical and pharmacognostical studies.

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