Ahana A.K & Prakash L Hegde / Int. J. Res. Ayurveda Pharm. 9 (5), 2018

Review Article
www.ijrap.net

A REVIEW ON RELEVANCE AND IMPACT OF PRATINIDHI DRAVYAS IN CHIKITSA
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Received on: 04/07/18 Accepted on: 14/09/18

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DOI: 10.7897/2277-4343.095146

ABSTRACT
Substitution of herbal drugs is a burning problem in the herbal drug industry and it has caused major treat in the research on commercial natural products. Many Pratinidhi Dravyas (Substitute Drugs) are mentioned in Ayurvedic texts. This review advocates similar action regarding Pratinidhi Dravyas (Substitute Drugs) without any adverse effect. In the current situation endangered plant list is increasing gradually so that implementation of Pratinidhi Dravyas may be the right option. The Pharmacopoeial or extra Pharmacopoeial drug should be assessed on the basis fundamentals of Dravyaguna like Rasa, Guna, Virya, Virpta etc. This article throws light on the concept of Substitution given by our preceptors and analyze these with the relevance and impact in treatment aspects and the present day trend of substitution.

Keywords: Pratinidhi Dravyas, Rasa, Guna, Virya, Vipaka, Substitute drugs.

INTRODUCTION
India is facing an increasingly distributing trend of depletion of its natural resources, medicinal plants are one among them. It is need of hour to do intensive research to find alternatives for these resources. Plant resources especially medicinal plants are vanishing at level of threat. Most of time not enough attention is being given to find alternate sources or substitutes for many of these plants. India is blessed with its richest floras in the world. Even though the medicinal species have disappeared or threatened or extincted from our country, there are still hundreds of species which have highly medicinal properties that can be used as substitutes to those getting extinct.

Demand of medicinal plants is ever increasing but fails to meet supply with authentic drug giving rise to irrational substitution affecting efficacy and safety of herbal medicines. Adulteration and substitution of herbal drugs is the burning problem faced by herbal industry at present. The degradation and destruction of habitats leading to deforestation and extinction of many species is a major cause of the loss of medicinal plant resources. Several plants in use today are substitutes for genuine ones. Such substitution is necessitated by incorrect identification of many drugs and the unavailability or dire shortage of the genuine medicinal herbs. Most of the times substitutes are deliberately selected andrationally used to bring desired effect. The principles to select substitute drugs is based on similarity of properties (Rasa, Guna,Virya and Vipaka) but most important factor is therapeutic action. In terms of pharmacy, substitute is generally used when original drugs are not available or may be available in small quantity. In ancient time, Yaidya had to collect the drug by own. The drugs which were less available in local area were replaced by other drugs known as Substitute drugs (Pratinidhi Dravyas).

Ayurvedic classics like Charaka and Sushruta have not mentioned direct reference for Pratinidhi Dravyas, whereas Acharya Vagbhata have given references for preparation of Compound formulations. Pratinidhi Dravyas had been dealt in detail in the Mishraka varga prakarana of Bhavaprakasha nighante2 and Abhava varga of Yogaratnakara3 and Bhaishiyam Ratnavali has also compiled valuable information regarding Pratinidhi Dravyas.4 There is need to analyse these concepts with the present trend of substitution so that we can adopt the drug in preparation of formulation and treatment.

CONCEPT OF PRATINIDHI DRAVYA
“Pratinidheeyate Sadrusheekriyate iti”
According to Abhava varga of Yogaratnakara Pratinidhi Dravya or Substitutes means the Substance having Similar Pharmacological activities as like that of Genuine drug but may not have similar appearance.

QUALITIES OF SUBSTITUTES
1. Substitutes should have similar pharmacological actions like that of genuine drugs.
2. Substitutes should be available easily and in large quantity.
3. Substitutes should be easy to prepare the required formulations.

CRITERIA FOR SUBSTITUTION
1. If any drug is unavailable, another drug with similar properties may be substituted and any drug which seems to be in appropriate can be excluded.
2. A drug to be considered as substitute should fulfill following criteria;
   • Exhibit Similarity in Rasapanchaka
   • Exhibit Similar therapeutic effect
3. In a formulation, the Pradhan Dravya should never be substituted.
   Eg: Nisha and Kataka in Nishakatakaadi Kashaya should not be substituted. Trivrit in Avipatichoornam can never be replaced with another drug. Haritaki in Agasty haritaki should never be substituted.
NEED FOR SUBSTITUTION\textsuperscript{6,7}

NON AVAILABILITY OF THE DRUG

In case of non availability of drugs;
Eg: Substitution of Ashtavarga Dravyas.

Ashtavarga Plants having their natural habitats in Himalayas is the important ingredient of various formulations such as Chyavanaprasha, Jeewantiya gana Kashaya etc. The major reason being unavailability and identity of Astavarga includes;
Difficulty in finding natural habitat, Lack of knowledge about specific ecological conditions, Difficulty in access and scarce availability, Deforestation, Lack of Developmental Programmes, Environmental changes, Geographical & Climatic changes etc. 
So in order to meet this Conservation and Sustainable utilization strategies should be followed. These species which are categorized as Endangered for the Globe deserves to be “Critically Endangered for the Globe”.\textsuperscript{8}

UNCERTAIN IDENTITY OF THE DRUG

Due to uncertainty different species such as Aralia quinquefolia, Ipomea sepiaria etc. are considered for the herb Lakshmana.

COST OF THE DRUG

Kumkuma (Crocus sativus) being costly herb is substituted by Kusumbha (Carthamus tinctorus). Expensive Drugs can be substituted with cheaper drugs having the same qualities. The main requirement for an appropriate Pratinidhi dravya is to possess similar guna and karma to that of original drugs.

SHELF LIFE OF THE DRUG

Dravyas like Ativisha (Aconitum heterophyllum), which get easily infected by cankers, thus may be substituted by drug like Musta (Cyperus rotundus Linn).

PREPARATION FORM OF THE DRUG

Substitution can be done in the form of preparation in case of unavailable prepared material and which can be used in emergency conditions. 
Eg: In case of unavailability of Guduchi Sattva (aqueous extract of Tinospora cordifolia) Guduchi Svarasa (juice) can be used.

SEASONAL AVAILABILITY OF THE DRUG

Some drugs are available in specific season, so other drugs having same action can be used. For example: Trianthema portulacastrum can be used in seasonal absences of Boerhavia diffusa.

TYPES OF SUBSTITUTION\textsuperscript{7,9}

Substitution with totally different drug

Substitution with totally different drug which exhibit Similarity in Rasapanchaka & Therapeutic Effect.

Here we can consider Bharangi (Clerodendrum serratum) and Kantakari. Bharangi has Tikt a rasa and Laghu, Ruksha guna and has Kapha and Vatahara property. While Kantakari (Solunum xanthocarpan) has katu vipaka and ushna virya. It has Glycosides –Verbasoside and Solasonin, solamargin, solasurine respectively. Both C. indicum and S. xanthocarpam have shown Anti-hisaminic activity. Both C. indicum and S. xanthocarpam are commonly used in respiratory disorders which are commonly associated with release of Histamines and other Autacoids.

Substitution of two different Species

Here we can consider two types of Gokshura- Tribulus terrestris(zygophylaceae) and Pedalium murex (Pedaliaceae) 
T.terrestris has the chemical constituents like Chlorogenin, Diosgenin, Rutin, Rhamnose, and Alkaloid.

While P. murex has Sitosterol, Ursolic acid, Vanilin, Flavonoids and Alkaloids.

Both the species are proved for Nephroprotective, Lithotriptic, Diuretic and Hepatoprotective activities. If we analyse the clinical conditions where Gokshura is indicated i.e, Mutrakrupa, Mutraghata, Ashmari, Prameha etc, both T. terrestris and P.murex appear to be appropriate substitute.

Substitution of Species belonging to same family

The Datura metal and Datura stramonium can be considered here. Chemical Constituents are Alkaloids, Scopalamine, Atropine, Hyocyanine, Loxiscine. The Alkaloids are proved as Bronchodilatory and inhibitor of secretion of mucous membrane.

The Alkaloid present in both the species are well proven Bronchodilators and also they inhibit the secretion of mucous membrane of the respiratory tract. Thus both D. metal and D. stramonium are beneficial for Respiratory tract disorders, while D. metal would be a better choice for Krimihara as it is a proven Antihelmintic.

Substitution of Different parts of the plant

The root of Sida cordifolia and the whole plant of Sida cordifolia can be considered. Root has the chemical constituents such as Sitoindoside, Acyelsteryglycoside. While the whole plant has Alkaloid, Hydrocarbons, Fatty acids, Ephedrine. Various extracts of the whole plant showed Anti-bacterial, Anti-oxidant, Hypoglycemic, Hepatoprotective and Cardio tonic activities. Though it is the root which is mentioned as officinal part of S.cordifolia in the classics as Balya, Brumhana,ショタワラ etc, modern researches proves that even the aerial parts are also equally effective.
**LIST OF PRATINIDHI DRAYAS**

<table>
<thead>
<tr>
<th>DRUG</th>
<th>BOTANICAL NAMES</th>
<th>SUBSTITUTE</th>
<th>BOTANICAL NAMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chitraka</td>
<td>Plumbago zeylanica</td>
<td>Danti</td>
<td>Baliospermum montanum</td>
</tr>
<tr>
<td>Dhanavarasa</td>
<td>Alhagi cameralorum</td>
<td>Duralabha</td>
<td>Fagonia Arabica</td>
</tr>
<tr>
<td>Tagara</td>
<td>Valeriana wallichi</td>
<td>Kashtha</td>
<td>Saussurea lappa</td>
</tr>
<tr>
<td>Murva</td>
<td>Marsdenia tenissimha</td>
<td>Jhirgini</td>
<td>Odina woodier</td>
</tr>
<tr>
<td>Ahimsra</td>
<td>Capparis separia</td>
<td>Mankanda</td>
<td>Atocasia indica</td>
</tr>
<tr>
<td>Lakshmana</td>
<td>Ipomea sepcea</td>
<td>Neelakantashshika (Mayurshikha)</td>
<td>Adiantum candatum</td>
</tr>
<tr>
<td>Pusharakamoola</td>
<td>Inula racemosa</td>
<td>Pankaja</td>
<td>Nelumbo speciosum</td>
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<tr>
<td>Udapala</td>
<td>Nymphea pubescens</td>
<td>Kamud</td>
<td>Nymphea alba</td>
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<td></td>
<td>Nymphea stellata</td>
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<td>N.rubra</td>
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<td></td>
<td>Nymphea nouchali</td>
<td></td>
<td>N.edulis</td>
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<tr>
<td>Ativisha</td>
<td>Aconitum heterophyllum</td>
<td>Musta</td>
<td>Cyperus rotundus</td>
</tr>
<tr>
<td>Shiva (Haritaki)</td>
<td>Terminalia chebula</td>
<td>Shiva (Amalaki)</td>
<td>Emblica officinalis</td>
</tr>
<tr>
<td>Nagapushpa (Nagakesara)</td>
<td>Meusa ferrea</td>
<td>Padmuesara</td>
<td>Nelumbium speciosum</td>
</tr>
<tr>
<td>Meda &amp;</td>
<td>Polygonatum cirrhifolium</td>
<td>Varsi</td>
<td>Asparagus racemosus</td>
</tr>
<tr>
<td>Mahameda</td>
<td>Polygonatum verticillatum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jeevaka &amp;</td>
<td>Microstilus wallichi</td>
<td>Vidarikanda</td>
<td>Pueraria tuberosce</td>
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<tr>
<td>Rishabhaa</td>
<td>Malaxis musciera</td>
<td></td>
<td>Ipomea dioegia</td>
</tr>
<tr>
<td>Kakoli &amp;</td>
<td>Fritillaria roylei</td>
<td>Aswagandhia</td>
<td>Withania somnifera</td>
</tr>
<tr>
<td>Kecharakoki</td>
<td>Lilium polyphyllum</td>
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<tr>
<td>Radadi</td>
<td>Habenariaudage worthi</td>
<td>Varakhanda</td>
<td>Dioscorea bulbifera</td>
</tr>
<tr>
<td>Vridhi</td>
<td>Habenaria latilabissors</td>
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</tbody>
</table>

**RELEVANCE & IMPACT IN CHIKITSA**

Most important criteria of Pratinidhi druga is similar in indications and their therapeutic activities. To select a proper substitute, one has to not only seek overall similarities of Rasa panchaka but also test its therapeutic efficacy clinically. Acc. to Ayurveda Sarasarangastra, the formulations contain one main drug and others supportive drugs. The formulations cannot be formed without the main drug hence, main drug cannot be replaced by any other drug. So list of Abhava druga is given for supportive drugs in the formulation.

**Balachaturbadra Choorna**

Balachaturbadra choorna is used in the treatment of pediatric complaints like fever, diarrhoea, cough, cold, asthma, nausea and vomiting.

**Balachaturbadra Churna Ingredients:** 10 g of each of:
- Ghana (Musta) – Cyperus rotundas
- Krnna (Pippali) – Piper longum
- Aruna (Ativisa) – Aconitum heterophyllum
- Srgi (Karkatasrgi) – Pistacia integerrima
- Ativisha – Red listed Medicinal plant.

As both Musta and Ativisha are present in the formulation, Musta can be Substituted double the quantity. The substitute will not exhibit desired effect of genuine drug.

**Rasnaerandandi Kashayam**

The substitution of Musta (Pratinidhi druga) for Ativisha (Abhava druga) is most likely based on Dravyaguna. Probably Ayurvedic seers looked at the similarities at Rasapanchaka and krama levels of Abhava-Pratinidhi Dravyas, rather than their morphological similarity.

**Dashamoola**

Dashamoola is the unique combination of 10 Medicinal roots which is widely used as Shothaginka for various systemic disorders. It is the major Ingredient in more than 200 formulations like Dashamoolarashatham, Dashamoolakathuryayam kashyan, Dashamoolarassatanam, Chyavanaprasham etc. Procurement of authentic Dashamoola in the market is a herculean task, so the parts of these plants may be useful. Substituting with alternative parts of the same plant when the intended parts can not be practically harvested. For example; instead flowers of Bilva (Aegle marmelos), use of unripe fruits has been suggested in Bhaishajya Ratnavali. Similarly use of Salaparni (Desmodium gangeticum) in absence of Prshniparni (Uraria picta), use of both root and whole plant for Prshniparni, whole plant of Bhrati, Kantakari, and Goksura has been mentioned in Niganta Adarsha. A comprehensive research needed to focus on identifying substitute species and also substitute parts that may be more available.

**DISCUSSION**

Substitution of the herbs is the need of the hour with many medicinal plants becoming red listed. The most essential criteria for substitution are the Pharmacological activity rather than Morphology or Phytoconstituents. Substitution of herbs achieved many goals, though basic idea was to provide similar therapeutic effect as that of original drug. It provided a greater scope for the physician to utilize herbs that are easily available, cost effective and most appropriate for the clinical condition. Substitution is generally done when original materials are not available or if available in insufficient quantity. Substitute should have proven efficacy as near as original drug. To Substitute a drug, Availability of the drug and Validation of Substitution are considered as important.

Ayurvedic concept based substitution differ the views of current botanical and pharmacy concept. The drugs should be assessed on the basis of their Guna-karma and further they should be evaluated. Regional substitution is the need of hour on the basis of synonym, homonym and its local usage. On the basis of Ayurvedic tools and current scientific base, assessment of proper Pratinidhi Dravyas may be possible. Same action like that of main drug is most important, to find out Substitute drug and Systematic researches are needed before finding the Pratinidhi druga. The concept of Abhava druga may not be applicable for single drug therapy, it can be applied in compound drug formulations where substitute drug can be used in scarcity of genuine drug. Substitutes should ensure availability, similar pharmacological action as the total effect of the yoga (formulation) should not be changed.
As the main requirement for an appropriate Pratinidhi Dravya is to possess similar gunas to that of original drug, the Abhava Pratinitdi Dravyas were compared on the basis of their Rasapanchaka and Rogagnhata. Pratinidhi drugs serves to overcome the problem of unavailable drugs due to scarcity, rare or difficult to procure. This in a way helps to produce good quality herbal products and lend a support in conservation and sustainability of medicinal plants. With proper revalidation of existing documented examples there is always a scope to find out new substitutes for Abhava dravyas of todays time.

CONCLUSION

Substitution of the herbs is the need of the hour. The most essential criteria for substitution are the pharmacological activity rather than morphology or phytoconstituents. Substitutes are of greater importance and efforts should be made for their systematic identification and evaluation by pharmacognostical and phytochemical studies. In the current scenario endangered plant list is increasing gradually, thus implementation of Pratinidhi may be the right option.

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Cite this article as:

Source of support: Nil, Conflict of interest: None Declared

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