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CONTROVERSY, ADULTERATION AND SUBSTITUTION - BURNING PROBLEMS IN AYURVEDA PRACTICES

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ABSTRACT

Ayurveda is an Indian traditional system of medicine. In present era, world is looking towards herbal medicine because of acceptability and safety. Medicinal plants constitute an effective source of Ayurvedic and other traditional system of medicines as well as modern medicine. In India, about 80% of the rural population depends on herbal medicines in primary health care level. A large percentage of plants used in herbal industries are subject of controversy. Non-availability of plants, poor understanding and parallel evolved knowledge systems are some of the reasons attributed to it. The existing practices of polynomial nomenclature system of Sanskrit, different perceptions in various communities, vernacular equivalents, all are cumulative factors for controversy, adulteration and substitution. "*Sandigdha Dravaya*" is a term used for that type of medicinal plants which are mentioned in Ayurvedic classics but their exact botanical source is not known. Adulterants and substitutes are the common practices in herbal raw material trade. Adulteration is a debasement of an article. The motives for intentional adulteration are normally commercial that which involves deterioration, admixture, sophistication, inferiority, spoilage and other unknown reasons. Substitution is a replacement of equivalent drugs in place of original drugs. The principles to select substitute drugs are based on similar *Rasa, Guna, Virya, Vipaka* and mainly the *Karma*. At present the adulteration and Substitution of the herbal drugs is the burning problem in herbal industry and in Ayurvedic practices. So it is necessary to develop reliable methodologies for correct identification, standardization and quality assurance of Ayurvedic drugs.

Keywords: Controversy, *Sandigdha Dravya*, Adulteration, Substitute.

INTRODUCTION

Ayurveda is an Indian traditional system of medicine. It is a science of life and believed to be prevalent for last 5000 years in Indian Subcontinent. It is one of the most noted systems of medicine in the world.[1] In Ayurvedic system of medicine, treatment is based on *Chikitsa Chatuspad* (Tetra-pod of treatment) and for success of treatment, all these pods most contain special qualities.[2] *Aushadh* (Drugs) is one of the major pod, and for success of treatment potent drugs are the primary requirement. Medicinal plants are the major source of drugs in Ayurveda.

India is one of the world's top 12 mega diversity countries. It has more than one fourth (8000) of the world's known medicinal plant species (30,000), which provides an important source of medicinal raw materials for traditional medicine systems as well as for pharmaceutical industries.[3] Medicinal plants are globally valuable sources of new drugs. There are over 1300 medicinal plants used in Europe, of which 90 % are harvested from wild resources; similar figure in India also. Furthermore, up to 80 % of people in developing countries are totally dependent on herbal drugs for their primary healthcare, and over 25 % of prescribed medicines in developed countries are derived from wild plant species.[4] Due to an increasing demand for medicinal plants and a loss and fragmentation of natural habitats, close to 300 species of Indian medicinal plants have been so far assessed as under threat in the wild. Around 1,000 species are estimated to be facing various degrees of threat across different biogeographic regions in the country.[5]

Due to such a high demand and less availability of natural sources and unavailability of crude genuine drugs, practices of substitution and adulteration are increasing day by day. Similarly a large percentage of plants used in herbal industries are subject of controversy. Non-availability of plants, poor understanding and parallel evolved knowledge systems i.e. knowledge of naming of plants by identifying species with partly similar or fully similar properties, inherent qualities of accent and dialects, non medical literature describing flora etc. are some of the reasons attributed to it.[6]

At present the adulteration and Substitution of the herbal drugs is the burning problem in herbal industry and in Ayurvedic practices. Due to adulteration, faith in herbal drugs has declined and led to one of the greatest drawbacks in promotion of Ayurveda and Herbal products. Adulterants are also creating health hazards or adverse events. Similarly controversy is creating problem for uniformity in standardization and reliability of Ayurvedic products and due to use of substitutions, it is difficult to get the appropriate effects as the genuine drugs could give.

The purpose of this study is to define and determine the causes of controversy, Adulterations and Substitution on classical and modern perspectives with appropriate examples and their effect on Ayurveda practices.

Material and Methods-

Available Ayurvedic and Contemporary literatures were studied for better understanding of concept of Controversy, Adulteration and Substitute of medicinal plants in Ayurvedic practices and herbal trade. Information regarding controversial drugs, adulterant drugs and substitute drugs from Ayurvedic texts, jour-

nals and internet media were also used for better and comprehensive understanding about the subject.

ENUMERATION OF CONTROVERSY, ADULTERATION AND SUBSTITUTION

Controversy and Controversial Drugs-

Controversial drugs or *Sandigdha Dravyas* are those plants which are mentioned in Ayurveda classics but their botanical identification is not clear. The Ayurvedic and Sanskrit literature has described a herb with many synonyms, which do not precisely indicate the botanical source but many a times attribute to therapeutic utility of the plant.[7] For a single herb various synonyms are mentioned in Ayurvedic lexicons on the basis of morphology, habitat, origin, therapeutic uses etc. by using different similes which are leading causes of controversy. Quantum of information gained from Ayurvedic and other Sanskrit literature revealed various incidences where on common vernacular name is used for two or more entirely different plant species in Ayurvedic and other traditional system of medicines[7] e.g. *Amrita* is used both for *Tinospora cordifolia,* and *Terminalia chebula* which are totally different drugs. Synonyms of herbs are also given according to the local languages. India is a country having a variety of languages and population dependent on different tribal and folklore medicine. Sometimes this is also responsible for confusion in the nomenclature of different plants having similar name.

Causes of Controversy [8,9,10]

- **Mistake done during copying of Manuscripts-** In past there was no printing machine, Acharyas had written the manuscript manually in *Bhurja-Patra* or *Taal-patra* or other substances. During copying of these manuscripts by editors or translators, mistakes might have occurred, which ultimately created controversy.
- **Single synonym given for multiple plants-** In Ayurvedic lexicons single synonym is used for two or more than two herbs which are totally different in morphology which creates controversy. These types of practices come in existence mainly during *Nighantu* periods e.g. *Amrita* is used for both *Tinospora cordifolia* (willd.) Miers ex Hook & Thoms and *Terminalia chebula* Retz.
- **Geographical variation-** India is a country of multi diversity having high Himalayas to sea level area and world highest rainy area to Thar Desert. Every area has its own types of plant diversity, the plant which found in northern India mayn't found in southern part. So due to unavailability of those species another species are used for the same purpose, which ultimately creates controversy. For example *Convulvulus microphyllus* Sieb. ex Spreng is used by the name of *Sankhpushpi* in north India but due to geographical variation, it is not available in southern part and there *Clitoria ternatea* Linn. is used.
- **Poor understanding of Sanskrit word in different context-** Ayurvedic classics are mainly written in Sanskrit language. Same word in different contexts give different meaning, and due to poor understanding of this type of words by commentator further creates controversy, for example *Pippala* denotes *Bodhivriksha* when used in male

gender and the same in female gender denotes long pepper.

- **Substitute leading controversy-** Due to non-availability or high cost in the market, there are chances of substitution of drugs. If this practice continues for long time the original identity of a plant may become obscure and the substitute will be considered as the original, which ultimately creates controversy later on. For example- *Pashanbheda* is used as urolithiasis (*Ashmaribhedana*) as the name indicates, so drugs like *Bryophyllum pinnata* (Patharchuda), *Aerva lanata Juss* etc. are used by name of *Pashanbheda*. But originally *Bergenia ligualata* (Wall.) Engle is identified as the source of *Pashanbheda*.
- **Parallel evolving knowledge system-** Identifying species and naming them with partly similar or fully similar properties, inherent qualities of accent and dialects may create controversy. For example *Brahmi* is mentioned in Ayurveda calssics as brain tonic. *Mandukparni* is another drug mentioned as *Medhya Rasayan* (brain tonic) in *Charaka Samhita*. *Bacopa monnieri* (L.) Pennel. is source for *Brahm*i but in North India *Centella asiatica* (L) urban (*Mandookparni*) is called as Brahmi due to similarity in therapeutic effects.
- **Vernacular names-** Somewhere same name is used in different languages but having different meaning and identity which is also a cause of controversy, e.g. ***M****atala* in Tamil refers to *Punica granatum L*inn. Where as in Kannada it pertains to *Citrus medica.*
- **Non Ayurvedic literature also creates controversy-** In poetry *Kamala, Utpala, Kumuda, Kalhara* all are referred as same plant lotus but botanically they are different species.
- **Polynomial nomenclature-** Multiple names for single plant are given in Ayurvedic lexicons. This type of trends aroused during *Nighantu* Period. Different *Nighantu* written by different authors gave multiple names for a single drug especially for better understanding about the drug but they created controversy later on.

Table 1: List of some controversial drugs[7, 8]

S. No.	Sanskrit name of drugs	Botanical sources of drugs
1.	Brahmi	*1. Bacopa monnieri* (L.) Pennel (Scrophulariaceae) *2. Centella asiatica* (L) urban (Apiaceae)
2.	Jeevanti	1. *Leptadenia reticulata* Wight and Arn. (Asclepiadaceae) 2. *Desmotrichum fimbriatum* Bl. Bidr (Orchiaceae) 3. *Cimicifuga foetida* Linn (Ranunculaceae)
3.	Shankhapushpi	1.*Convolvulus pluricaulis* Choisy (Convulvulaceae), 2, *Evolvulus alsinoides* (Convulvulaceae), 3. *Canscora decussate* Schult (Gentianaceae), 4. *Clitorea ternatea* Linn.(Papilonaceae).

4.	Daruharidra	1.*Berberis aristata* DC (Berberidaceae), 2. *Coscinium fenestratum* (Gaertn.) Colebr. (Menispermaceae),
5.	Rasana	1. *Vanda tessellata* Loud and Loud (Orchidaceae), 2. *Alpinia galanga* (L.) Willd (Scitaminaceae), 3. *Pleuchea lanceolata* C.B.Clarke. (Compositae) 4.*Viscum album* (Loranthaceae), 5.*Withania coagulens* (Stocks) Dunal (Solanaceae), 6.*Aristolochia indica* L.(Aristolochiaceae) 7.*Inula racemosa* Hook.f. (Asteraceae) 8.*Rauwolfia serpentine* (L.) Benth. ex Kurz (Apocynaceae), 9. *Lochnera rosea* (Apocynaceae) *10.* Enicostemma littorale Blume (E. littorale) (Gentianaceae)
6.	Nagakeshara	1.*Mesua ferrea* L.(Clusiaceae) 2.*Ochrocarpus longifolius* (Clusiaceae) 3,*Dillenia pentagyna* Roxb. (Dilleniaceae)
7.	Twak	1.*Cinnamomum tamala* Nees & Eberm (Lauraceae) *2.Cinnamomum zeylanicum* Blume (Lauraceae) *3.Cinnamomum cassia* Blume(Lauraceae)
8.	Amaravela	1.*Cascutta reflexa* Roxb. (Convolvulaceae), 2.*Cassyatha filiformis* Linn. (Lauraceae).
9.	Pashanabheda	1.*Aerva javanica* Juss. (Amarantaceae) 2.*Ammania baccifera* Linn. (Lythraceae) *3.Bergenia ligulata* Wall (Saxifragaceae) 4.*Bryophyllum pinnatum* (Lam.)Kurz. (Crassulaceae) 5.*Coleus aromaticus* Benth. (Lamiaceae) 6.*Rotula aquatica* Lour.(Boraginaceae) 7.*Bridelia montana* (Roxb.) Willd. (Euphorbiaceae) 8.*Homania riparia* (Euphorbiaceae) 9.*Ocimum basillicum* L.(Lamiaceae)
10.	Talishpatra	1.*Abies webbiana* Lindl.(Pinaceae) 2.*Taxus baccata* Linn.(Pinaceae) 3.*Rhododendron anthopogon* D. Don.(Ericaceae)

ADULTERATION-

Adulteration is a practice of substituting original crude drug partially or wholly with other similar looking substances but later is either free from or inferior in chemical and therapeutic properties. In simple word, it is debasement of an article.[1] On the basis of motive; adulteration is intentional or direct and accidental or indirect adulteration. Direct or intentional adulteration is mainly done for commercial benefits.[12]

Deterioration, Admixture, Sophistication, Substitution, Inferiority and Spoilage are methods of adulteration. Intentional impairment in the quality of drug is Deterioration. Addition or mixing one substance to another accidentally or carelessly or due to ignorance is Admixture. It is a type of unintentional adulte-

ration. Sophistication is the intentional or deliberate type of adulteration in which some totally different substance is added in place of genuine drug while Inferiority refers to adding of any substandard drug, and Spoilage is due to the attack of microorganisms or parasitic infestation.[1]

Major Intentional types of Adulteration[1,11,13]

- Substitution with substandard commercial varieties- This is the most common type of adulteration in which low standard drugs are mixed which are morphologically, chemically and therapeutically resembles to the original crude drugs, for example Arabian senna is used instead of Indian senna.
- Using superficially similar inferior drugs – In this type of adulteration adulterants are superficially similar in appearance but may or may not having any chemical or therapeutic value as the original crude drugs. For example papaya seeds are adulterated with *Piper nigrum*, saffron is admixed with dried flowers of *Carthamus tinctorious*.
- Using artificially manufactured substance – In this type of adulteration artificially manufactured substances resemble to original crude drugs, are adulterated. This type of adulteration is done for costlier drugs. For example Calcium carbonate compounds are used by name of *Vansha lochan*.
- Using exhausted drug - This type of adulteration is usually done for those drugs which contain volatile oil, for examples fennel, clove, coriander, caraway etc. In this type same crude drug is adulterated but after extracting major chemical constituents, e.g. Volatile oil is extracted from bud of *Lavanga* (clove) and exhausted buds are adulterated. In this case sometimes extra additives are used to make the exhausted drugs attractive.
- Using synthetic chemicals to enhance natural character- Synthetic chemicals are used as adulterant which enhances the natural characteristics of original drug, for example, Citral is added in citrus oil like oil of lemon or orange oil.
- Presence of vegetative matter of same plant- Instead of proper used parts of crude drugs other parts of same species or miniature species grown around the large species are mixed with genuine crude drugs. For example instead of *Moola* (root) of *Bala* (*Sida cardifolia*) stem or whole parts of plant is used. This type of adulteration occurs in both intentional and unintentional adulteration.
- Harmful adulterants - For increasing weight of crude drugs for commercial profit, some harmful substances are added with genuine crude drugs, for example stone pieces and sand particles mixed in *Guggulu* (gum of *Commiphora mukul*).
- Adulteration of powders- The drugs which are commonly found in powder forms are adulterated with powder of other substances resembling the same, examples are dextrin in ipecacuanha and *Kampillak* (*Malotous phillipinensis*) powder is adulterated with Annatto dye (*Bixa orellana* Linn.)

Reason for Adulteration-

1. Intentional adulteration is done mainly due to commercial benefits, when there is high demand but less availability of drugs.
2. Unintentional adulteration is done due to following reasons : [14,15]

- Confusion in vernacular names- e.g. *Aerva lanata* (source of *Pashanbheda* in south) adulterated as *Bergenia ligualata.*
- Lack of knowledge about authentic source- e.g. *Calophyllum inophyllum* is adultered with *Mesua ferra.*
- Similarity in color and morphology – For example *Mucuna utilis* and *Mucuna deeringiana* are used for *Mucuna pruriens*
- Careless collection/ improper collection – Definite part of herb should be collected in particular season, particular place and particular part of plant should be collected but ignorance of these things during collection and drugs collected carelessly may cause adulteration.
- Improper storage- Due to improper storage physical factors such as air (oxygen), humidity, light, and temperature can bring about deterioration directly or indirectly and use of such type of drug acts as adulterant.
- Imperfect preparation- Some of crude drugs should be processed before marketing, during such processing improper technique may destroy active constituents e.g. over drying of crude drugs, removal of cork from zinger etc.

Table 2: List of few commonly used adulterants in Ayurveda[16, 17]

S, No,	Main Drugs	Adulterants
1.	Mussabar(*Aloe barbadensis*)	Black catechu (*Acacia catechu*)
2.	Nagkeshara (*Mesua ferrea*)	Buds of *Mammea suriga* and *Calophyllum inophyllum*
3.	Punarnawa (*Boerhavia diffusa*)	*Trianthema portulachastrum*
4.	Sthulaila (*Amomum subulatum*)	*Heracleum rigens*
5.	Vacha (*Acorus calamus*)	*Alpinia officinarum, Alpinia galangal*
6.	Vasa (*Adhatoda vasica*)	*Ailanthus excels*
7.	Guggulu (Gum of *Commiphora wightii*)	Gum resin of *Boswellia serrata, Hymenodictyon excelsura*
8.	Bol or Myrrh (*Commiphora myrrha*)	Gum of *Commiphora wightii*
9.	Kutaja (*Holarrhena antidysenterica*)	*Wrightia tinctoria, Wrightia tomentosa*
10.	Ashoka (*Saraca indica*)	*Polyalthia longifoia*

SUBSTITUTION –

Substitution is a replacement of equivalent drugs in place of original drugs on the basis of similar pharmacological actions and therapeutic uses. In Ayurveda, substitution is described by the name of *Abhava Pratinidhi Dravya*. During *Samhita* Period concept of adulteration and substitution was not existed but later on this practices come in existence. But *Vagbhatta* has mentioned that the *dravya* having similar *Ras* (taste), *Guna*(characteristic), *Veerya* (potency) and *Vipaka* should be used in absence of each other. So *Abhava Pratinidhi Dravya* is a replacement of original drug basically having similar *Rasa, Guna, Veerya, Vipak* and mostly on *Karma*. Description of *Ab-*

ahva Pratinidhi Dravyas are mentioned in *Bhavaprakash Nighantu*, *Yogratnakar* and *Bhaishajya-Ratnawali*.[17-19] There are 47 drugs of plant origin (*Sthavar Dravya*), 2 drugs of animal origin (*Jangam Dravya*), 7 drugs Minerals-Metals origin (*Bhoumya Dravya*) and 5 food materials (*Ahara Dravya*) mentioned for *Abhava Pratinidhi Dravya* in *Bhavaprakash Nighantu*.[9,17]

Table 3: List of substitute drugs (herbs) mentioned in *Bhavaprakash Nighantu*[9, 17]

S. No.	Main Drugs		Substitute drugs	
	Sanskrit name	Botanical name	Sanskrit name	Botanical name
1.	Chitraka	*Plumbago zeylanicum* Linn.	Danti	*Baliospermum montanum* Muell
2.	Dhanavyasa	*Alhagi camerlorum* Fisch.	Duralabha	*Fagonia Arabica* Linn.
3.	Tagara	*Valeriana wallichii* D C	Kushtha	*Saussurea lappa* C B Clarke
4.	Moorva	*Marsedenia tenacissima* W	Jhingini	*Odina woodier* Roxb.
5.	Ahimsra	*Capparis sepiaria*	Maankand	*Alocasia indica* (Roxb.) Schott
6.	Lakshmana	*Solanum xanthocarpum Schrad.* or *Ipomoea sepiara* Koenig ex Roxb	Neelakanth ashikha (Mayurshikha)	*Adiantum caudatum* Linn. *or Celiosia cristata* Linn.
7.	Bakula	*Mimusops elengi* Linn.	Kalhaar [Rakta Kumud]	*Nelumbo speciosum* Willd. / *Nelumbium rubra* Roxb.
8.	Utpal	*Nymphea pubescens* Willd. *Nymphea stellata* Will.	Pankaj	*Nelumbo speciosum* Willd/ *Nelumbo nucifera* Willd
9.	Neel-utpala	*Nymphea stellata* Willd/ *Nymphea Nouchali* Burm.f.	Kumud	*Nymphea alba/ N.rubra* Roxb.ex Andrews /*N.edulis*DC
10.	Jati pushpa	*Myristica fragrans* Houtt.	Lavanga	*Syzygium aromaticum* (Linn) Merr. & L.M.Perry
11.	Arka Payas (dugdha)	*Calotropis gigantean* (Linn) R.Br. ex Ait	Arka patra swarasa	*Calotropis gigantean* (Linn) R.Br. ex Ait
12.	Poushkar	*Inula racemosa* Hook.f	Kustha	*Saussurea lappa* C.B. Clarke
13.	Langali	*Gloriosa superb* Linn.	Kustha	*Saussurea lappa* C.B. Clarke
14.	Sthouneya	*Clerodendron infortunatum* L	Kustha	*Saussurea lappa* C.B. Clarke
15.	Chavika	*Piper chaba* Hunter	Pippali mula	*Piper longum* Linn.
16.	Gaja-Pippali	*Scindapsus officinalis* Schott	Pippali mula	*Piper longum* Linn.
17.	Somraji (Bakuchi)	*Psoralea corylifolia* Linn.	Prapunnad phala (Chakramar da)	*Cassia tora*
18.	Daru-nisha (DaruHaridra	*Berberis aristata D C*	Nisha (Haridra)	*Curcuma longa* Linn.
19.	Rasanjana	*Berberis aristata* D C	Darvi	*Berberis aristata* D C
20.	Talispatra	*Abbies webbiana* Linn.	Swarnataali	Not yet identified
21.	Bharangi	*Clerodendrum serratum* Spreng	Talispatra/ Kantakari mula	*Abbies webbiana/ Solanum xanthocarpum* Schrad & Wendl

22.	Madhuyasti	*Glycrrhiza glabra* Linn.	Dhataki	*Woodfordia floribunda* Salisb
23.	Amlavetasa	*Garcinia pedunculata* Roxb.	Chukra	*Rumex vesicarius* Linn
24.	Draksha	*Vitis vinifera* Linn.	Kashmari (Gambhari)	*Gmelina arborea* Linn
25.	Kashmari phala (Gambhari)	*Gmelina arborea* Linn.	Jati pushpa	*Myristica fragrans* Houtt.
26.	Draksha & Gambhari	*Vitis vinifera & Gmelina arborea*	Madhuca	*Madhuca indica* J.F. Gmel.
27.	Kankola	*Piper cubeba* Linn.f.	Sugandhi Mustak	*Cyperus rotundus* Linn.
28.	Karpura	*Cinnamomum camphora* Nees & Eberm	Granthipara	*Angelica glauca* Edgw
29.	Kumkum	*Crocus sativus* Linn.	Kusumbha	*Carthamus tinctorius* Linn.
30.	Shrikhanda (Sweta chandan)	*Santalum album* Linn.	Karpura	*Cinnamomum camphora* Nees & Eberm
31.	Sweta chandan	*Santalum album* Linn.	Rakta chandan	*Pterocarpus santalinus* Linn.f.
32.	Karpura	*Cinnamomum camphora* Nees & Eberm	Rakta chandan	*Pterocarpus santalinus* Linn.f.
33.	Rakta Chandan	*Pterocarpus santalinus* Linn.f.	Usheera	*Vetiveria zizanoides* Linn.
34.	Ativisha	*Aconitum heterophyllum* Wall	Musta	*Cyperus rotundus* Linn.
35.	Shiva	*Terminalia chebula* Retz.	Shiva	*Emblica offcinalis* Gaertn.
36.	Nagpushpa (Nagkeshar)	*Mesua ferrea* Linn.	Padma keshar	*Nelumbium speciosum* Willd.
37.	Meda	*Polygonatum cirrifoluim* Linn.	Vari (Shatavari)	*Asparagus racemosus* Willd.
38.	Mahameda	*Polygonatum verticillate*	Vari (Shatavari)	*Asparagus racemosus* Willd.
39.	Jeevak	*Microstylis wallichi* Linn.	Vidari kanda	*Pueraria tuberose* D C *OR Ipomoea Digitata* Linn.
40.	Rishabhaka	*Microstysis muscifera*	Vidari kanda	*Pueraria tuberose* D C *OR Ipomoea Digitata* Linn.
41.	Kakoli	*Fritillaria roylei*	Ashwagandha	*Withania somnifera*
42.	Ksheerakakoli	*Liluim polyphyllum*	Ashwagandha	*Withania somnifera*
43.	Riddhi	*Habenaria edgeworthii*	Varahi kanda	*Dioscorea bulbifera* Linn.
44.	Vriddhi	*Habenaria latilabris*	Varahi kanda	*Dioscorea bulbifera Linn*
45.	Varahi kanda	*Dioscorea bulbifera* Linn	Charmakaralu	*Tacca aspera* Roxb.
46.	Bhallatak- asa-hyta (unable to tolerate)	*Semecarpus anacarduim* Linn. f.	Rakta- chandan	*Pterocarpus santalinus* Linn.f.
47.	Bhallatak	*Semecarpus anacarduim* Linn. f.	Chitra	*Plumbago zeylanica* Linn.

NEED FOR SUBSTITUTION[9, 10, 11, 13, 15]

- **Non-availability of the drug**: Some drugs mentioned in Ayurvedic lexicon are not available nowadays, so those drugs are substituted by other drugs having similar therapeutic value. For example most of drugs from *Astavarga* are not easily available so those drugs are substituted by other ones e.g. *Meda* and *Mahameda* are substituted by *Shatavari*.

- **Uncertain identity of the drug**: The drugs which are mentioned in Ayurvedic classics but their botanical identity is not clear those are substituted by known one e.g. for the herb *Lakshmana*, different species such as *Arlia quinquefolia, Ipomea sepiaria* etc. are considered.
- **Cost of the drug**: *Kumkuma* (*Crocus sativus*) is more costly so it is substituted by less expensive *Kusumbha* (*Carthamus tinctorius* Linn.).
- **Geographical distribution of the drug**: *Rasna (Pluchea lanceolata*) is used in Northern India while in southern parts *Alpinia galanga* is used as Rasana and *Vanda roxburghii* is considered as source in Bengal.
- **The adverse reaction of the drug**: *Vasa* (*Adhatoda vasica*) is good *Rakta-Pittahara* (antihaemorrhagic) drug, but having abortificiant activity, so instead of this drug *Laksha* (*Lacifer lacca*), *Ashoka* (*Saraca asoka*) etc. are used in pregnant women for the same purpose.
- **Seasonal availability of drug-** *Punarnawa* (*Boerhaavia diffusa*) is commonly not found throughout the year so for that *Trianthema portulacastrum* (*Varshabhu*) can be used as substitute, which is found throughout the year.

TYPES OF SUBSTITUTION- [9,0,11,13,15,21]

- **Substitution with totally different drug-** Use of *Danti* (*Baliospermum montanum*) as a substitute of *Chitraka* (*Plumbgo zelenycum*).
- **Substitution of species belonging in same family** – *Datura metal* is substituted by *Datura stamonium*.
- **Using different species having common Sanskrit name** - Two types of *Gokshura* are used, they are *Tribulus terrestris* (Laghu Gokshur) and *Padalium murex* (*Brihat Gokshura*).
- **Using different parts of same plant** – Instead of root of *Sida cordifolia* whole plants of *Sida cordifolia* is used.
- **Due to similar action-** *Aamalki* (*Embelica officinalis*) is taken instead of *Bhallatak* (*Semicarpus anacardium*) for *Rasayan karma* (rejunaive action).

DISCUSSION

Controversy, Adulteration and Substitution are interrelated with each other. Substitution practices if exists for long time the original identity of a plant may become obscure and the substitute will be considered as the original, leading to create controversy. Non-availability and high market price of crude drugs led to adulteration. Similarly controversy about authentic botanical source of medicinal plants dealt in classical Ayurveda texts led a cause of substitution because of lack of proper authentication, the drugs having similar morphology or similar therapeutic effects might be practiced. Controversy, adulteration and substitution create problems for standardization of Ayurvedic practices and herbal products. Substitution of genuine drug is need of time because of unavailability of genuine drugs due to deforestation, global warming, lack of adequate cultivation practices etc. Although substitution should be only done for

endangered and red listed plants and the major constituent of a preparation should not be substituted. The rational substitution in Ayurveda is based on similarities in *Guna* of both the drugs and not on inferior qualities. It should be properly validated in contemporary context using both Ayurvedic principles and Modern Scientific tools. World Health Organization (WHO), in its publication on quality standards for medicinal plant materials, recommends rejecting any batch of raw material, which has more than 5% of any other plant part of the same plant (e.g. stem in leaf drugs), never the less if they are derived from the authentic plant. Based on these standards, adulteration whether, intentional or unintentional, should be rejected. Collectors, suppliers and traders should be educated for authentic sources of drugs. Intentional adulteration should be discouraged by strictly implementing the regulatory laws. Due to adulteration faith in Ayurvedic practices and drugs has declined and adulteration in market samples is the greatest drawback in promotion of herbal drugs. So for quality, safety and standardization purpose of Ayurvedic products and practices the problem related with controversy, substitution and adulteration of drugs should be resolved for its worldwide acceptance.

The prime factor for resolution of controversy is the proper authentication of botanical source of medicinal herbs mentioned in classics, for this, literature review, ethno-botanical survey, medicinal plants survey and drug evaluation (morphological, microscopic, chemical, physical and biological evaluation) should be done. Similarly for determination and detection of adulteration, various steps of drug evaluation should be applied. Substitution of drugs should only suggested when therapeutic efficacy of substituted drug is similar to original one.

The uniformity in selection of crude drugs for pharmaceutical preparations and practices should maintain the standardization of Ayurvedic products and for this Ayurvedic pharmacopeia of India (API) and Ayurvedic formulary of India (AFI) is playing a vital role, so maximum number of drugs mentioned in classics and practiced traditionally should be incorporated in API and AFI.

CONCLUSION

- Controversy about drugs is mainly due to polynomial system of nomenclature in classical texts.
- *Naama-Roopa* (nomenclature and morphology) of drugs are clear in *Samhitas*, controversy aroused mainly due to *Nirukti* (basonyms)and *Paryaya* (synonyms) are given by different *Nighantus*.
- Proper identification of original botanical source is even a great problem till date.
- Adulteration and Substitution are different. The most essential criteria for substitution is the pharmacological activity rather than morphology or phytoconstituents.
- Substitution of the herbs is the need of the hour with more than 300 medicinal plants becoming red listed.
- Adulteration is a malpractice not only done intentionally but accidentally due to involvement of untrained personnel in collection and trade.
- Controversy about authentic botanical source of medicinal plants dealt in clas-

sical Ayurvedic texts and problem regarding substitution and adulteration should be resolved by integrated research and those sources should be validated which have more potency for described pharmacological activities.

REFERENCES

1. Kokate C K, Purohit A P and Gokhele S B: Pharmacognosy. Chapter-7, 15th edition. Pune:Nirali Prakashan, 2014.
2. Agnivesha, Charaka samhita, Sutra Sthan, chapter 9th, Khuddakchatushpadiyam Adhyaya, Shloka no.2, Jaydev Vidyalankara, editor. 9th edition. Vol. 1. Varanasi: Chaukhamba Surbharati Prakashan; Reprint1999. p.74
3. Bhattacharyya R, Bhattacharya S, Chaudhuri S. Bhattacharyya R, Bhattacharya S, Chaudhuri S. Conservation and documentation of the medicinal plant resources of India. Biodiversity and Conservation 2006;15:2705–2717
4. Shi-Lin Chen1, Hua Yu, Hong-Mei Luo, Qiong Wu, Chun-Fang Li, André Steinmetz. Conservation and sustainable use of medicinal plants: problems, progress, and prospects. Chin Med 2016; 11(37):1-10
5. WWF. Sustainable Harvest of Medicinal Plants in India. FRLHT. Februar 2007 (www.wwf.de/fileadmin/.../HG_Sustainable_Harvest_of_Medicinal_Plants_in_India.pd.)
6. www.shodhganga.inflibnet.ac.in/bitstream/10603/6813/11/11_chapter%203.pdf Dixit VK. Controversial ayurvedic herbs.J Adv Pharm Tech Res 2011;2:78-80.
7. Sharma. P.V. Dravya-Guna Vigyan. Vol. 5. Varanasi: Chaukhambha Bharati Academy, Reprint 2014.
8. Vaghela B, Soni H, Shukla L. A Concept of Herbal Pratinidhi Dravyas (Substitute drugs) In Ayurved.Pharmagene 2013;1(3):85-88
9. Pravin R. Joshi, Bhupesh R. Patel1, Vinay J. Shukla2. An overview on the substitution of drugs in Ayurveda and their evaluation methods. AYU. Oct-Dec. 2012; 33(4): 481-484
10. Poornima B, Adulteration and substitution in herbal drugs a critical analysis. IJRAP 2010; 1(1): 8-12.
11. Dr. Poonam. Adulteration of crude drugs burning problem. International Journal of Applied Research 2016; 2(2): 99-101
12. Pawan Kumar Sagar. Adulteration and Substitution in Endangered, ASU Herbal Medicinal Plants of India, their Legal Status, Scientific Screening of Active Phytochemical Constituents. IJPSR, 2014; Vol. 5(9): 4023-4039
13. Mitra S K, Kannan R. A Note on Unintentional Adulterations in Ayurvedic Herbs. Ethnobotanical Leaflets 2007; 11: 11-15. (https://www.researchgate.net/publication/27654557)
14. Om Prakash, Jyoti, Amit Kuma, Pavan Kuma, Niranjan Kumar Manna. Adulteration and Substitution in Indian Medicinal Plants: An Overview. Journal of Medicinal Plants 2013;1(4): 127-132
15. Sharma PC, Yelne MB, Dennis TJ. Editors. Database on Medicinal Plants used in Ayurveda, Vol 1. New Delhi: Central

Council for Research in Ayurveda and Siddha, Reprint 2002

16. Sharma PC, Yelne MB, Dennis TJ. Editors. Database on Medicinal Plants used in Ayurveda, Vol 2. New Delhi: Central Council for Research in Ayurveda and Siddha, Reprint 2005.
17. Bhava Mishra. Bhavaprakash Nighantu,Vidyotini Hindi Commentary, Mishraka Varga, 6th Chapter, shloka no.138-168.Mishra B, Shankar.editor. 10th edition. Vol.1, Varanasi: Chaukhamba Sanskrit sansthan 2002.pp. 181-183
18. Anonymous. Yogratnakar, Vidyotini Hindi commentary, Shri Lakshmipati Shastri Commentator. Brahmashankar Shastri. editor.Reprint, 2015, pp. 171
19. Shastri Ambikadatta "Baishajya Ratnavali" 18th Edition. Varanasi: Chaukhambha Sanskrit Sansthan 2005.
20. Prachi A. Khaire, Prashant B. Nandwate. Substitutes for Ayurvedic medicinal herbs: A Review. International Journal of Recent and Futuristic Ayurveda Science 2017; 2 (1): 107-114

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