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Review Article

Pratinidhi dravya and its adaptation in current scenario - A bird's eye view

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In the current situation endangered plant list is increasing gradually thus implementation of pratinidhi dravya may be the right option. The pharmacopeial or extra pharmacopeial drug should be assessed on the basic fundamentals of dravyguna like rasa, virya, vipaka etc.as well as resemblance, regional substitution on the basis of synonym, homonym, pharmacological and clinical trials. This will enrich the current practices of pratinidhi dravya in Ayurvedic science.

Key words : Pratinidhi dravya

According to the world health organization (WHO) reports about 4 billion people of the world presently use herbal medicines for their primary health care as alternative system of medicine i.e. *Ayurvedic, Homeopathic, Naturopathic, Oriental and Native American Indian medicine*.[5]

In view of the phenomenal increase in demand of herbal drugs, the concerned medicinal plants have been indiscriminately over exploited leading to scarcity or endangerment of many valuable plant species. In India more than 90% plant species used by industry are collected from wild and over 60% of the collection involve destructive harvesting. According to an estimate over half a million tonnes of the raw materials are indiscriminately collected from wild, mostly following destructive harvesting procedure and thus about 165,700 hectares forest being clear-felled each year. Hence alarming situations have resulted into short supply, high prices, forced import, or substitution and adulteration in crude drugs.[5]

Pratinidhi dravyas are encountered in Ayurvedic classics as in case of non-availability of any particular drug in the preparation of a compound one should try to get another similarly potent drug having similar *Rasa, Guna, Veerya, Vipaka* and *Karma*.[2] It is evident from literature that considerable interest is being shown in medicinal plants, commonly use in the indigenous systems of medicine and finding the Indian substitutes of standard drugs for removing adulterants. This may also help to check the adulteration and import of some costlier drugs for which substitutes are available in our country. By utilizing substitutes, pressure on a single and rarely found drug will be lesser. The broad aspect of substitution can be understand by regional availably with aspect of synonym homonym, local ethenobotanical uses of medicinal plant, pharmacological action and lastly it should be tried on the comparative or parallel clinical trials.

Considering all the facts and facets researches highlighted regarding the substitution done in I.P.G.T. & R.A.GAU, Jamnager. Here a noble attempt is made to enrich the concept of substitution towards a ray of hope in Ayurvedic research.

Aims and objectives-

Approaches or rationality behind the selection of the Pratinidi dravya (substitutes) are taken into consideration by compiling the research work on the substitution carried out in Dravyaguna Department I.P.G.T.& R.A. GAU, Jamnagar.

Researches carried out with special reference to substitutes and the approaches regarding its adoptation[1]-

Tilaparni (*Cleome viscosa* Linn.) and Ajagandha(*Gynandropsis gynandra* Linn.)[6]

Ajagandha and Tilaparni are two different plants according to Caraka. *Cleome viscosa* Linn. and *Gynandropsis gynandra* Linn. are different from the classical plants Suvarcala, Brahmasuvarcala and Aditybhakta.Gynandropsis appears more nearer to Ajagandha of Caraka and Cleome nearer to Tilaparni. Both the plants belong to the same family Capparidaceae. Though therapeutically both the plants have some similarity, pharmacognostically they are different from each other. As both the plants had more water soluble extractive these should be administered in wet form or in Kwath, Phanta or Hima Kalpana.In TLC both the plants show some different separation pattern indicating separate identity as well as different chemical nature. Pharmacologically both the plants have histamine potentiating activity. Cleome is more potent than Gynandropsis. Both the plants failed to modulate immunomodulation, anti-inflammatory and analgesic activity at significant level.

In the clinical study both the groups shown better results while comparing between the groups Group B shows better result as compared to that of Group A. No adverse effects were found in both the treated groups. Both the plants useful in Vicarcika of Kapha dominancy. On the basis of above study it can be concluded that Cleome is more effective to treat Vicarcika as compared to Gynandropsis. Gynandropsis can be taken as Ajagandha of Caraka and Cleome can be taken as Tilaparni. Further these plants should be studied on different clinical conditions told in the classics to support the finding.

Shweta Chitraka (*Plumbago zeylanica* Linn.) And Rakta Chitraka (*Plumbago rosea* Linn.)[9]

Both varieties of Chitraka have same taste and texture. Both have irritant odour but comparatively Shweta Chitraka is less irritant than Rakta Chitraka.Rakta Chitraka is enriched with more proportion of inorganic salts, inorganic components and chemical constituents than Shweta Chitraka. Both drug showed presence of tannins, triterpenoids, carbohydrates, alkaloids and anthraquinones chemically. % of total alkaloids is found to be maximum in one time Shodhit Rakta Chitraka. Plumbagin is active principle present in both plants which possess highly cytotoxic and irritant potential. The HPTLC study showed the percentage of active principles; Plumbagin is maximum in Ashodhit Rakta Chitraka which reduces after the process of Shodhana. No significant difference is found in the loss of Plumbagin after one and two times Shodhana process. Shodhit lime water shows the presence of Plumbagin.

Both the Chitraka corrects imbalanced Agni by their Deepan and Pachan properties and this was the chief cause for the alleviation in the symptoms like increased size of pile mass, Gudapeeda, Vibandha and Bhaktaruchi.Both the varieties lower the systolic and diastolic blood pressure as well as the lymphocyte count. Both the drugs provided same results on statistical scale, however if Rakta Chitraka is to be used clinically as a single drug, extreme caution should be observed and it should be given at the lowest desired dose for short period only. On the basis of the literature study, for the Rasayana purpose only Rakta Chitraka should be used.

Shodhana of the Rakta Chitraka should be carried out for three consecutive days with lime water and the lime water should be changed everyday. The clinical use of both the types can be done at long time only with the vehicle of Takra because it lowers the toxic potential of Chitraka with its alkaline nature.

***Berberis aristata* D.C. and Berberis asiatica Roxb[11]. –**

The morphology of both plant vary in context of Leaves and Inflorescences. Microscopically also these two stem can be differentiated by difference in the architecture of Cork, cortex, medullary rays and presence of Rytidoma, prismatic crystal of calcium oxalate. Analytical study showed that the aqueous extract and berberine quantity is higher in the stem of *B. asiatica*. In pharmacological study the solidified aqueous extract of both species was compared, both have anti-hyperglycaemic action but *B.aristata* has higher magnitude, however both drug didn't showed hypoglycaemic in normal rats and Anti-diabetic action in alloxan induced diabetic rats. In clinical study significant relief was seen in chief complaints and reduction in postprandial sugar levels in both the groups was observed, however reduction in fasting blood sugar and change in biochemical parameters were insignificant.

Hastishundi (*Heliotropium indicum* Linn.) and *Heliotropium ovalifolium* Forsk[8] –

About 18 species available having resemblance to the Hastishundi. The two species selected here resemble each other to a great extent morphologically The pharmacological study brings us to conclusion that: Both drugs have mild anti- pyretic activity; however *H. ovalifolium* showed better Anti-pyretic activity after 24hrs. Both test drugs are having almost similar pharmacological activities; hence *H.ovalifolium* may be used in place of *H.indicum* in its non availability. The culture sensitivity test of the Throat swab of the patients revealed the resistance to the group of antibiotics while the test drug was found to be sensitive to the Micro-organisms. The disease Tundikeri has Tridosha involvement but the predominance of Kapha is clearly visible.

The failure of antibiotics to mitigate the disease demands the need of an Ayurvedic approach towards the menace. The drugs *H. indicum* and *H.ovalifolium*, both have shown statistically highly significant results confirming the pharmacological findings which recommend the use of any of the two in the treatment of Tundikeri.

Brihati (*Solanum indicum* Linn.) and its substitutes[7] -

Drug Brihati is found rare drug. *Solanum torvum* Swartz is considered as Sweta Brihati. On the basis of synonyms of Brihati, these all five varieties can be consider as Brihati. Valli or Lata synonyms are similar with *Solanum trilobatum* Linn.*Solanum dubium* Fresen. having more alkaloid content as compared to others. TLC profile shows very similar when developed with concept of Alkaloid. Taking in to consideration the overall activity profile generated during the study it can be suggested that from both Sothahara and Kashahara point of view *Solanum incanum* is equi-effective to *Solanum indicum*. If the requirement is for kashahara all the substitutes are equally effective like the original source plant *S. indicum*. As has already been mentioned Brihati is frequently not used as single plant in therapeutics it is normally used as component of the renowned Dasamoolarista. Hence, for effective comparison it is ideal to prepare five samples of Dasamoolarista with the above five source plants and evaluate them for anti-inflammatory, diuretic and antitussive activities. The present study can be considered as first endeavor for the above requirement.

Shaliparni [*Desmodium gangeticum* DC.] and other four species of *Desmodium genus*[4]

There is no reference regarding Shaliparni during in any of the Vedic literatures but the named "ANSHUMATI" is mention in Atharvaveda. Shaliparni is considered as *Desmodium gangeticum* DC. (API Part 1 Vol. 3), Shaliparni is comes under list of rare drugs. Now a day few Desmodium species, which are having morphologically similar characters are using on the name of Shaliparni. Which are *Desmodium repandum* DC. *Desmodium lexiflorum* DC. *Desmodium diffusum* DC. and *Desmodium triflorum* DC.Very minute differences between these five Desmodium species. Regarding the type of Shaliparni there is no clear-cut reference by any Acharya but Acharya Bhavmishra mention Shaliparni (*Desmodium gangaticum* DC.) in Guducyadi varga with Triparni synonym. Triparni is indicate that in ancient time trifoliate leaves plant is also used like Shaliparni(*Desmodium gangaticum* DC.) or its other species of Shaliparni(*Desmodium gangaticum* DC.) which grow around their place. Some most famous synonyms of Shaliparni indicates there Morphological character. The name Shaliparni indicates its resemblance with the leaf of shalidhanya`s leaf. Dirghapatra indicates the elongated or long leaf. Vreehiparni indicates that the leaf is like Vreehidhanya`s leaf. Dirdhmoola indicates that the root of Shaliparni is very long. Some most famous synonyms of Shaliparni indicates there Action. Vataghni indicates that it act as Vataghna. Pitta indicates that it act as pittahara karma. Shothaghni indicates that it act as Shothahara. Somya indicates that it has not Ushana property. Dhruva indicates that it decreased any roga.In Pharmacognostical study microscopically no more other differentiating characters were observed in *Desmodium gangaticum* DC. in comparison to other Desmodium species.

The *Desmodium lexifloram* DC. and *Desmodium trifloram* DC. having high alkaloid content in compare to Desmodium gangaticum DC. The pH of given five samples are almost same. Flavonoids, Steroids and Alkaloids are present in all five Desmodium species, while Tannins are not present in all five Desmodium species. TLC profile shows very similar when developed with concept of Alkaloid. Taking in to consideration the overall activity profile generated during the study it can be suggested that from both Sothahara and Kashahara point of view Desmodium lexiflorum DC. which has better anti-cough and moderate diuretic and sodium excretion properties can be considered for substitution in the absence of Desmodium gangaticum DC., Desmodium diffusam DC. and Desmodium trifloram DC. can be considered as the other species. If the cough suppression is the main objective then all the four species can be considered for substitution with Desmodium lexiflorum DC. being the best followed by Desmodium repandum DC.

***Prishniparni* (*Uraria picta* Desv.) and *Alysicarpus longifolius* W. & A. Prodr.[3]**

With the advancement of time, the increasing references regarding *pratinidhi dravyas* are themselves a proof of worsening scenario of paucity of genuine drugs. Extra pharmacopoeial drugs which are in folklore practice are to be brought in the mainstream. *Prishniparni* (*Uraria picta* Desv.) is vulnerable species. *Uraria picta* and *Alysicarpus longifolius* are locally known as *Samervo* in Saurashtra region (Gujarat).

Both *Uraria picta* Desv. and *Alysicarpus longifolius* W. & A. Prodr. belong to same family i.e. Fabaceae.Morphological characters like leaves, stems, roots and inflorescence of *Uraria picta* Desv. and *Alysicarpus longifolius* W. & A. Prodr. are similar in structure. Midrib portion of leaves show white stripes in both the species. Both the species show similarity in their microscopical characters of root such as cortex, phloem, xylem, prismatic crystals of calcium oxalate and yellowish brown content.

Differentiating key characters of both species are medullary rays and starch grains. *Uraria picta* shows bi-multiseriate medullary rays and starch grains without hilum. *Alysicarpus longifolius* shows uni-multiseriate medullary rays and starch grains with hilum. *Uraria picta* and *Alysicarpus longifolius* possess *Madhura, Tikta* and *Kashaya rasa. Alysicarpus longifolius* is having mild anti-inflammatory activity. *Uraria picta* is having mild *pachana* activity. Both the drugs are not having *deepana* activity.

The concept of pratinidhi dravya mentioned in Ayurveda is having scientific base. The term substitution/alteration in terms of pharmacognosy mentioned for pratinidhi dravya gives only superficial meaning. As it is already mentioned substitution as one type of Adulteration in modern cognosy. Here we like to coat the reference of Dr.Sunita garg in her book '**Substitutes and Adulterant'** where she mentioned substitutes sometimes having greater result as that of actual drug. E.g. The rhizomes of Costus specious (Koen.)Sm.recognised as Kebuka are also sometimes sold for use in the name of Langali.It's action on uterus has also been found to be nearly similar but also powerful to that of Langali.[10]

As the chitraka and rakta chitraka are from the same species might have a same result. Chemical composition of both the drugs having plumbagin so these drugs are using substitutes for one another. Further in the book of Vanspatishastra by Jaykrishna Indraji suggest Vogelia sp. as substitute for chitraka in Saurastra region.

In some region there is availability of brihati and in some Kantakari.In Ayurvedic classics Brihati dwaya i.e. Kantakari and Brihiti is mentioned where as in Rajanighantu there are many varites are mentioned thus on the basis of regional availability the brihati or kantakari one has been taken into consideration. Other species like *Solanum incanum* etc. also taken in to consideration with respect to availability to substitute the plants like Bhrihati which is now a rare plant.

Endangered plants list is increased day by day like Shaliparni and Prishnaparni so these plants requires alternative source. Thus Desmodium laxiflorum and Desmodium triflorum can be taken as alternative source.

In Saurastra region sameravo is known for prishniparni and ubhosamareho for Alsycarpous longifolous thus regional substitutes can be considered on the basis of synonyms and homonyms.

Rather than exploitation of the whole drug the easily available parts of the same plants may be used to enrich the introduction of *pratinidh dravya.* As the classics suggest that the whole plant and other plant parts posses same qualities with only exclusion of some species like Patola etc. Thus in this context rather than using of root of kantakari one can use its panchanga. In case of unavailability of Gokshura-Tribulus teristris; Bada Gokshura pedalum murex can be used which acts as anabolic and diuretic.

Conclusion

Ayurvedic concept based Substitution differ the views of current botanical concept. The drugs should be assessed on the basis of their gunakarma and further they should be evaluated. Regional substitution is need of hour on the basis of synonym, homonym and its local usage (ethenomedicinal use.)

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References

1. Bagel M.S. 2005, Researches in Ayurveda, Mridu ayurvedic publication and sales, jamnagar, 2nd edition pp.22-28
2. Bhavamishra, 2007, Bhavaprakasha with 'Vidyotini' Hindi commentary, Part 1, edited by Brahmashankara Mishra and Rupalalaji Vaishya, Ed. 11th, Chaukhambha Sanskrit Bhawan, Varanasi, , Purvakhanda 6/165-167;pp 183.
3. Bhavesh patil, 2011,A comparative appraisal of *Prishniparni* (*Uraria picta* Desv.) and *Alysicarpus longifolius* W. & A. Prodr. w. s. r. to their pharmacognostical, physicochemical and pharmacological profiles.
4. Bhavesh Vaghela, 2010, A comparative study of *Shaliparni* [*Desmodium gangeticum* DC.] and other four species of *Desmodium* genus w.s.r. to its Pharmacognostical, Physicochemical and Pharmacological profile" Bhavesh Vaghela
5. Kalia A.N. 2005, Textbook of Industrial pharmacognosy CBS publishers & Distributors Pvt.Ltd. 1st edition New Delhi, India pp10,12
6. Kamble Sharavati, 2003**,** Comparative study of Cleome viscosa Linn. and Gynandropsis gynandra Linn. (Ajagandha) with special reference to Kustha.
7. Kotak neha, 2009, A comparative appraisal of Brihati (*Solanum indicum* linn.) And its substitutes w.s.r. To its pharmacognostical physicochemical and pharmacological profile.
8. Paswan Ram babu, 2007, Pharmacognostic, phytochemical and pharmacological studies on hastishundi (heliotropium indicum Linn.) And allied species heliotropium ovalifolium forsk. And their effect on tundikeri(tonsillitis)
9. Patel kalpesh 2005,A comparative study of Shveta-Chitraka (Plambago zeylanica) and Rakta-Chitraka (Plumbago rosea) w.r.to their shushka arshoghna karma.
10. Thakur balvant singh, 1999,Chunaker K.C. Glossary of vegetable drugs in Brhattrayi, Chaukahamba amar bharati prakshan Varansi, 2nd edition, pp.349
11. Upadhaya ganesh, 2005, A comparative study of Berberis aristata DC and Berberis asiatica Roxb.ex DC (Daruharidra) w.s.r. to kushta.