Review Article
www.ijrap.net

EXPLORING THE CONCEPT OF VACHA (*ACORUS CALAMUS* LINN.) SHODHANA IN AYURVEDA

Bhat Savitha D[1]*, BK Ashok[2], Acharya Rabinarayan[3]
[1]Lecturer, Department of Dravyaguna, Muniyal Institute of Ayurveda Medical Sciences, Manipal, Karnataka, India
[2]Research Assistant, Pharmacology laboratory, IPGT & RA, Gujarat Ayurved University, Jamnagar, India
[3]Associate Professor, Department of Dravyaguna, IPGT & RA, Gujarat Ayurved University, Jamnagar, India

Received on: 06/03/12 Revised on: 11/04/12 Accepted on: 09/05/12

***Corresponding author**
Dr. Savitha Bhat, Lecturer, Department of Dravyaguna, Muniyal Institute of Ayurveda Medical Sciences, Manipal, Karnataka, India

ABSTRACT
Ayurveda advocates Shodhana (Purificatory procedures) for poisonous substances to render it safe and effective for therapeutics. But mentioning of Shodhana for a non poisonous plant like Vacha is a matter of great curiosity with regards to the purpose of Shodhana. In this review an attempt has been made to analyse the concept and relevance of Vacha Shodhana in view of both classical and modern thoughts.
Keywords: Shodhana, Vacha, Carcinogenic, Chakradatta, Purification.

INTRODUCTION

Vacha (*Acorus calamus* Linn.), an indigenous drug of India belongs to family Acoraceae. It is delineated under various therapeutical groups like 'Lekhaneeya', 'Triptighna', 'Arshoghna dashemani' etc., by Acharya Charaka[1], 'Pippalyadi', 'Vachadi' etc., ganas by Acharya Sushruta[2] and 'Mustadi', 'Vatsakadi'etc., gana by Vagbhata[3]. The pharmacognostical characters of Vacha are described through various synonyms like 'Shadgrantha' (Having six nodes), 'Ugragandha' (Having strong aroma), 'Lomasha' (Having small hairs), 'Golomi' (Having small hairs like cow) etc. It has important pharmacological properties like Deepana (Appetizer), Pachana (Digestive), Vamaka (Emetic), Medhya (brain tonic), Kanthya (Good for throat), Sanjnasthapana (Restores lost conciousness), Vedanasthapana (Anodyne) etc., and hence used extensively in therapeutics[4-6]. Classics like Chakradatta and Bhaishajya Ratnavali have given emphasis on Shodana (purification process) of Vacha using different media like Gomutra (Cow's urine), Mundi Kwatha (Decoction of *Sphaeranthus indicus* Linn), Gandhodaka (Decoction of six aromatic herbs) etc[7, 8]. Some folklore traditions of Karnataka and Kerala also practise Vacha Shodhana through Goksheera (Cow's milk) and Mastu (Curd whey) respectively. The concept of Shodhana for Vacha is further supported by the references from Ayurvedic Pharmacopeia of India and Herb directory of Indian System of Medicine and Homeopathy, that it should be used after Shodhana for therapeutics[9, 10].

Concept of Shodhana

The Shodhana concept is prevalent in two contexts, be it the human body or a dravya, it literally refers to 'Purification' or 'to purify'[11]. Shodhana for the body refers to removal of excess and vitiated doshas through different routes of the body. Similarly Shodhana of a dravya refers to removal of unwanted properties or impurities from a substance through different pharmaceutical procedures[12]. There are references in Charaka Samhita where Shuddhi (purification) of Dhatu and Ratnas are carried out using hairbrush, washing with water and cloth which indicate that procedures involving cleaning and processing also mean Shodhana[13].

Shodhana procedures have been advocated for both herbal as well as mineral drugs based on their toxic nature. Poisonous plants like Vatsanabha (*Aconitum ferox* Wall.), Kupilu (*Strychnos nux-vomica* Linn.) etc are effectively used for medicinal purpose after passing through a series of purification (Shodhana)[14]. The classical quotes also reveal that Shodhana not only refers to purification procedures but also to different samskaras through which there is 'gunaantardhana' (transformation in properties) in the primary substance rendering it safe as well as many desired qualities are imbibed in it[15]. For example, Shodhita Guggulu (*Commiphora mukul* Engl.) was found to be more effective than Ashodhita Guggulu in inhibiting the spasms induced by acetylcholine in experimental models[16]. Studies have shown that Shodhana can reverse the pharmacological actions of a drug by altering its phytoconstituents. The raw Kupilu seeds showed convulsions in experimental animals while convulsions were absent in animals administered with Ksheera Shodhita Kupilu[17]. It is true in case of Vatsanabha also where Shodhita Vatsanabha (aconite detoxified in cow's urine) is converted into cardiac stimulant, whereas crude Vatsanabha is claimed to be cardiac depressant[18]. Hence the ultimate objective of the Shodhana process is to increase the biological availability of the drug further potentiating the biological efficacy.

Shodhana in Modern Perspective

Though there is no clear concept of Shodhana found in modern pharmacy, certain procedures are adapted to detoxify or to modify the quality as well as the quantity of the phyto constituent. Various methods like sifting, elutriation, lixiviation, acidification, precipitation, alkalization etc are adopted. With column chromatography the required percentage of phyto constituent could be achieved and thereafter, the drug can be used as medicine. Recent advances in analytical techniques such as spectroscopy, electron microscopy, crystallography etc. can provide useful information about structural as well as compositional change in the raw

material during the different steps of Shodhana and its end product[19, 20].

Importance of Media in Shodhana

It is an amazing fact that even in olden days; classical texts have advocated particular media for each herb to be converted into a potent therapeutic agent without the aid of analytical or spectroscopic methods. Most of the toxic constituents are said to be transferred when the drug is processed in a particular media. It is also evident in the recent researches that toxic alkaloids like Scopalamine and Hyosciamine in Dattura (*Datura metel* Linn.) were transferred to the milk (taken as a media) thereby rendering it safe[21]. Similarly Triphala kwatha Shodhita Guggulu showed better antispasmodic activity than distilled water Shodhita Guggulu[14]. In another experimental study, better antimicrobial activity was observed in Kanji Shodhita Gunja seeds than other media[22]. For drugs like Vatsanabha, Kupilu and Bhallataka (*Semecarpus anacardium* Linn.) a number of media have been used for purification indicating that particular media were selected so as to obtain a desired pharmacological action[23].

Need of Vacha Shodhana

Shodhana has also been advocated for certain plants and plant materials even though they do not come under the classical Visha varga (group of poisonous drugs). Some of them are Vacha, Hingu (*Ferula narthex* Linn.), Lashuna (*Allium sativum* Linn.) and Haridra (*Curcuma longa* Linn.)[24]. References pertaining to Shodhana of these dravyas are not mentioned in Brihatrayees (Foremost classical texts like Charaka Samhita, Sushruta Samhita and Ashtangasangraha) leading to a debatable question whether Shodhana is required or not for these commonly utilized, rather safe drugs.

Even though *Acorus calamus* Linn. is used extensively in Indian medicine, U.S food and Drug administration has considered it to be unsafe for human consumption since 1968, based upon cancerous tumours found in laboratory animals when treated with β-asarone - an active constituent of the plant[25, 26]. Also, some adverse effects like disturbed digestion, gastroenteritis, persistent constipation followed by diarrhoea and passage of blood into the faeces were observed in some studies[27]. In 1981, Joint FAO/WHO Expert Committee on Food Additives evaluated β-asarone and did not establish an acceptable daily intake but recommended that calamus oil used in food should contain lowest possible amount of β-asarone. Scientific Committee on Food evaluated beta asarone in 2001 and concluded that beta asarone has a weak carcinogenic effect but did not rule out the possibility of genotoxicity[28, 29]. The Council of Europe Committee of Experts on Flavouring substances recommended limits of β-asarone as 0.1mg/kg in foods and beverages with the exceptions of 1mg/kg in Alcoholic beverages containing *Acorus calamus*[30]. European Medicines Agency has suggested an exposure limit of 115 µg/day (2 µg/kg bw/day) for β-asarone in herbal medicinal products[29]. In view of the toxicity of β-asarone, attempts are being done to reduce its concentration in herbal medicinal products to a minimum extent and diploid varieties like American diploid variety of calamus without β-asarone is always preferred for therapeutics and other industries[31, 32].

Methods of Vacha Shodhana

Shodhana for Vacha has been mentioned in Chakradatta for the first time and later in Bhaishajya Ratnavali. As per the classical reference, the rhizomes are to be boiled successively in Gomutra (Cow's urine), Alambusha and Panchapallava kwatha followed by bashpa swedana (fomentation) using Surabhitoya[33].

As per the views of commentator Shri Nischalakara of Ratnaprabha commentary for Chakradatta, Alambusha is considered as Mundi and Surabhitoya as Gandhodaka. A detail method for preparation of Gandhodaka is also described in the same chapter. Several herbs like Twakpatri (*Cinnamomum zeylanicum* Breyn.), Patraka (*Cinnamomum tamala* N.), Ushira (*Vetiveria zizanoides* Linn.), Musta (*Cyperus rotundus* Linn,) and Balamula (*Sida cordifolia* Linn.) are taken in the amount of 25 pala (1250g) each. Kushta (*Saussurea lappa* C. B. Clarke.) is taken in the amount of ardhapala (612g). They are boiled in 25 prastha (18.750litres) of water and reduced to half to obtain Gandhodaka[34].

Other than classical methods of Shodhana, there are certain folklore methods practised in states like Karnataka and Kerala. In Sirsi taluk of Uttara Kannada district in Karnataka, Vacha rhizomes are soaked in appropriate amount of Cow's milk for overnight, then washed in warm water and dried in sun. A similar method is followed in Ottappalam (Kottayam) of Palakkad district, Kerala state where Vacha is soaked in Dadhi mastu for overnight, then washed in warm water and dried in sun.

DISCUSSION

Vacha was known to mankind before 3000 years and its growing popularity by the passing years is evident by the fact that there are numerous therapeutic utilities involving the drug[35]. This popularity was tainted in European countries because of some carcinogenicity reports in experimental animals due to administration of an isolated compound called β-asarone and ban on Vacha henceforth[25]. However, it was revised by several committees but none of them ruled out the possibility of carcinogenic and genotoxic potential of β-asarone[28, 29].

In India, the scenario is different; Vacha is frequently used in clinical practice without any reports of adverse effects or toxicity. It is commonly used in the form of powder and occasionally decoction. The herb is composed of several active principles with divergent pharmacological activities. There is possibility that these principles act in a synchronized fashion and exert a cumulative beneficiary effect on the human system. But the isolated constituents of the plant drug may not give the same clinical response as the crude preparation of that plant drug. Very often, they produce side effects. For example, ephedrine an isolated herbal constituent has the well-known side-effect of speeding up the heart rate, but the whole plant *Ephedra sinica* Staph. does not has this effect as, apart from ephedrine, it contains other alkaloids that slows down the heart rate. Also toxicity could largely be due to misidentification and overdosing of certain constituents[36].

In case of Apasmara (Epilepsy), it is advised to take Vacha for a longer duration of time indicating that prolonged administration may not cause adverse effects[37].

Also, Vacha Shodhana has not been noted in Brihatrayees (1500BC-550AD) but was mentioned for the first time in Chakradatta (11th century), a text devoted to therapeutic formulations, whereas it is also observed that many texts or Nighantus (Material medica) concerned with the drug profile have not reported its contraindications or Shodhana. These facts make us to assume that intension of Acharyas behind explaining the Shodhana methods, probably were meant to reduce any toxicity observed when Vacha was given for a long time or some other plant having toxicity potential was being used in the name of Vacha during that period. It is also possible that Shodhana was intended to reduce the Teekshnata (Sharp/irritant nature) of the drug so that it can be administered safely in children or was aimed to increase its potency without increasing the dose because increase in the dose of Vacha will cause emesis[38].

Most of the ingredients used in Shodhana have similar properties that of Vacha. Gomutra has been proved to be anti cancerous[39] and using it as one of the media might restrict the chances of carcinogenicity if any. Mundi, well known for its Mutrala (diuretic), Shothahara (reducing oedema) and Medhya properties[40], may potentiate Vacha further. Panchapallava is used in the Kshalana (washing/cleaning) of Gandha dravya (aromatic herbs) which can be considered as a type of Shodhana. These Gandha dravyas have Vacha as ingredient[41] and hence it's cleaning or processing done by Panchapallava kwatha suggests that Panchapallava is capable of doing Shodhana of Vacha as a single entity. Gandhodaka contains most of the drugs which are aromatic and having essential oils. Bashpa swedana with Gandhodaka might be aimed to imbibe certain essential oil components into the drug which might have been lost after Shodhana. The Gandhodaka also contain herbs like Bala and Musta which are vatahara further potentiating vatahara karmas of Vacha[42].

The reason to select milk as one of the media by the folklore practitioners might be that, Vacha is administered to children for improving speech and milk is compatible to most of the children since birth. Mastu, another media of Shodhana, has been used as an ingredient along with Vacha in several yogas indicating its compatible nature when mixed with Vacha[43]. This also shows that folklore method of Shodhana which involves both Mastu and Vacha may not produce any adverse effects when combined. Also Mastu is Kaphavatahara[44, 45] which further potentiates the action of Vacha.

CONCLUSION

Shodhana for Vacha seems to be an uncommon procedure in the Ayurvedic armamentarium because of its only reference in Chakradatta. Also lack of therapeutic indications particularly for Shodhita Vacha makes us to assume that Shodhana was not particularly intended to reduce the toxicity, but alter its pharmacological activity desirably. Since there is lack of reported data suggesting the methods for Shodhana of Vacha or its outcome, it can be considered as one of the essential subject to be scientifically evaluated through modern parameters and clinical trials to establish these facts.

REFERENCES

1. Agnivesha. Charaka Samhita. Part I. In: Kashinatha Shastry & Gorakhanatha Chaturvedi (ed.). Varanasi: Chaukambha Bharati Academy; 2001. p. 72, 80, 81, 83, 94 and 791.
2. Sushruta. Sushruta Samhita. Part I. In: Kaviraja Ambikadatta Shastri (ed.). Varanasi: Chaukhambha Sanskrit Sansthan; 2002. p. 143, 145 and 147.
3. Vagbhata. Ashtanga Samgraha. In: Kaviraja Atrideva (ed.). Varanasi: Chaukhambha Krishnadas Academy; 2005. p. 140,138 and 139.
4. Bhavamishra. Bhavaprakasha nighantu, Hareetakyadi varga/103. In: G. S. Pandey (ed.). Varanasi: Chaukhambha Bharati Academy; 2006. p. 43-45.
5. Dhanvantari nighantu. Shatapushpadi varga/7-8. In: Sharma PV. (ed.). Varanasi: Chaukhambha Orientalia; 2005. p. 71.
6. Kaiyadeva. Kaiyadeva nighantu. Oushadhi varga/1215-1217. In: Sharma PV (ed.). Varanasi: Chaukhambha Orientalia; 2001. p. 224-225.
7. Chakrapanidatta. Chakradatta. In: Ramanath Dwivedi (ed.). Varanasi: Chaukamba Sanskrit Samsthan; 2005. p. 155.
8. Govind Das. Bhaishajya Ratnavali. In: Brahmashankar Mishra (ed.). Varanasi: Chaukhambha Surabharati Prakashan; 2008. p. 570.
9. Anonymous. The Ayurvedic pharmacopoeia of India, Part I, Vol 2nd. 1st edition. New Delhi: Ministry of health and family welfare, Govt of India; 1999. p. 168-170.
10. Anonymous. Herb directory, Annual Report: Department of ISM & H. 1998; 1(X): 18-25.
11. Sir Monier Monier-Williams. A Sanskrit English dictionary. Amen house, London: Oxford university press; 2008. p. 1118.
12. Sadananda Sharma. Rasatarangini 2/42. In: Kashinath Shastri (ed.). Delhi: Motilal Banarasidas; 2000. p. 735.
13. Agnivesha. Charaka Samhita, Sutrasthana 5/18. In: Kashinatha Shastry & Gorakhanatha Chaturvedi (ed.). Varanasi: Chaukambha Bharati Academy; 2001. p. 114.
14. Anjana Chaube, Prajapati PK., Dixit SK. On the Technique of Shodhana. Ancient Science of Life 1996; 16(1): 67-73.
15. Agnivesha. Charaka Samhita, Vimanasthana 1/22. In: Kashinatha Shastry & Gorakhanatha Chaturvedi (ed.). Varanasi: Chaukambha Bharati Academy; 2001. p. 680.
16. Rachana Kamble, Sadhana Sathaye and Shah DP. Evaluation of antispasmodic activity of different Shodhit guggulu using different shodhan process. IJPS, May-June 2008; 368 -372.
17. Alex Hankey and Geetha Krishnanan. Ayurveda news from Europe, News and Comments. Journal of Ayurveda and Integrative Medicine, April 2010; 1(2):161-167.
18. Prasanta Kumar Sarkar. Evaluation of Shodhana process and antidotal study on Vatsanabha. Ph.D. thesis submitted to I.P.G.T and R.A, Gujarat Ayurveda University, Jamnagar. 2008.
19. Sastry JLN. Dravyaguna Vijnana, Part I. Varanasi: Chaukhamba orientalia; 2001. p. 327.
20. Pankaj Rai, Vikas M. Gupta, Richa Pathak, Laxmi Narayan Gupt, Neeraj Kumar and Singh RS. Importance of Media in the Pharmaceutical Processing of Metals and Minerals Scanning - Electron Microscopy Study and Energy Dispersive X ray Analysis Of Abhraka (Biotite). Int J Pharm Pharm Sci, 2010; 2(4): 121-126.
21. Patel Yogesh, Bhat Savitha D., Acharya Rabinarayan, Ashok BK., Shukla VJ. Role of Shodhana on Analytical parameters of *Datura innoxia* Mill and *Datura metel* Linn seeds, IJRAP 2010; 1(2):249-254.
22. Sudipta Roy. A comparative phytopharmacognostical and antimicrobial evaluation of raw and Shodhita Gunja (Abrus precatorius Linn.) seeds. M. Pharm thesis submitted to Gujarat Ayurveda University, Jamnagar. 2012.
23. Ilanchezhian R., Roshy Joseph C., Rabinarayan Acharya. Importance of media in Shodhana (purification / processing) of poisonous herbal drugs. Ancient science of life 2010; 30(2): 54-57.
24. Ramnarayan Vaidya. Ayurveda Sara Sangraha, 12th edition. Baidyanath Ayurved Bhavan, Jhansi.1982; 237-240.
25. United state food and drug administration, Code of Federal Regulations, 3(1): 2010; 21.
26. Gianfranco Patri and Silano V. Plants in Cosmetics: Potentially Harmful Components. Committee of Experts on Cosmetic products, Council of Europe publishing, F67075, Strasburg codex, September, 3: 2006; 15-17.
27. Pammel LH. A manual of poisonous plants, 1911. In: Timothy J. Motley. The ethno-botany of Sweet Flag, *Acorus calamus* (Araceae), Economic Botany, 48(4): 1994; 397-412.

28. Anonymous. Evaluation of Medicines for Human use. European Medicines Agency/ HMPC/139215/2005. Accessed from http://www.emea.eu.int on 20.07.10.
29. Anonymous. Extracted Ratified Minutes, Complementary Medicines Evaluation Committee 49, Australian Government 2004; 01-12.
30. Beta-asarone WHO Food Additives Series 16, 09-21-10, accessed from http://www.inchem.org/documents/jecfa/jecmono/v16je04.htm.
31. Chu Chen, Daniela Spriano and Beat Meier. Reduction of β-asarone in Acori Rhizoma by Decoction. Planta Med 75: 2009; 1448-1452.
32. European Food Safety Authority; Compendium of botanicals that have been reported to contain toxic, addictive, psychotropic or other substances of concern on request of EFSA. EFSA Journal 2009; 7(9): 281. doi:10.2903/j.efsa.2009.281. Available online: www.efsa.europa.eu.
33. Govind Das. Bhaishajya Ratnavali, 19th edition. In: Brahmashankar Mishra (ed.). Varanasi: Chaukhambha Surabharati Prakashan; 2008. p. 570.
34. Chakrapanidatta. Chakradatta, Nischalakara's Ratnaprabha commentary. In, Sharma PV (ed.). Jaipur: Swami Jayaramdas Ramprakash Trust; 1993. p. 392.
35. Timothy J. Motley. The Ethnobotany of Sweet Flag, *Acorus calamus* (Araceae). Economic Botany 1994; 48(4): 397-412.
36. Giovanni Maciocia. Safety of Chinese herbal medicine. Buckinghamshire, United Kingdom: Su Wen Press; 1999. p. 13-14.
37. Vagbhata. Astanga Hridaya, Uttaratantra 7/34. In: Brahmanand Tripathi (ed.). Varanasi. Chaukhambha Sanskrit Pratishthan; 2003. p. 933.
38. Bhavamishra. Bhavaprakasha, Part II, 6/40. In: Brahmashankar Mishra (ed.). Varanasi: Chaukhambha Sanskrit Sansthan; 2000. p. 78.
39. Ambwani S. Molecular studies on apoptori in avian lymphocytes induced by perticides. PhD thesis submitted to Department of Biotechnology and Molecular Biology, College of Basic Sciences and Humanities, GBPAUT, Pantnagar, India. 2004.
40. Bhavamishra. Bhavaprakasha nighantu, Guduchyadi varga / 215-218. In: Pandey GS (ed.). Varanasi: Chaukhambha Bharati Academy; 2006. p. 413-414.
41. Govind Das. Bhaishajya Ratnavali, 26/301-304, 19th edition. In: Brahmashankar Mishra (ed.). Varanasi: Chaukhambha Surabharati Prakashan; 2008. p. 557.
42. Sharma PV. Dravyaguna Vijnana, Part II. Varanasi: Chaukhambha Bharati Academy; 2001. p. 250, 114, 370, 735 and 572.
43. Agnivesha. Charaka Samhita, Siddhisthana 7/18. In: Kashinatha Shastry & Gorakhanatha Chaturvedi (ed.). Varanasi: Chaukambha Bharati Academy; 2001. p. 1036.
44. Sushruta. Sushruta Samhita, Sutrasthana 45/81-82. In: Kaviraja Ambikadatta Shastri (ed.). 13th edition. Varanasi: Chaukhambha Sanskrit Sansthan; 2002. p. 175.
45. Pandit Narahari. Rajanighantu, Ksheeradi varga/53. In: Indrdeo Tripathy (ed.). Varanasi: Chowkhambha Krishnadas Academy; 2003. p. 514-515.