



USE OF KANTAKARI STEM AS A SUBSTITUTE OF KANTAKARI ROOT :A REVIEW

Ayurveda

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ABSTRACT

Kantkari widely used as main drug in many Ayurvedic preparations. It is found widely but its used part is root. While preparing the drug the whole plant is destroyed. Kantkari used as KASAHARA drug mainly. Currently the antitussive are the opioid preparations which have many side effects. In present era of civilization natural source of herbal raw material are on the verge of extinction. On the other hand consumption of herbal and natural product going higher and higher worldwide. So to meet the challenge at commercial exploitation and its globalization we must focus on alternative or substitute.

KEYWORDS

kantkari, substitute, pratinidhi dravya, pharmacognosy

INTRODUCTION

Ayurveda is Embodies of eternal science that provide the knowledge pertaining to life. It is a science and philosophy of life. *Ayurveda* deals with physical and mental health, essential for the enjoyment of worldly pleasure and attainment of internal and supreme happiness. *Ayurveda*, the science of life has emerged through adaptation of man with natural touch of healthy living. Basic principle of *Ayurveda* is to protect the health of the healthy person and curing the ailment of ailing. In the present era of civilization natural sources of herbal raw material are on verge of extinction due to overexploitation. On the other hand consumption of herbal and natural products going higher and higher worldwide. So to meet the challenge at commercial exploitation and its globalization we must focus on alternatives or substitutes. For that establishment of official substitutes of plant and plant part is need of hour. Since the availability of a genuine drug is very difficult because of adulteration. The proper identification of a drug is very essential to procure the desired drug. Introducing a new drug to any system of medicine requires proper identification.

'*Dashamoola*' is a combination of ten drugs which is advocated by the Acharyas for the treatment of all the three *doshas*. '*Dashamoola*' is being widely used in different *kalpanas* like *kwath*, *tail*, *ghrit*, *asava* etc. and through multiple administrations like *nasya*, *pana*, *basti*, *parisheka* etc. for different *nanatmaja* and *samanyaja vyadhi* of all the three *doshas*.

'*Dashamoola*' includes *Brihatpanchamoola* and *Laghupanchamoola*, its root part is used for the treatment. Because of wide use and having broad spectrum utilities, to get genuine raw material in adequate quantity is very difficult. In case of *Laghupanchamoola* roots are very small as the *Laghupanchamoola* plants are herb in nature. *Laghupanchamoola* includes *Shaliparni*, *Prishniparni*, *Kantkari*, *Brihati* and *Gokshura*. Out of these *kantkari* is a widely used and easily available herb. *Kantkari* is a potent medicinal plant which is also widely used in single drug therapy for different diseases.

In Charaka Samhita *kantkari* is mentioned in *Kanthyā*, *Hikkanigrahana*, *Kasahara*, *Shothahara*, *Sheetaprasamana*, *Angmadprashamana* (Ch.Su.4) and *Madhura-Skandha*².

In Sushruta Samhita *kantkari* is mentioned in *Brihatyadi*, *Varunadi* and *Laghupanchamoola Gana*³. In Bhavprakash Acharya Bhavamishra described two types *Shwetapushpi* and *Neelapushpi Kantakari* in *Guduchyadi Varga*. In present condition *Shwetapushpi Kantakari* is not available in many regions while *Neelapushpi Kantakari* is found widely. *Kantkari* is available widely but its part used is root. This means while preparing medicine whole plant is destroyed and only few part of the plant are used for medicine. According to classics, in *laghupanchamoola*, the *moola* of *kantkari* is used. While in other formulations *panchanga* is to be used. Generally in market whole plant i.e. *panchanga* of *kantkari* is sold instead of root.

Currently the antitussive are opioid preparations which have many

side effects like depression, addiction, constipation, mouth dryness, laziness etc.

Hence it is necessary to evaluate whether the *Stemkantkari* of the having same *guna*, *karma* in compare with *Root* or *Stem* of plant can be alternated of whole plant.

All the studies show good efficacy of *kantkari* in many formulation. Previously, some of the plants of *Dashmoolaviz*. *Brihati*, *Shaliparni*, *Prishniparni* have been evaluated for the substitution. But no work has been done to alternate plant part i.e. *Root* with *stem* of *kantkari* as per the knowledge of the scholar. Hence the present study has been carried out.

Because of overexploitation and environmental changes decline of vegetation takes place and subsequently scarcity of the plant parts, particularly roots arises. Root is the most used part of the plant and to obtain it, one has to destroy the whole plant which may cause the more decline of the medicinal plants. So, substitution of a particular plant as well as part used is need of hours, not only to overcome the scarcity of the medicinal plants but also to preserve it. For that, assessment of different parts of plant is very essential. As stated in '*Siddhabheshajmanimala*' 'It is evident from literature review that considerable interest is being shown in medicinal plants, commonly in use in the indigenous systems of medicine and on finding the Indian substitutes of standard drugs and also finding and 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. Detail description regarding *Pratinidhi dravyas* can be traced from *Bhavaprakasha*, *Yogaratanakara* and *Bhaishajya ratnavali*. Due to *kala parivartana*, many drugs come under the list of the rare drugs. In that condition we have to use the drug which has similar properties i.e. *Rasa*, *Veerya*, *Vipaka*, as of the main drug. Regarding the *Pratinidhi Dravya*, Acharya Bhavamishra mentioned in Mishra varga⁵.

Among the things enumerated so far and not mentioned here; if any drug is not available then any other drug which is similar to it in *Rasa*, *Veerya* and *Vipaka* should be selected by the physician and made use of it. The author of *Yogaratanakara* also states the same concept regarding the *Pratinidhi dravyas*.⁶

In the text *Bhaishajya Ratnavali*, it is clearly stated that the main drug in any formulation can not be substituted. The excess drugs in the formulation can be substituted by appropriate *Pratinidhi dravya*. If any of *Dashamoola* plant is not available then one can use another drug which has similar *Rasa*, *Veerya* and *Vipaka* to that particular drug.

Need For Substitution:

1. Non-availability of the drug: Ex: - Substitution for Ashtavarga dravyas.
2. Uncertain identity of the drug: Ex: - for the herb *Lakshmana* different species such as *Arlia quinquefolia*, *Ipomea sepiaria* etc are considered.

3. Cost of the drug: Ex: - Kumkuma being costly herb is substituted by Kusumbha
4. Geographical distribution of the drug: Ex:- As Rasna *plucia lanceolata* is used in Northern India while in southern parts. *Alpinia galanga* is considered as the source.
5. The adverse reaction of the drug: Ex:- Vasa is a well known Rakta-Pittahara drug, but due to its Abortifacient activity its utility in pregnant women is limited, instead drugs such as Laksha, Ashoka etc are substituted.

Criteria For Substitution:

Kadaachit dravyamekamvaa yoge yatra nalabhyate |
Tat tadgunayutam dravyam parivartena grihyate || (Oushada vignana)

A drug to be considered as a substitute should fulfill the following criteria – Similarity in Rasa-panchakas.
Ex:- Bharangi and Kantakari.

Exhibit similar therapeutic effects.
Ex:- Ativisha and Musta.

In a formulation the pradhana dravya i.e. the Major ingredient should never be substituted.
Ex: - while preparing Bharangyaadi guda should not substitute Bharangi with any other drug

KANTAKARI

Kantakari (*Solanum surattense* Burm.f) is an important and very useful plant in Ayurveda which have many medicinal properties, the study for the progress of knowledge with regard to this drug has to be examined. As per Ayurvedic Pharmacopeia *kantakari* has –
Rasa- Katu, tikta
Guna- Laghu, ruksha, tiksna
Virya- Ushna
Vipaka- Katu
Karma- Kapha vata hara, Dipana, pachanana, Mutrala, Ashmarighna, Sukra rechaka

This highly significant medicinal plant is used by Ayurvedic physicians in treating various diseases. *Kantakari* used as a *kasahara* drug mainly.

Classical Categorization in Ayurveda:

Charaka:- Kasahara, sothahara, hikkani-graha, kanthya, angmadprashamana mahakasaya

Susruta:- Brhatyadi, varunadi, laghupanchmoola gana

Vaghabhta:- Brhatyadi, varunadi gana

Acharya Charaka mentioned *kantakari* as *kasahara* dravya mainly. It is widely used in antitussive ayurvedic preparations and in various respiratory disorders. It is one among the main drug in Dashmoola which is the combination of ten plants roots together. It comprises roots of five big or major trees (Brihat panchmoola) and roots of five small or minor herbs (Laghu panchmoola). *kantakari* comes under *Laghu panchmoola*. *Dasamoola* is an important compound formulation of Ayurveda and has been advocated with promising result in various diseases.

It is used specially in treating Kasa, shwasa, jwara etc.

Kantakari which is used specially in treating Kasa, shwasa, jwara etc., is used as an ingredients in many of the compound formulations like vyaghriharitki avaleha, chvanprasha, Dashmoolarishta, Vyaghr tailam, vyaghr ghrut, Vyaghryadi kwatha etc.

The whole plant is useful in vitiated condition of vata and kapha, helminthiasis, dental caries, inflammations, flatulence, constipation, dyspepsia, anorexia, leprosy, skin disease, fever, cough, asthma, bronchitis, hiccup and epilepsy.

The plant is bitter, acrid, thermogenic, antihelminthic, anti-inflammatory, digestive, carminative, appetizer, expectorant, laxative, stimulant, diuretic, rejuvenating, aphrodisiac.

The description of *kantakari* along with its another variety and synonyms found in many nighantus like Dhanvantri nighantu, Sodhal nighantu, priya nighantu, madanpal nighantu, raj nighantu, kaivalyadeva

nighantu, bahvprakash nighantu, nighantu adarsh.

Acharya Charaka has given the description of *kantakari* Root in about 109 preparations and has described the use of *panchang* in 23 preparations in *charaka samhita*.

Acharya Sushruta described 45 preparations of *root* and 1 preparations of *panchang* of *kantakari* in *sushruta samhita*.

In *Ashtang sangrah* Acharya Vagbhata described 85 preparations of *root* and 9 preparations of *panchang* of *kantakari*.

In *Bhavprakash* Acharya Bhav Mishra described 69 preparations of *root* and about 11 preparations of *panchang* of *kantakari*.

Acharya Sharandhara in *Sharngdhara samhita* described 7 preparations of *panchang* of *kantakari* but they did not describe any formulations of *Root* alone.

The study of Samhitas shows that the Acharya described the use of the *root* of *kantakari* more than *panchang* (whole plant) of *kantakari* in many formulations for various diseases. But they did not describe the use of only the stem of *kantakari* in any formulations.

By through the literature study, it is evident that Acharyas have described the formulation of *kantakari*. The present study shows that Acharya describe the formulations which contain *kantakari* root and *panchang* (whole plant) in various contexts. For preparation of formulations there is a bulk need of the root of *kantakari* but normally from a plant we get very less amount of *root* and it is costly too. Several places instead of *root* *panchang* of plant is sold in market. Since the availability of root is very less, there is a huge chain of adulterations with its *root*. And in order to collect the root the whole plant has to be destroyed which eventually affects our biodiversity. So the aim of this present study was to use the stem of the same plant as an alternative of *root* as availability of the stem is comparatively higher.

DISCUSSION ON PHARMACOGNOSY

Kantakari is identified as (*Solanum surattense* Burm.f), belongs to Solanaceae family. It is available in all over India. It is a prickly diffuse herb.

Leaves- ovate or elliptic sinuate or subpinnatifid glabrescent, with straight spines. **Flowers-** In few flowered lateral cymes, blue coloured; corolla with shallow lobes.

Fruits- globose berries, white and green-bloched, yellow when ripe.

Seeds- many, glabrous.

Root- Root is 10-45 cm long, few mm to two cm in diameter, almost cylindrical and tapering, bearing a number of fine longitudinal and few transverse wrinkles with occasional scars or a few lenticels and small rootlets, transversely smooth end surface shows a thin bark and wide compact cylinder of wood; fracture short, taste bitter.

Stem:- Herbaceous, prickly with prominent nodes and internodes, green when fresh, young branches, covered with numerous hairs, mature ones glabrous, furrows more prominent in young stem appearing almost circular towards basal region, stem pieces 8-10 mm thick of variable length, external surface light green, when dry, surface yellowish green and smooth, transversely smoothed surface shows a very thin bark and prominent wood, centre shows a large and distinct pith, mature and dry stem often with hollow pith, fracture short to slightly fibrous.

Major Chemical Constituents- ROOT CONTAIN

- Sterols
- Tannin
- Flavonoids
- Amino acid
- Glicocides
- Alkaloids
- Saponin
- Phenols

STEM CONTAIN

- Tannin

- Flavonoids
- Amino acid
- Glicocides
- Alkaloids
- Saponin
- Phenols

FRUIT CONTAIN- Salosaniin

Whole plant of *kantkari* also use in ayurvedic medicine but root is specially *root* is used in kasa roga.

We have divided pharmacognosy study of *kantkari* into three parts –

- A – Botanical evaluation
- B – Physicochemical evaluation
- C – Phytochemistry

Botanical Evaluation

Macroscopic evaluation of *kantkari* root and *stem*

- Name of the drug – *Root* and *stem* of *kantkari*

ROOT

Shape : cylindrical
Size : 10-45 cm long
Surface : smooth
Odour : odourless
Taste : bitter

STEM

Shape : Herbaceous, glabrous, prickly
Size : pieces 8-10 mm thick variable length
Surface : yellowish green smooth
Odour : odourless
Taste : bitter

Physicochemical Evaluation

A- Physicochemical evaluation of *root*

Physical analysis: Physical analysis of *kantkari* root shows: Loss on drying 8.46%, Total ash value -6.42%, Acid insoluble ash 2.26%, Water soluble extractive -22.40%, Alcohol soluble extractive -12.48%.

Determination of Moisture contents (Loss on Drying), Total ash, Acid insoluble ash, Water soluble ash, Water soluble Extractives, Alcohol Soluble Extractives and Foreign matter were found to be within standard reference limits as mentioned in API and other previous studies.

Mineral analysis of root showed:

Analysis showed the qualitative presence of calcium, iron, manganese while absence of Phosphorus and sulphur.

Phytochemical analysis of root showed:

Petroleum ether extract of root showed presence of Sterols, tannin.

Chloroform extract of root showed presence of protein, carbohydrate, Sterols, Tannins, Amino acids, Saponins and Alkaloids.

Ethanol extract of root showed presence of protein, carbohydrate, Sterols, Tannins, Flavonoids, Amino acids, Saponins and Alkaloids.

Aqueous extract of leaves showed presence of protein, tannin, Flavonoids, Amino acids and Alkaloids.

B- Physicochemical evaluation of *stem*.

Physical analysis: Physical analysis of *kantkari* stem shows: Loss on drying 8.46%, Total ash value -6.42%, Acid insoluble ash 2.26%, Water soluble extractive -22.40%, Alcohol soluble extractive -12.48%.

Determination of Moisture contents (Loss on Drying), Total ash, Acid insoluble ash, Water soluble ash, Water soluble Extractives, Alcohol Soluble Extractives and Foreign matter were found to be within standard reference limits as mentioned in API and other previous studies.

Mineral analysis of stem showed:

Analysis showed the qualitative presence of calcium, iron, manganese while absence of phosphorus and sulphur.

Phytochemical analysis of stem showed:

Petroleum ether extract of *stem* showed presence of Sterols,

Chloroform extract of *stem* showed presence of protein, carbohydrate, Sterols, Tannins, Amino acids, Saponins and Alkaloids.

Ethanol extract of *stem* showed presence of protein, carbohydrate, Sterols, Tannins, Flavonoids, Amino acids, Saponins and Alkaloids.

Aqueous extract of *stem* showed presence of protein, Flavonoids, Amino acids and Alkaloids.

By thorough study the literature it is clear that the root are commonly used in comparison with whole plant. High demand and over exploitation of the drug leads to the scarcity of this plant. Keep this situation persists there is a huge chain for adulteration of the drug with some other plant. Keeping all these aspects, we tried to find a better solution for this through study.

In Bhavprakash's Samhita, Acharya Bhav Misra emphasized that during the unavailability of a particular drug, a suitable substitute can be used in its place. Acharya also mentions that the plant should have similar pharmacological properties of the plant for which it is getting substituted.

Rather than going to another species, we tried to focus on the other parts of the same plant, already it is mentioned that the whole plant can be used for medicinal purpose, the toxicity or any other adverse effects were out of question. Hence, in this study we tried to compare the pharmacognostical properties of the *stem* with the *root* to analyze the *stem* could be a safe replacement of the *root*.

After analysing the pharmacognostical test report it is evident that the pharmacognostical properties of the *stem* are almost similar with the *root*.

The physical analysis of the *root* and *stem* shows the same value as Loss on drying 8.46%, Total ash value -6.42%, Acid insoluble ash 2.26%, Water soluble extractive -22.40%, Alcohol soluble extractive -12.48%.

The phytochemical analysis of the *root* and *stem* were also similar except the absence of tannin in petroleum and aqueous extracts of *stem*.

The physicochemical parameters of *Root* and *Stem* of *kantkari* indicate that the total ash value, protein, carbohydrate are same.

The important mineral contents calcium, iron, manganese were present in both sample of *root* and *stem* of *kantkari*.

Sterols, flavonoids, amino acids, glycosides, acidic compounds, phenols, saponin, alkaloids were present in qualitative test of both sample the *root* and the *stem* of *kantkari* except tannin which is absent in the sample of *stem* with petroleum ether and aqueous extract.

The Chromatography test of *root* and *stem* sample were same. The Fluorescence test for *root* and *stem* sample were also same. By considering all the above said factors we can conclude that the *stem* of *kantkari* can be used in place of the *root* when the availability of the *root* is less.

CONCLUSION-

All review shows that there are very similarities in *root* and *stem* result of *kantkari*. Only one content tannin is absent in *stem* study during dilute with petroleum ether and in aqueous extract. Hence it was concluded that *stem* of *kantkari* can be alternate of its *root* in its lack.

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