MAR Pharmacology and Toxicology

Research Article

A Literary Review on Vriddhadaru and Kankola as Renoprotective Medicinal Plants

Dr. Priyanka Chakraborty[1], Dr. O.P Gupta[2]

1. PG Scholar, Department of Kayachikitsa, Government Ayurvedic college and hospital, Guwahati, Assam, Pin-781014
2. Professor, Department of Kayachikitsa, Government Ayurvedic college and hospital, Guwahati, Assam, Pin-781014.

*__Corresponding Author: Dr. Priyanka Chakraborty__, PG Scholar, Department of Kayachikitsa, Government Ayurvedic college and hospital, Guwahati, Assam, Pin-781014.

Received Date: January 12, 2021

Publication Date: February 01, 2021

Abstract

Background: *The green ecology is surrounded by innumerable plants having different medicinal values. Some of them are in use but a lot is yet to be discovered and used for the human tribe so that they need not be dependent on artificial and toxic chemicals. Ayurveda has a holistic approach. It nourishes and clears out the toxins from the body and believes in the organic way of treatment.*

Purpose: *In Ayurveda, there has been mentioning of various medicinal plants that are efficient in protecting the kidneys from disease causing harmful agents. Out of several herbal plants, Vriddhadaru and Kankola have their independent efficacy in renoprotection.*

Methods: *The review has been established based on both Ayurvedic classics and modern experimental studies.*

Result: *The article establishes the fact that Vriddhadaru and Kankola can be used as a single drug or as combined treatment with other medicinal herbs as nephroprotective.*

Conclusion: *Various nephroprotective plants are being used regularly by Ayurvedic practitioners for the management of nephropathy. Among them, vriddhadaru and kankola can prove to be effective in the management of nephropathy.*

Keywords: *Ecology, Ayurveda, Vriddhadaru, Kankola, Nephroprotective.*

Abbreviations

ACE- Angiotensin-converting enzyme, ARB- Angiotensin II receptor blocker

eGFR- estimated Glomerular Filtration Rate

Introduction

The kidneys play a vital role in maintaining the homeostasis of the body. The drugs or the toxic chemicals in the form of edible items that are ingested have to get eliminated from the body. The greatest proportion of drug excretion occurs through the kidneys. This makes the kidney more vulnerable to toxicity and acute injury. As a result, nephrotoxicity has become one of the major causes of nephropathy in the world's population.Obesity, hypertension, diabetes mellitus and drugs are the major risk factor for renal dysfunction as of today.

The damage to the nephrons can be both reversible and irreversible. The impairment in renal function leads to decreased eGFR and retention of metabolic by-products resulting in progressive renal failure. The lifechanging microvascular complications are now challenging the morbidity and mortality with high health cost rates to every group of society. Nephropathy is one of the causes of End-stage renal disease with an increased incidence of dialysis and renal transplantation.

In modern medicine, ACE inhibitors and ARB are the drug of choice for the management of progressive nephropathy. In the end stage, Renal replacement becomes the only option for decreasing the

progression. This as a result not only increases more side effects and risks but also increases the cost rates which a few patients can avail themselves. **(27,23)**

Ayurveda approaches holistic management which destroys disease from the root. Several plants are having medicinal values and yet to be discovered. Various nephroprotective plants can be used regularly by ayurvedic practitioners for the management of nephropathy. Among them, *vriddhadaru* and *kankola* may have the efficacy to be effective in the management of nephropathy.

Method

The review has been done based on *Brihat trayee*, *Ashtanga hridaya*, *Bhavprakash Nighantu* and other experimental and evidence-based research papers on *Vriddhadaru* and *Kankola*.

VRIDDHADARU

BOTANICAL NAME: *Argyreia speciosa Linn fam.*

FAMILY: Convolvulaceae

SYNONYMS**(18)** : *vriddhadaru, vriddhadaraka, samudrasosha, chagalanghri, antakotarapushpi*

VERNACULAR NAMES: **(18,35)**

Sanskrit: *vriddhadaru*

Hindi: *samanadar ka pat, samundrasokha, ghav-patta*

Bengali: *bichtarak, guguli*

Marathi: *samundarsokh, samudrasoka*

Gujarati: *samundarsosh, vardhara*

Malayalam: *samudrapaccha, samudraphala*

Tamil: *samutrappalai*

Telegu: *samudrappala*

Kannada: *chandrapada*

English: elephant creeper, woolly morning glory

Morphology **(6,35,29)**

Vriddhadaru is a woody climber found throughout India, up to an altitude of 300m, common in Assam, West Bengal, Bihar, Orissa, and South India. The stem is white and tormentose in the young stages. The older stems are mostly transversely elongated. The lower surface of the leaf is entirely covered with hairs on the upper surface of the leaf is green, glabrous and shows the markings of nerves by slight depression. The flower is bell-shaped; the outer part is white and the inner is violet. The fruit is green when it is unripe and white on ripe. The seeds are 0.5-0.75 cm long and more or less triangular.

Figure 1

Phytochemistry

Seeds: The seeds yield fatty oil which is found to contain the glycosides of palmitic acid, oleic acid, stearic acid, behenic acid, linoleic acid and linolenic acid. **(6,13,21)**.

The free amino acids reported in the seeds are glutamic acid, glycine, isoleucine, leucine, lysine, phenylalanine, tyrosine, praline and alpha-aminobutyric acid. **(6,22)**

Figure 2

Fruits: Beta-sitosterol, p-hydroxycinnamoyl octadecanolate, n-triacontanol and caffeic acid were reported in fruits of *vriddhadaru*. **(6,32)**

Leaves: The petroleum ether extract of the leaves of *vriddhadaru* yielded 1-triacontanol, epifriedelinol acetate, epifriedelinol and beta sitosterol. **(6,15)**

The leaves were found to contain flavonoids, quercetin, kaempferol and kaempferol 3-0-L-rhamnopyranoside. **(6,33,31)**

Roots: The hexane extract of the roots of *vriddhadaru* yielded tetradecanyl palmitate, 5,8-oxidotetracosan-10-one. **(6,16)**

Two aryl esters characterized as stigmasteryl-p-hydroxy cinnamate and hexadecanyl p-hydroxycinnamate along with coumarin scopoletin were isolated from the root. **(6,7)**

Ayurvedic Pharmacology (9,18)

Rasa – katu, tikta, kasay

Guna – laghu, snigdha

Vipak – madhura

Virya – ushna

Dosha karma – vata-kapha samak

1. *Vriddhadaru* has been mentioned as *Rasayan* in *Chakradatta* (*Rasayanadhikara*), *Bangasena (Rasayan*) and *Vrindamadhava.*
2. *Bhavprakash* has mentioned vriddhadaru in the treatment of *aamvat, vatarsha, sotha, prameha.* It exhibits *shukra, ayu, bala, medha, agni, swara, kanti vriddhi.*
3. According to *Kaideva Nighantu*, along with *rasayana* effect, *vriddhadaru* can be used in *sotha, aamvat, vatarsha, vatameha.*
4. Powder of *vriddhadaru* root being dried after giving *bhavana* with *shatavari swaras* if taken with *ghrita* for one-month results *medha* and *smriti.*

(*Bhaisajya Ratnavali, Rasayan prakaranam*,13)

Dose **(18)** : 3-6g (root powder) and 1-3g (seed powder)

Parts used **(18)** : root and seed

Pharmacological Activities of Vriddhadaru

1.Immunomodulatory effect: **(25)**

A 95% ethanolic extract of dried root of *Argyreia speciosa* was reported to stimulate both cellular and humoral immunity.

2.Anti-oxidant effect and hepatoprotective: **(24)**

Ethanol extract and ethyl acetate extract (200mg and 400mg/kg) of *Argyreia speciosa* root showed hepatoprotective activity against carbon tetrachloride-induced hepatotoxicity in rats. They also showed in-vivo anti-oxidant activity against oxidative stress in rats.

3.Anti- diabetic activity: **(14)**

The ethanolic extract of *Argyreia speciosa* recorded an improvement percentage of glucose level and glycogen content.

4.Nephroprotective effect: **(14)**

On the histopathological study of diabetic rats, the ethanolic extract of *Argyreia speciosa* in photomicrographs of kidneys (H&EX200) showed that the *Argyreia speciosa* reversed the abnormal histology of renal cortex areas induced by alloxan with normal glomeruli, bowman's capsule and associated tubular structures.

5.Wound healing effect: **(2)**

The leaves of *Argyreia speciosa* increases the rate of wound contraction, breaking strength, hydroxyl protein content and reduced epithelialization point.

Kankola

Figure 3

BOTANICAL NAME: *Piper cubeba* Linn. Fam

FAMILY: Piperaceae

SYNONYMS**(10,18)** : *gandhamaricha, sugandhamaricha, katukaphala, kola, katuphala, bahuphala, bahuphala, sthoola maricha, madyochosita, krutaphala, kolaka, dweepa maricha, koshaphala, madhavochita, rudrasanmita, kankushtha.*

VERNACULAR NAMES**(18)** :

Sanskrit: *kankola*

Hindi: *kababchini, sheetalchini*

Bengali: *kababchini*

Marathi: *himsimiri*

Gujarati: *tadamir*i

Tamil: *valmulaku*

Telegu: *tokamiriyalu*

Arabic: *kababesini, habbul-urus*

English: tail pepper, cubeb

Morphology **(1)**

Figure 4

Kankola is a creeper with a strong stem. The leaf is 5-6 inches long, heart-shaped and dark green. The flowers are small and found in clusters. The fruits are round similar to maricha but a little big than later. The fruits are having a strong smell. It is also known as tail pepper because of the stalk in fruits. The fruit is collected before it gets ripe. The seed is hard and white.

Phytochemistry

Piper cubeba is rich in alkaloid, glycosides, flavonoids, tannins and anthraquinones. It contains mainly cubebin, cubeb oil, cubebic acid. The plant also contains piperine, sesamin, cubebinin, yatein, cubeninone. **(1)**

Cubebin, hinokinin, yatein, dihydrocubebin, etc. have been shown to possess anti-inflammatory, analgesic, anti-oxidant and anti-cancer activities. **(26,34,20,5,19)**

Several polyhydroxy cyclohexanes have been isolated from *Piper cubeba* and have shown to display tumor inhibitory, anti-leukemia and antibiotic activities. **(3)**

Figure 5

Ayurvedic Pharmacology **(10,18)**

Rasa: katu, tikta

Guna: laghu, ruksha, tikshna

Vipak: katu

Virya: ushna

Karma: vata-kapha hara, hridya, dourgandhya hara, krimi, agnimandya, ruchya, asyadourgandhya, deepan, pachan.

Dose **(18)** : 1-3g (powder)

Parts used **(18)** : fruit

Pharmacological Activities of Kankola

1.Anti-microbial activity: **(4)**

The study showed that the ethanolic extract of *Piper cubeba* under various extracts like carbon tetrachloride, benzene, chloroform, ethylactetate, acetone, ethanol and distilled water has anti-bacterial effect against *Escherichia coli, Bacillus megaterium, Staphylococcus albus, Salmonella typhi, Pseudomonas aeruginosa* and has anti-fungal effect against *Aspergillus niger*.

2.Anti-oxidant activity: **(26)**

The result of the study suggested that the ethanolic extract of the *Piper cubeba* has higher free radical scavenging activity in comparison to *Piper nigrum* due to presence of phytochemical constituents especially polyphenols.

3.Nephroprotective activity: **(26)**

An experimental study by Unani medicine showed the nephroprotective effect of *Kababchini* (*Piper cubeba*) against Gentamicin induced nephrotoxicity in Wistar rats. The efficacy was assessed based on

biochemical estimation (urea and creatinine) and histopathological examination of the kidney pre and post-treatment.

4.Diuretic activity: **(17)**

The study showed that the increased urine volume significantly and also potentiates excretion of sodium in urine output.

Discussion

According to Ayurveda, *vrikka roga* occurs due to the vitiation of *Pachak pitta*, *samana vayu, apana vayu and avalambak kapha*. These *dushita dosha* again vitiates the *agni, dhatus, lasika, vasa* and *oja* resulting in increased production of *dravamsa* or *drava padartha* leading to *bahudrava*. The *abaddha meda* leads to the *avarana* of *apan vayu* in the *pakwasay* region ultimately results *vrikka dosha*. The *oja* which got vitiated by the *kleda* comes out through the *mutravaha srota* leading to *oja kshay*. At last, in the *samprapti* of *vrikka dosha*(nephropathy), *agnimandyata*, *dhatu kshay* and *oja kshay* are seen. **(12)**

The extract of *Vriddhadaru* and *Kankola* independently has showed various specific activities which can establish the fact that they can be used in Nephropathy.

Katu rasa present in both *Vriddhadaru* and *Kankola* possess *guna* like *laghu* and *ruksha* also does the *shoshan* of *drava padartha*, *kleda* and *kapha*. As *kapha* and *kleda* have *sheeta guna*; *ushna virya* in *vriddhadaru* being opposite does *samprapti bhedana*. *Katu vipaka* present in *Kankola* also helps to destroy *kleda* and *kapha*. **(11,8)**

Kashaya and *tikta rasa* present in both *Vriddhadaru* and *Kankola* do the *kleda* and *meda shoshana* and help in mitigating the *bahu Drava* and *abaddha meda* from the *srota*. **(11,8)**

Here in *vrikka dosha* (nephropathy), *apan vayu* and *samana vayu* are *dushta* due to *ruksha, laghu and sheeta guna*. So, *ushna virya* and *madhura vipaka* and *snigdha gunatmaka dravya* **(11,8)** like *Vriddhadaru* may work well. And as it is a *rasayana*, it helps in the rejuvenation of the viable nephrons.

Conclusion

Ayurveda is based on holistic approach to the treatment of diseases. It has been shown both in classics and modern researches that *vriddhadaru* and *kankola* have efficacy in the management of nephropathy. Studies have mentioned their activity as anti-oxidant, immunomodulatory, anti-diabetic, diuretic and nephroprotective. This article has tried to establish the fact that *vriddhadaru* and *Kankola* have the potential in the management of Nephropathy as Reno protective drugs independently.

SOURCE OF SUPPORT: None

CONFLICT OF INTEREST: None declared

AUTHOR DECLARATION

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

References

1.Wasim Ahmed,et al 2009-2012. “An appraisal of Medicinal Properties of Kababchini (Piper cubeba)”. Unimed Kulliyat, Special combined issue, April 2009- March 2012, vol v, Issue I to vol III, Issue 2.

2.Yadav KS, et al, 2014. “An assessment of wound healing potential of Argyreia speciosa leaves”. The Scientific World of Journal; 5:01-06

3.Coimbra Hdos S, et al, 2004; “Analgesic and anti-inflammatory activities of (-)-o benzyl cubebin, a(-)-cubebin derivative obtained by partial synthesis”. Boll Chim Farm Journal;143:65

4.Mohib Khan, Mustafa Siddiqui, 2007; “Anti-microbial activity of piper fruits”. Natural Product Radiance, Volume 6(2); 111-113

5.Aquil F, et al 2006. “Antioxidant and free radical scavenging properties of twelve traditionally used Indian medicinal plants”. Turkish Journal of Biology; 30:177-83

6.V J Galani, B G Patel and N B Patel, 2010. “Argyreia speciosa (Linn. F) sweet: A Comprehensive review”. Pharmacognosy Reviews 4 (8),172

7.Shrivastava A, Shukla YN, 1998. “Aryl esters and a coumarin from Argyreia speciosa”. Indian Journal of Chemistry; 37B:192-94

8.Gaur Vishwavasu, Ashtanga Hridaya (Vaghbhata), Sutrasthana Rasabhediya adhyaya (10:17-19) Chaukhamba Orientalia, Varanasi ,2010.

9.Bhavprakash Nighantu, Purvakhanda, Guducyadi varga, samudraphala

10.Bhavprakash Nighantu, Purvakhanda, Karpuradi varga, sheetalchini

11.Charaka Samhita, Agnivesha Shukla AV, Tripathi RD, Sutra sthana Deerghamjeevitiya adyaya (1:59) Chaukhamba Sanskrit pratishthan, Delhi,2004.

12.Charaka Samhita, Savimarsha vidyotini, volume 2, Kashinath Shastri, Dr Gorakhnath Chaturvedi, Chikitsa sthan, Trimarmiya chikitsa, sotha chikitsa, prameha chikitsa adhyaya.

13.Biswas B, et al, 1947; “Chemical composition of the fixed oil from the seeds of Argyreia speciosa”. Indian soap Journal; 13:51-4

14.Ali S.A, et al, 2011. “Chemical constituents of Argyreia speciosa Fam. Convolvulaceae and its role against hyperglycaemia”. Journal of Applied Pharmaceutical Sciences 01(08):76-84

15.Sahu NP, Chakravarti RN, 1971; Constituents of the leaves of Argyreia speciosa; Phytochemical; 10:1949.

16.Rani A, Shukla YN, 1997; “Disubstituted tetrahydrofuran and an ester from Argyreia speciosa”, Indian Journal of Chemistry; 36B:299-300

17.Zaid Ahmad, Tajuddin, Azizur Rahman, 2014; “Diuretic activity of Kababchini (Piper cubeba)”. International Journal of Medicine and Pharmaceutical Research,Volume 2(1):446-450

18.Acharya Priyavrata Sharma, Dravyaguna vijnan, volume 2

19.Karthikeyan J, Rani P, 2003; “Enzymatic and non-enzymatic anti-oxidants in selected Piper species”, Indian Journal of Experimental Biology,41:135-40

20.Sumathykutty MA, et al, 1999; “Essential oil constituents of some Piper species”. Flavour Fragrance Journal; 14:279-282

21.Kelkal GM, et al, 1947; “Fatty oil from seeds of Argyreia speciosa”. Journal of Indian Chemical Society; 24:83-6

22.Jaiswal S, et al, 1984; “Free amino acids of some regionally available medicinally important plant seeds”. Science Culture; 50:24-6

23.J Larry, Jameson et al, “Harrison’s nephrology and acid base disorder”.

24.Habbu P, et al, 2008; “Hepatoprotective and anti-oxidant effects of Argyreia speciosa in rats”. African Journal of Traditional Complement Alternative Medicine; 5:158-64

25.Gokhale AB, et al, 2003; “Investigations into the immunomodulatory activity of Argyreia speciosa”. Journal of Ethnopharmacology; 84:109-114

26.Qazi Zaid Ahmad, et al, 2012; “Nephroprotective effect of Kababchini (Piper cubeba) in Gentamycin induced Nephrotoxicity”. Saudi Journal of Kidney Diseases and Transplantation; 23(4):773-781

27.Neil Turner et al, Oxford textbook of clinical nephrology

28.Singh P, 1957; “Pharmacognosy of leaf of Argyreia speciosa sweet”. Journal Scientific and Industrial Research; 16C:204-6

29.Singh P, 1965; “Pharmacognostic study of root and stem of Argyreia speciosa sweet”. Quarterly Journal of Crude Drug Research; 5:774-83

30.Gayatri Nahak, RK Sahu, 2011; “Phytochemicals evaluation and anti-oxidant activity of Piper cubeba and Piper nigrum”. Journal of Applied Pharmaceutical Science,01(08):153-157

31.Khan MS, et al, 1992; “Phytochemical investigation on the leaves of Argyreia speciosa”; Journal of Indian Chemical Society; 69:110

32.Purushothaman KK, et al, 1982; “Phytochemical study of Argyreia speciosa (Vriddhadaru)”. Bull Medico-Ethnobotany Research; 3:250-3

33.Daniel M, 1989; “Polyphenols of some Indian vegetables”; Current Science; 58:1332-4

34.Da Silva, et al, 2005; “Synthesis and biological activity evaluation of lignan lactones derived from ()-cubebin”. Bioorganic and Medicinal Chemistry Letters; 15:1033-7

35. “The wealth of India, 1985- Raw materials”, Volume 4, New Delhi, Publication and Information Directorate, CSIR; Anonymous; p 419.

Volume 2 Issue 1 February 2021

©All rights reserved by Dr. Priyanka Chakraborty