WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 9, 2023-2032. Review Article ISSN 2277–7105

SHRIPHALA KUSUMA – THE WONDERFUL INFLORESCENCE TO BE EXPLORED

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Article Received on
20 March 2024,

Revised on 10 April 2024,
Accepted on 30 April 2024

DOI: 10.20959/wjpr20249-32275

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INTRODUCTION

Shriphala Kusuma (Coconut Inflorescence) : Shriphala is often used as synonym for coconut fruit which can be considered as Nature's Gift of versatility and delicacy. When it comes to versatile and delicious natural ingredients, the coconut often takes the spotlight. From its nourishing water to its creamy flesh and nutritious oil, every part of the coconut offers a unique culinary experience. The coconut palm is one of nature's wonder. In India, it is appropriately eulogized as 'Kalpavriksha' (a mythological tree supposed to grant all desires – "the tree that provides all the necessities of life") or 'Tree of Life' since every part of the tree is supposed to be beneficial and has various therapeutic uses. Coconut is grown throughout the tropical and subtropical regions, and well recognized for its versatile uses. Cocos nucifera Linn, the coconut palm is a member of the monocotyledons family Arecaceae (Palmae). It is found abundantly in almost all parts of India, in all seasons and is also a means of livelihood. Among its many hidden treasures is the coconut inflorescence, an often- overlooked part of the tree that holds immense potential for various uses.

Ethnomedical usages & biological activities of different parts of Coconut

Coconut water, flowers, oil, milk, and ash of coir have medicinal uses. At present, coconut is used in folk medicine, Ayurveda, Siddha, Tibetan, and Unani systems of medicine. It possesses anthelmintic, antidotal, antiseptic, aperient, aphrodisiac, astringent, bactericidal, depurative, diuretic, hemostat, pediculicide, purgative, refrigerant, stomachic, styptic, suppurative, and vermifuge properties. It is used as a folk remedy for abscesses, alopecia,

amenorrhea, asthma, bronchitis, bruises, burns, cachexia, calculus, colds, cough, debility, dropsy, dysentery, dysmenorrhea, earache, erysipelas, fever, flu, gingivitis, gonorrhea, hematemesis, hemoptysis, jaundice, menorrhagia, nausea, phthisis, pregnancy, rash, scabies, scurvy, sore throat, stomachache, swelling, syphilis, toothache, tuberculosis, tumors, typhoid, venereal diseases, and wounds. It is also believed to be anti-blenorrhagic, antibronchitis, febrifugal, and anti-gingivitic. Various coconut products are used as antihemorrhagic, anti-bronchitis, febrifugal and anti-gingivitis agents in Indian folk medicine. Different extracts of husk fiber have been shown to possess antimicrobial, radical scavenging, analgesic, anti-inflammatory, anti- helminthic and anti- proliferative activities. Recent studies have revealed that different extracts from mesocarp exhibit antimalarial, Vaso-relaxant, and antihypertensive activities, Virgin coconut oil is revealed to be cardioprotective, anti-thrombotic and has hypolipidemic activities. Coconut flowers are edible, they are mixed with curd for consumption by diabetics and are given to newlyweds as aphrodisiac.[1]

Ethnomedical uses of different parts of coconut:[2]

No.	Part of coconut tree	Uses	Region where it is practiced/Source of information
1.	Root	Anti-helminthic Sore throat-astringent gargle Uterine diseases	Cambodia
		Diuretic Blennorrhagia Bronchitis Liver disorders with/without eruptive fevers	
		Diarrhoea - tea Stomach pains -tea	Papua New Guinea
2.	Bark	Scabies	Unani system of medicine
		Amenorrhea and dysmenorrhea- Bark extract Venereal diseases- Bark tea	Trinidad
		Piles- Wood	Cambodia
3.	Coconut inflorescence	Menorrhagia- Decoction of immature inflorescence	Srilanka
4.	Fermented juice of flower (Toddy)	Stomachic Antihelminthic Shantidayak (calming) mutrala (diuretic)	Unani
5.	Fruit	Aphrodisiac, fever, paralysis, Liver complaints, Piles Enriches blood. Increases weight of the body	Unani system of medicine
		Cooling and diuretic- fruit pulp	Ceylon
		Antimalarial drug	Malaysia
		Diarrhea- Husk fiber extract	Brazil

6.	Coconut shell	Oral diseases	Cameroon
		Acne vulgaris- Shell oil and ginger paste	
7.	Coconut Oil	Vermifuge Bhallataka (Semecarpus anacardium) allergy-Antidote	Jamaica
			India
		Prevent hairloss	Fiji, South Asian countries
		Burns- ointment	Haiti
8.	Coconut water	Refrigerant, thirst, fever, urinary disorders, blood purifier.	Tropical countries
9.	Coconut milk	Diarrhea	Ghana

Morphological characters of inflorescence of Cocos nucifera L.

The coconut inflorescence is enclosed in a double sheath or spathe; the whole structure is known as a spadix which is born singly in the axil of each leaf. The palm is monecious i.e., the inflorescence contains both male and female flowers. The male flowers are more numerous and born on the top portion of the spikelet which are attached to a main axis or peduncle. The female flowers are situated at the base of the spikelet.

The inflorescence primordium can be detected about four months after the first leaf primordium is differentiated. The male and female flowers, twenty-two months thereafter. The opening of the fully grown spathe occurs one year later. The male flowers are the first to open beginning at the top of each spikelet and preceding towards the base. A normal inflorescence may have 10-50 female flowers. With natural pollination 50-70% usually abort and fall off, especially those which emerge during severe dry weather. The remaining flowers develop into fruits, which takes about twelve months to mature.[3]

Spadix (closed)

Individual spikelet seen after blooming.

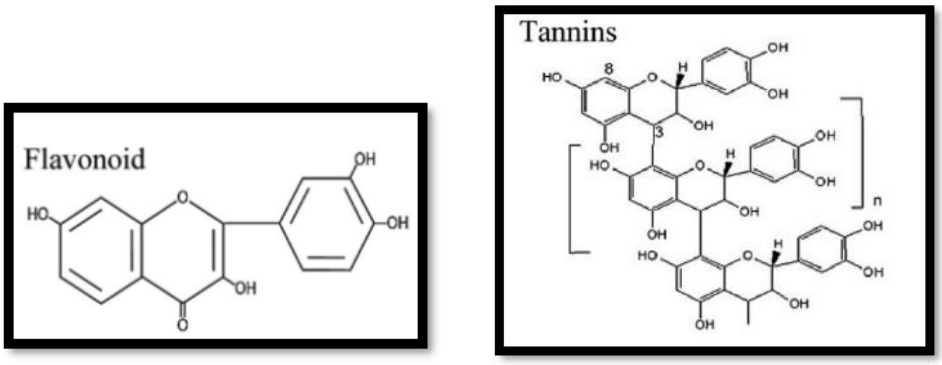
Phytoconstituents present in the inflorescence of Cocos nucifera L.

While coconut inflorescence primarily contains carbohydrates, including sugars and dietary fibre, it also contains several phytochemical constituents. Some of the phytoconstituents found in coconut inflorescence include:

1. Phenolic compounds: Coconut inflorescence contains phenolic compounds such as flavonoids, phenolic acids, and tannins. These compounds possess antioxidant properties and contribute to the potential health benefits of coconut inflorescence.
2. Vitamins: Coconut inflorescence contains various vitamins, including vitamin C (ascorbic acid) and B vitamins such as thiamine (B1), riboflavin (B2), niacin (B3), and folate (B9). These vitamins are important for maintaining overall health and metabolism.
3. Amino acids: Amino acids are the building blocks of proteins, and coconut inflorescence contains a range of essential and non-essential amino acids. These include arginine, cysteine, glycine, glutamine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tyrosine, and valine.
4. Minerals: Coconut inflorescence contains various minerals, including potassium, calcium, magnesium, phosphorus, and iron. These minerals are essential for various physiological processes in the body.
5. Phytohormones: Coconut inflorescence contains phytohormones such as cytokinin, auxins, and gibberellins. These plant hormones play important roles in regulating growth, development, and other physiological processes in plants.

The phytochemical analyses on inflorescence showed the presence of phenolic compounds, flavonoids, resins and alkaloids. The macronutrient analyses, on the other hand, showed the presence of carbohydrate, proteins and fibers. Administration of the methanol extract of coconut inflorescence to the diabetic rats showed dose dependent reduction in hyperglycemia. The cytoprotective property of coconut inflorescence was evidenced from the acute toxicological evaluation. The levels of serum aspartate aminotransferase, alanine aminotransferase, and alkaline phosphatase were significantly decreased in the diabetic rats treated with inflorescence when compared with the diabetic control rats.[2]

It's worth noting that the composition of phytoconstituents in coconut inflorescence can vary depending on factors such as the maturity of the inflorescence, environmental conditions, and processing methods.



Structures of the main phytoconstituents isolated from the inflorescence of Cocos nucifera (L.)

Potential health benefits associated with coconut inflorescence based on current trends and research data available

While research on the specific health benefits of coconut inflorescence is limited, it is commonly used in traditional medicine and culinary practices in some regions

1. Antioxidant properties: Coconut inflorescence contains antioxidants that help protect the body's cells from damage caused by harmful free radicals. Antioxidants are known to have anti-inflammatory and anti-aging effects.[4]
2. Nutritional content: Coconut inflorescence is a good source of various nutrients such as vitamins (including vitamin C), minerals, amino acids, and phytonutrients. These nutrients are important for overall health and well-being. Coconut inflorescence sap (Neera), phloem sap obtained by tapping the unopened spadix of coconut palm was reported to be highly nutritive and contained numerous health promoting biochemical constituents such as phenolics, flavonoids, antioxidants, and vitamins. It also functions as a good digestive agent.
3. Potential anti-diabetic effects: Some studies suggest that coconut inflorescence may have anti-diabetic properties. It is believed to help regulate blood sugar levels and improve insulin sensitivity. The results obtained from a recent study suggested that the coconut inflorescence has cytoprotective and antihyperglycemic properties. Protective and curative effects of Cocos nucifera L. inflorescence on alloxan induced pancreatic cytotoxicity in rats have also been reported. However, more research is needed to fully understand its effects on diabetes.[5]
4. Cardiovascular health: Coconut inflorescence is thought to have potential benefits for heart health. It contains certain compounds that may help lower cholesterol levels and reduce the risk of heart disease. However, scientific evidence is limited, and further research is required.

Shriphalakusuma in Ayurveda

Numerous references related to Narikela are found in Ayurvedic classics where different parts of the palm are mentioned for its application in various diseases and different kalpanas. In traditional medicine, coconut inflorescence is often used for various purposes, such as boosting energy levels, improving digestion, promoting lactation in nursing mothers, and enhancing male fertility. Shriphala Kusuma is considered to be auspicious and is said to be Mangalya. Few formulations mention the direct use of the inflorescence of Narikela or Shriphala kusuma in disease conditions.

Rasapanchaka of Shriphalakusuma

- Rasa (Taste)- Madhura (Sweet)
- Guna (Attribute)- Guru (Heavy), Snigdha (Unctous)
- Veerya (potency) – sheeta(cold)
- Vipaka(post digestive effect)- Madhura(Sweet)
- Doshaghnata(Action on doshas)- Vatapitta hara
- Rogaghnata-(Action on diseases)- raktapitta(bleeding disorders), daha(burning sensation), mutraroga(urinary disorders), shukradosha(seminal disorders), trushna(Thirst), Srama(fatigue), raktavikara (haemorrhagic disorders), kshayaroga(emanciating diseases), prameha(diabetes), kandu (itching), daurbalya (debility), jwara(Fever), shoola(pain), khalitya(hairfall), palitya(greying of hair), amlapitta(acid reflux disorders). It is also mentioned as having rasayana(rejuvenating) and hridya(cardiotonic) property.

Ayurvedic formulations that contain pushpa of narikela

- Therapeutic uses of Shriphalakusuma in classical texts includes its use in Asrgdara where decoction of pushpa of narikela with other ingredients is mentioned.

नालिकेर प्रसूनैर्वा जपया बलयापि वा ।

जम्बू वल्केन व सिद्धः क्वाथऽसृग्दरनाशनः ॥ (Sahasrayoga - Asrgdara)

- The powder of Shriphalakusuma is used to treat sharkara could be related to calculi.

त्रपुसीबीजादियोगः

त्रपुसिबीजं पयसां पीत्वा वा नारिकेरजं कुसुमम्

दृढमूत्रशर्करावान्भवति सुखी कतिपयैर्दिवसै॥ (Bharata Bhaishajya Ratnakar-2/2335)

- Shriphalakusumadi vati is mentioned in Rasachandamshu under the context of Sootika roga.

श्रीफलकुसुमवटिका

कर्षैकमानं नवकुंकुमं च रेवाचिनी प्रथिकशौण्डिकष्णम् ॥

प्रत्येककर्षेद्वयजातिपत्रं खण्डं लवंगं ह्यपि जातिसस्यम्॥६६३॥

मिशित्वगाजाजिपलप्रमाणं प्रत्येकमेतत्सकलैः समानम्

श्रीनारिकेलीकलिकाऽतिगूढा संमद्ये सर्वे वटि पूगतुल्या ॥ ६६४ ॥

एका प्रगे गोपयसा च पीत्वा पथ्यं च दुग्धोदनवारि वर्ज्यम् ॥

दुःसाध्यसूतीगदनाशनाय चतुर्दशाहानि भजेद्वटीयम् ॥६६५॥

According to Vanoushadi chandroday, Narikela pushpa is mentioned to have sheeta guna, is malarodhaka and used for the treatment of raktatisara, rakta pitta, prameha and soma roga.

Narikela pushpadi kwath is mentioned in Bharata Bhaishajya Ratnakar for the treatment of Stree roga, Similar yoga is found in Sahasrayogam indicated for Asrgdhara.

Narikela pushpa swarasa along with sharaka (sugar) is given for the treatment of Pradara. Another interesting yoga also quoted in Sahasrayoga is Thenginpookuladi ghritam (Keraleeya yoga) also indicated for the treatment of Asrgdhara.

Ayurvedic preparation named Thenginpookuladi lehyam, made from coconut flowers processed along with coconut milk is widely used as a post-natal medicine. It helps in relieving back pain, promoting lactation and in overall development of baby and mother and reduces post- natal tension and anxiety. This medicine is helpful for leucorrhea, menorrhagia and ejaculation related weaknesses.

Neera the drink obtained from Shriphala Kusuma is believed to be guru, veerya vardhaka, madakaraka, snigdha, amla, kaphakaraka, pittajanaka and alleviates pitta and krimi.

After scrutiny of various textbooks of Ayurveda, few formulations that contain Shriphalakusuma have been noted and given as below.

Type of formulation	No. of references	Name of the kalpanas
Kwatha (Decoction)	2	Thenginpookkula kashayam,
Ghrita	1	Thenginpookuladi ghritam
Lehyam	1	Thenginpookuladi lehyam
Gulika/ Tablet	2	Trapusibeejadi yogam, Sreephala

DISCUSSION

The coconut inflorescence, often overshadowed by the prominence of the coconut fruit and oil, possesses remarkable value in various fields. From its nutritional value and medicinal properties to its role in sustainable agriculture and environmental conservation, this often-overlooked part of the coconut tree holds immense potential. In some traditional practices, coconut inflorescence is used in rituals and ceremonies, symbolizing purity and auspiciousness. This reflects the holistic approach of Ayurveda, which considers the interconnectedness of physical, mental, and spiritual well-being.

The coconut inflorescence, also known as the coconut flower or spadix, is a complex structure that undergoes a fascinating developmental process. It is comprised of numerous flowers arranged on a central axis called the rachis. The inflorescence typically emerges from the leaf axil and is protected by a series of bracts. Understanding the inflorescence of the coconut palm is not only of botanical interest but also holds practical significance for medicine as well as agriculture.

Research on the phytoconstituents of coconut inflorescence has revealed the presence of various bioactive compounds with potential health benefits. While studies on this topic are not as extensive as those on coconut oil or coconut water, the available literature sheds light on some key phytoconstituents found in coconut inflorescence such as proanthocyanidins and is mainly found to have cytoprotective, anti-inflammatory, anti- hyperglycemic, and antioxidant action.

Ayurveda, the traditional system of medicine in India, considers various parts of plants, including flowers, for their potential health benefits. Sriphalakusuma is one such inflorescence which has not been much explored even though the classics quotes its properties, therapeutic effects along with various formulations. On a general note it is observed that it possess nourishing, anti-inflammatory and rejuvenating action on the body based on its attributes while understanding of the action of the formulations prepared with it points towards its action in diseases related to the female reproductive system such as

asrgdara (menorrhagia) which is excessive bleeding from the uterus while menstruation, that in turn signifies its action in rakta vikara(diseases related to the blood/circulatory system).

Use of formulations that contain Shriphalakusuma is also observed to be more towards the southern states of India may be due to its availability and traditional usage of the inflorescence in medicine leading to its popularity among the local folks and the Vaidya community.

CONCLUSION

Each and every part of a coconut tree is found to have exceptional qualities and exploration as well as application of this knowledge can be used to treat various disorders. Shriphala Kusuma is a unique inflorescence be it in appearance, properties and medicinal values. Overall, while coconut inflorescence has a long history of traditional use and anecdotal reports of its health benefits, scientific research on its specific medicinal uses is limited. Further studies are needed to validate its efficacy and safety in treating various diseases. The coconut tree and its inflorescence truly stand as testaments to the wonders of nature and the marvels it bestows upon us.

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