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THERAPEUTIC AND MEDICINAL USES OF KANTAKARI : A REVIEW

Ayurveda

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ABSTRACT

Kantakari 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 *kantakari* is mentioned in *Kanthya, Hikkanigrahana, Kasahara, Shothahara, Sheetaprashamana, Angmardprashamana* (Ch.Su.4) and *Madhura-Skandha* (Ch.Vi. 8) In Sushruta Samhita *kantakari* is mentioned in *Brihatyadi, Varunadi* and *Laghupanchamoola Gana* (Su. Su. 38). 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. *Kantakari* 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 *laghupanchapanchmoola*, the *moola* of *kantakari* is used. While in other formulations *panchanga* is to be used. Generally in market whole plant i.e. *panchanga* of *kantakari* is sold instead of root. Currently the antitussive are opoiod preparations which have many side effects like depression, addiction, constipation, mouth drowness lazyness etc. Modern studies have also explicitly revealed that *kantakari* has a wide range of pharmacological effects such as , anti-inflammatory, , ant-bacterial activity, anti-fungal activity, antiasthmatic , anti fertility, hypoglycaemic ,anthelmintic, molluscidal activity etc. In this review article an effort has been made to explore all properties of kantakari and mode of action.

KEYWORDS

Atharvaveda ,antiasthmatic, hypoglycaemic, anthelmintic, molluscidal

INTRODUCTION

Kantakari is the common name for the plant *Solanum virginianum*, which belongs to the *Solanaceae* family. The plant is one of the members of the Dashmula (an Ayurvedic formulation of ten herbs) of Ayurvedic medicine. It grows on sandy soil and is found all over India.[1] This plant is also listed in the Ayurvedic Pharmacopoeia of India (an official publication presented with a list of medicinal drugs and their uses).[2]

Properties of Kantakari

This plant may show a variety of helpful properties, including:

- It may show hepatoprotective (liver protective) potential
- It may show cardioprotective (heart protective) potential
- It may show antidiabetic property
- It may show anti-asthmatic property
- It may show anti-inflammatory (reduces inflammation) property
- It may show anti-cancer activity[3]
- It may show anti-arthritic property[1]
- It may show diuretic (increases passing of urine) property [4]

Taxonomic position:

Kingdom:Plantae
Division: Spermatophyta
Sub-division: Angiospermae
Class: Dicotyledonae
Sub-class: Gamopetalae
Series: Bicarpellatae
Order: Polemoniales|
Family: Solanaceae
Genus: Solanum
Species: *Solanum xanthocarpum* Schrad.&Wendl

VERNACULAR NAMES (A.P.I.) [5]

Hindi: Choti kateri\ Bhatkateya,Katai,Katali
Telgu: Nelamulaka
English: Yellow Berried Night Shade
Bangali: Kantakari
Tamil: kandankattiri
Marathi: Bahuirigni
Punjabi: Kandiyari
Sanskrit: Vyaghri,Nidighika ,Kantakarika,Dhavini
Assamesse: Katvaedan,Kantakar
Gujrati: Bharingani
Kannada: Nelagulla,Kiragulla
Kashmiri: Kath
Malyalam: Kantakari Chunda
Oriya: Ankaratil,Chakada, Bhoji, Bhejibaugana

Botanical Description

Habit: A Prickly diffuse herb
Leave: Ovate or elleptie sinuate
Flowers: In few flowers lateral chymes blue coloured
Fruit: Globose berries glabrous whitish and green blotheh yellow when ripe
Seeds: Many glabous
Flower and fruit: March july

Habitat And Distribution:-

Common in waste land and throughout ndia.

Part used:- Root and whole plant

Properties And Action[6]

Rasa: Tikta katu
Guna: Laghu,ruksha
Veerya: Ushna
Vipaka: Katu
Doshaghanta: vaataghna,kaphaaghna.
Karma: Kaphavata hara, Dipana, Pachana, Mutrala, Ashmarighna, Sukra rechaka

Habit-

It is a very spiny diffuse herb with a height of up to 1.2 meters .The young branches dencely covered with minute star shape hair,while the mature branches are zigzag ,covered with yellow,sharp shining prickles and spread close to ground .The midribs and other nervesof the leaves have sharp yellow prickels and grow up to 10cm in length. The purple flowers that they are 2cm long with five petals,can be seen in small bunches, sometimes opposite to the leaves. Kantkari plant bears glabrous,globular drooping berries as fruit,yellow or pale in colour,with green veins .The plant is cultivated throughout india .

Morphology

Root :

10-45 cm long, few mm to two cm in diameter, almost cylindrical and taering, bearing a number of fine longitudinal and few transverse wrinkles with occasional scars or a few lenticels and small rootlets, transversely smoothened 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 smoothened surface shows a very thin bark and prominent wood, centre shows a large and distinct, pith, mr ture and dry stem often with hollow pith, fracture short to slightly fibrous.

Leaves:
Petiolate, exstipulate, ovate--oblong or elliptic, sinuate or sub-pinnatifid, subacute hairy, 4-12.5 cm long and 2-7.5 cm wide, green, veins and midrib full with sharp prickles, odour and taste not distinct.

Flower :
Ebracteate, pedicellate, bisexual, pentamerous, regular, complete, bright blue or bluish purple, calyx-persistent, gamosepalous, tube short, globose, linear-lanceolate, acute,hairy, 0.5-1 .3 cm long and densely prickly, corollagamopetalous, lobes deltoid, acute, hairy,1-2 cm long and purple in colour, stamens 5, epipetalous, basifixed, filament short 1-1.5 mm long, anther, oblong lanceolate, 0.7-0.8 cm long, ovary superior, ovoid, glabrous, bilocular with axile placentation having numerous ovules.

Fruit:
Berry globular, measuring 0.8-1 cm in diameter, surrounded by persistent calyx at base unripe fruits variegated with green and white strips, ripe fruit shows different yellow and white shades.

Seeds:
Circular, flat, numerous, embedded in a fleshy mesocarp about 0. 2 cm in diameter, glabrous taste, bitter and acrid.

Chemical Constituents –
Root Contain
- Sterols
- Tanin
- Flavonoids
- Aminoacid
- Glycocydes
- Alkaloids
- Saponin
- Phenols

Stem Contain
- Tanin
- Flavonoids
- Aminoacid
- Glicocydes
- Alkaloids
- Saponin
- Phenols

FRUIT CONTAIN - Salosanin

DOSE- Decoction- 40-80 ML

ROOT POWDER - 10 GM

LEAVES – juice 2.5 -5 ML

Formulation And Prepration:
- *KANTAKARI GHRITA*
- *VYAGHRI HARITKI*
- *VYAGHRI TAIL*
- *NIDHIDIKA KWATH*

1. Pharmacological Studies:-
Antifungal activity:-
S.Gaherwal, et at all was reported the antifungal activity of solanum xanthocarpum against aspergillis nigar and cadidalbicans was assessed on the basis of agar well diffusion method in PDA media and growth inhabitation in PDB media with distil water and hexanic extract of solanum xanthocarpum leaf.

Antiashthmatic properties:-
Asthma is an inflammatory disorder of the airways characterized by various airway obstruction, airway eosinophilic inflammation and bronchial hyper responsiveness and is a global health problem that results from a complex interplay between genetic and environmental factors. Among several respiratory diseases affecting man, bronchial asthma is the most common disabling syndrome. Nearly 7–10% of the world population suffers from bronchial asthma. A pilot study on the clinical efficacy of Solanum xanthocarpum Schrad and Wendl and Solanum trilobatum in bronchial asthma were undertaken to prove the significant use of herbs in treatment of asthma. It is evaluated that the therapeutic effect of ethanolic extract of Solanum xanthocarpum Schrad & Wendl i.e. asthma relieving or antihistaminic, antiallergic property. Mast cell stabilization as compared to standard drug Disodium chromoglycate (DSCG). Solanum xanthocarpum is widely used by practitioners of the Siddha system of medicine in southern India to treat respiratory diseases. The powder of whole dried plant or a decoction is used for this purpose. Govindan et al. (1999) showed that treatment with Solanum xanthocarpum improved the pulmonary functions to a significant level in patients suffering from mild to moderate asthma. Subjective relief from asthmatic symptoms was reported by the patients an hour after administration of Solanum xanthocarpum powder. The effect lasted for about 6–8 h. However, responses observed were apparently less when compared to that of deriphilline or salbutamol. A decrease in forced expiration volume and peak expiration flow rates are indicative of both large and small airway obstruction and muscle power.The dose of Solanum xanthocarpum Schrad & Wendl was well tolerated and no untoward effects were reported. It was suggested that relief from the symptoms of bronchial asthma produced by Solanum xanthocarpum Schrad and Wendl may be due to: (a) a bronchodilator effect, (b) reduction in the bronchial mucosal edema (c) reduction in the secretions within the airway lumen.

Antifertility activity:-
Solasodine, an alkaloid of Solanum xanthocarpum possesses antispermatogenic activity. In Dixit VP 1980 study, chronic administration of solasodine (20mg/kg each other day oral for 60 days) rendered male rats and dogs infertile. Mating test showed 87% infertility in rats, this returned to normal after 60 days cessation of drug feeding. Solasodine is well tolerated and inhibits spermatogenesis and Sperm motility.No significant change was noticed in the weight of testes and accessory sex organs. The RNA, protein, sialic acidand glycogen contents of the test were reduced significantly, serum proteins, triglycerides, Serum enzymes (GOT/GPT /Alkaline phosphatase) nonesterified fatty acids levels were in normal range. Solasodine is estrogen free but inhibits testosterone release from dispersed mouse Leydig cells (200 uM significantly inhibited unstimulated and LH stimulated release). Solasodine can be developed as male pill of plant origin.

Hypoglycemic activity:-
The aqueous extract of *Solanum xanthocarpum* showed significant hypoglycemic effect in both normal and streptozotocin induced diabetic rats at dose of 100 and 200 mg/kg. The activity showed by aqueous extract was comparable to that of standard oral hypoglycemic agent glibenclamide. The experimental results indicated that it exhibited a potent blood glucose lowering property both in normal and streptozotocin induced diabetic rats. The LD50 of the extract was found to be high indicating high margin of safety.

Anti-inflammation activity:-
Solasodine isolated from Solanum trilobatum has been examined for anti-inflammatory activity in acute and chronic inflammatory animal models. Solasodine exerted statistically significant and dose-dependent antiinflammatory activity in carrageenan-induced rat paw oedema. Topical application of solasodine significantly inhibited the ear inflammation induced by multiple applications of tetradecanoyl-phorbol 13-acetate. The alkaloid produced a significant increase in the reaction time in the hot plate test. LPS-stimulated macrophage as a model of inflammation was used to investigate the antiinflammatory effects of tomatidine and solasodine whereby it was found that tomatidine exhibited a more potent anti-inflammatory effect than solasodine in the tested concentration.

Antifilarial effect:-
Lalit Mohan et al. reported the larvicidal potential of crude extracts of Solanum xanthocarpum and suggested its suitability as an ecofriendly, effective larvicide in the management of mosquito populations and in

limiting the outbreak of various vector borne epidemics.

Anthelmintic activity:-
Gunaselvi.G.et al confirmed anthelmintic activity of fruity extract of *Solanum xanthocarpum* plant water as well as ethanolic extraxt of *Solanum xanthocarpum* fruit were used for study.

Antibacterial activity:-
Methanolic as well as acetone leaf extracts of *Solanum xanthocarpum* were quite effective in inhibiting the growth of *Staphylococcus aureus* which is a serious human pathogen causing infections in wounds. Possible reasons for this antibacterial activity of *Solanum xanthocarpum* are presence of alkaloids, phenolics and flavanoids in its leaves

Toxicological studies:-
Potential molluscicidal extract, obtained from the indigenous Chinese plant Solanum xanthocarpum (Schrad. and Wendl), was tested for toxicity against snails and fish in static, acute-toxicity tests. The extract had a significant effect on mature and young snails of the amphibious Asian freshwater prosobranch Oncomelania hupensis (Gredler) and also on mature specimens of the freshwater pulmonate snails Biomphalaria glabrata (Say) and Lymnaea stagnalis (Linnaeus). The minimum dose that produced 100% mortality of snails exposed for 48h, 4.321mg/litre, is much less than the threshold, of 100mg/litre, set for a potential molluscicide by the World Health Organization. In contrast, the minimum concentration producing 100% mortality in the fish Gobiocypris rarus (Ye and Fu) was 17.28mg/litre. The extract also limited the extent of water-leaving by snails exposed to it, an important feature for the control of amphibious snails. This extract thus represents a promising plant-derived molluscicide which is worthy of further investigation.

Antidepressant -Alzheimer's, depression, and anxiety are the most common brain conditions that affect individuals. Kantakari extract, when given to animals, showed anti-anxiety (relaxing), antidepressant (depression relieving) and memory enhancing benefits. These benefits could be due to the presence of certain phytochemicals in Kantakari.[4] These effects of kantakari on the brain have been observed in animal trials. More studies are required to support the use of kantakari on the human brain. Therefore, you need to exercise precaution and avoid using kantakari without a doctor's consultation.

CONCLUSION
Modern studies have also explicitly revealed that *kantakari* has a wide range of pharmacological effects such as, anti-inflammatory, ant-bacterial activity, anti-fungal activity, antiasthmatic, anti fertility, hypoglycaemic ,anthelmintic, molluscidal activity etc. This article concludes that herb has great pharmaceutical applications.And it requires further clinical evaluation of same.

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