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PIPPALI (KRISHNA) AS A RASAYANA

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ABSTRACT

Pippali contains many phytochemicals, including alkaloids as important secondary metabolites (piperine and piperlongumine), flavonoids, essential oils, and steroids. Piperine has been documented to have several pharmacological functions such as antidepressive, antiepileptic anti inflammatory, anti oxidant and anti convulsant properties. Based on the many effects of piperine on the nervous system, its neuroprotective effect has also been studied. Piperine increases the cell viability and restored mitochondrial functioning. It alsoshows neuroprotective effects in Parkinson's disease.

KEYWORDS: Piperine, antidepressive, antiepileptic, anticonvulsant.

INTRODUCTION

Botanical name – Piper longum

Natural Order- Piperaceae

Classical names – Magadhi, Krishna, Kana, Chapala, Upakulya, Vaidehi, Tikshna tandula, Shaundi.

Vernacular names English – long pepperHindi – pipali

Bengali – pipalamul Gujarati – pipli Marathi – pimpli

Botanical description

A slender aromatic climber with perrineal woody roots. Stem screeping jointed. Leaves ovate, cordate, subacute, entire glabrous. Spikes cylindrical pedunculate, male larger and slender, female 1.3 – 2.5 cm long. Fruits ovaland orange, sunk in fleshy spike.

Parts used

Fruit, root.

AIM

Study of Pippali (Krishna) as a Rasayana drug.

OBJECTIVES

Study of pippali (Piperine), its actions and uses according to Ayurveda andmodern science.

Actions and uses of pippali

The root is bitter, thermogenic, purgative, expectorant, antihelmenthic stomachic, and digestive. They are useful in gout, lumbago, dyspepsia, apoplexy. Dried spikes are acrid, vermifuge, mildly thermogenic, tonic, laxative, digestive, emollient, and antiseptic. They are useful in anorexia, dyspepsia, vomiting, flatulent, colic, diarrhea, cholera, dysentery, asthma, bronchitis, coryza, hiccough, gastric disorders, epilepsy, insomnia, fever, gonorrhea, haemorrhoids, gout and lumbago. The fruits are used after child birth to check postpartum haemorrhage, as a cholagague in bile duct and gall bladder obstruction. Unripe fruit is used as an alternative and tonic. A decoction of immature fruits and roots is used in chronicbronchitis cough and cold, also used in palsy, gout, rheumatism and lumbago.

Ayurvedic Description

Rasa – Katu

Guna – Laghu, Snigdha, TikshnaVirya – Anushna Sheeta

Vipaka – Madhura

Doshaghnata – Kaphavatashamak

Rogaghnata – Shotha, Sheetayukta vedana, Mastishka daurbalya, Vatavyadhi, Aruchi, Agnimandya, Ajjerna, Vibandha, Gulma, Udarashoola, Arsha, Yakritvikara, Pleehavriddhi, Krimiroga, Hrid daurbalya, Pandu, Raktavikara, Amavata, Vatarakta, Kasa, Shwasa,Hikka, Kshaya, Yakshma, Mootravikara, Shukradaurbalya, Kushtha, Jeernajwara, Vishamajwara, Samanyadaurbalya, Rajorodha, Kashtaprasava.

Karma – Raktoklesha, Jantuighna, Shirovirechana, Medhya, Vatahara, Deepana, Vatanulomana, Shoolaprashamana, Pleehavriddhihara, Yakrituttejaka, Mriduvirechana, Krimighna.[1],[2]

Uttejaka, Raktavardhak, Raktashodhak, Kasahara, Shwasahara, Hikkanigrahana, Mootrala,

Vrishya, Kushtaghna, Jwaraghna, Vishamajwarapratibandhak, Balya, Rasayana, Garbhashayasankochak.

Due to its Yogvahi guna, pippali is stated to be harmful by Charak Aacharya if consumed for long time and in large quantity.[3]

Gridhrasi is one of the Vatavyadhis in which the pain starts from hip and gradually comes down to waist, back, thigh, knee and foot affecting these parts with stiffness, distress and piercing pain.[4]

Krishna choorna(powdered Piper longum) with its Ushna (hot), Tikshnaguna (penetrating) leads to Shoolanashan(pain relief) and Vyadhiprashaman(disease cure) in Gridhrasi vyadhi.

Dose – Powder 0.5 to 1 .5 gm.

Pharmacognosy

The roots are adventitious, upto 9 cm long, surface dark brown with few rootlet scars, fracture short and starchy. In T.S. the root shows thin walled and rectangular to slightly tangentially elongated cork cells. The cortical cells are large sized, thin walled and roundedto oblong with intercellular spaces. Most of the cortical cells contain spherical or oval starch grain A few cortical cells contain minute prismatic crystals of calcium oxalate. Many secretory cells are found scattered in the cortex. A wavy ring of endodermis is composed of one row of rectangular cells with their side wallsslightly thickened. The centre of root is occupied by pith which is surrounded by 4 – 6 wedge shaped radiating strips of vascular tissue. The cells composing the pith are polygonal, thin walled and contain starch grains. Six groups of xylem bundles are present outside the pith. Xylem is composed of xylem vessels, xylemparenchyma and wood fibres and its wider end is crowned with hemispherical strip of phloem. A strip of cambium is present between xylem and phloem. Phloem is composed of many sieve tube with their companion cells that can be distinctly made out towards inner region of the phloem and the small thin walled polygonal phloe parenchymal cells. One or two groups of stone cellscomposed of 2 to 3 cells are present at peripheral region of phloem. The outer border of phloem is limited by a row of pericyclic cells.

Chemical constituents

Two alkaloids piperlongumine and piperlonguminine characterized as N-(3,4,5 – trimethoxy cinnamoyl) Piperidine – 2- one and isobutylamide of piperic acid respectively.(stem and

roots); n-hexadecane, n- heptadecane, n- octadecane, n- nonadecane, n- eocosane, n-heneicosane, alpha thujene, terpinolene, zingiberene, p- cymene, p- methoxy acetophenone, traces of dihydrocarveol, phenyletyl alcohol and two sesquiterpenes (essential from the driedfruit), piperine, piplartine, triacontane, dihydro-stigmasterol, an unidentified steroid, reducing sugars, glycosides aesamine and methyl 3,4,5- trimethoxycinnamate(roots); major alkaloid piperine and sesamin (stem and fruits); sesquiterpenehydrocarbon, caryophyllene , a sesquiterpene alcohol, carbonyl compound(essential oil);N- isobutyldeca- trans -2- trans-4-dienamide, piperine, piplartine and a liganin d- sesamin, two piperadine alkaloids-pipernonaline and piperundecalidine(fri=uit), sylvatine, sesamine and diaeudesmin.

PHARMACOLOGY

Antibacterial, anti-inflammatory, antimalarial, CNS stimulant, antitubercular, antihelminthic, hypoglycemic, antispasmodic, cough suppressor, anti- giardial, immunostimulatory, hepatoprotective, analeptic, antinarcotic, antiulcerogenic.

Pippali contains many phytochemicals, including alkaloids as important secondary metabolites (piperine and piperlongumine), flavonoids, essential oils, and steroids.

Some of the therapeutic uses of pippali are listed below

- Anti-inflammatory and analgesic
- Antioxidant
- Antimicrobial
- Anticancer
- Anti-parkinsonian
- Anti-stress
- Nootropic
- Anti-epileptic
- Anti-hyperglycemic
- Hepatoprotective
- Anti-hyperlipidemic
- Anti-platelet
- Immunomodulatory
- Anti-arthritic
- Anti-ulcer
- Anti-asthmatic

- Antihelminthic.

Piperine

Pepper is an ubiquitous spice that is used worldwide. Pepper is also considered as an important medicinal ingredient. Piperine is a nitrogen containing alkaloid derived from fruits of Piper longum. Piperine has historically been a component of the human diet and is responsible for the characteristic pungent sensory effect of pepper. Piperine has been documented to have several pharmacological functions such as antidepressive, antiepileptic, anti inflammatory, anti oxidant and anti convulsant properties.

Based on the many effects of piperine on the nervous system, its neuroprotective effect has also been studied.

Piperine increases the cell viability and restored mitochondrial functioning .It also shows neuroprotective effects in Parkinson's disease.

Benefits of Pippali

- **Insecticidal Benefits of Pippali**

According to studies, the fruits' essential oil had insecticidal and insect repellentproperties.
In addition, piperidine alkaloids (pipernonaline and piperoctadecalidine), obtained from P. longum, had insecticidal action.

- **Antifungal Activity of Pippali**

P. longum L. has fungicidal properties in the essential oil of the fruits.
In addition, Pipernonaline, a piperidine alkaloid, has a potential fungicidal effect against P. recondita.

- **Antimicrobial Activity of Pippali**

P. longum extracts have shown antimicrobial activity against bacterial pathogens such as S. albus, S. typhi, P. aeruginosa, E. coli, and B. megaterium, as well as one fungus, A. niger.

- **Antiamoebic Benefits of Pippali**

According to animal studies, Entamoeba histolytica infecting the caecum was inhibited by a crude methanol extract of Piper longum fruit.
In addition, the severity of caecal wall ulceration was lessened.
The fruit and root of P. longum have an approximately similar antiamoebic effect.

- **Immunomodulatory Activity of Pippali**

According to animal and laboratory studies, piperinic acid, one of the active ingredients in pippali, has been shown to reduce lymphocytes (CD4+ and CD8+ Tcells) and cytokine levels in a dose-dependent manner.

The alcoholic extract of P. longum fruits and its component piperine haveimmunomodulatory and anticancer properties.

The fruits' alcoholic extract and piperine were proven to be cytotoxic. 100% giardicidal activity was found in an aqueous extract of P. longum fruit powder. P. longum protects from stress generated by the environment.

In mice infected with Giardia lamblia, a popular Ayurvedic preparation containing long pepper in pippli rasyana was evaluated and found to activate macrophages significantly, as indicated by an enhanced phagocytic activity.

- **Anti-diabetic Effects of Pippali**

As per animal studies, oral administration of dried fruits of Pippali has been provento have strong anti-hyperglycemic, anti-lipid peroxidative, and antioxidant properties.

- **Antioxidant Benefits of Pippali**

A combination of different Piper spices, salts, and herbs shows antioxidant activity. Piper nigrum has the highest antioxidant activity, followed by piper longum.

- **Benefits of Pipali as a Cardioprotective Agent**

As a non-competitive thromboxane A2 receptor antagonist62, a component of P. longum suppresses platelet aggregation.

As per animal studies, piperine, pipernonaline, piperoctadecalidine, and piper longumine, all isolated from the fruits of P. longum, showed dose-dependent inhibitory activity on platelet aggregation induced by collagen arachidonic acid (AA)and platelet-activating factor (PAF), except for thrombin-induced platelet aggregation.

The inhibitory effects of piperlongumine were more potent than those of otheracidamides.

- **Antidepressant Benefits of Pippali**

In animal studies, treatment with piperine for 72 hours reversed the corticosterone-induced decline in brain-derived neurotrophic factor (BDNF) mRNA expression in cultured

hippocampal neuron.

Formulations

Gudapippali, Pippali khand, Pippalyasava, Ttrikatu, Ashtangavaleha, Kalyanavaleha, Pugakhand, Vyaghriharitaki, Bhrihat ashvagandhaghrit.

Pippali.

Pippali Herb.

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