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THERAPEUTIC USES OF VITEX NIGUNDO

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ABSTRACT

Vitex negundo is a well-known medicinal herb that is used in Indian System of Medicine. It is commonly known as Five-Leaved Chaste Tree or Monk`s pepper. In India it is known as *punjgusht*, *Nirgundu*, *Sambhalu* or *sephali*. The *Vitex negundo* extracts have been used in Unani system of medicine as anti-inflammatory, expectorant, tranquilizer, antispasmodic, anti convalesant, rejuvenative, anti-arthritic, anthelminthic, anti-fungal and antipyretic. In Unani, the seeds are recommended for controlling premature ejaculation and also enhance the male lidibo. *Vitex negundo* relieves muscle aches and joint pains. The Ayurvedic and Unani Pharmacopoeia of India has documented the use of the leaf, seed and the root to treat excessive vaginal discharge, edema, skin diseases, pruritus, helminthiasis, rheumatism and puerperal fever. *Vitex negundo* is also used as a constituent in many herbal preparations. Chrysosplenol D has antihistamine and muscle relaxant properties and is a compound found in Five-Leaved Chaste Tree.

KEYWORDS: *Vitex negundo*, punjgush, Sambhalu, Unani, Muhallil, Qabiz, anti-inflammatory.

Latin name: *vitex negundo* Linn. (Verbenaceae).

Indian name: Sambhalu, Nirgundi, Sephali, Panjgusht (fanjangusht).

English Names: Five-Leaved Chaste Tree, Monk`s Pepper.

Taxonomical classification

Kingdom: *Plantae*- Plants.

Subkingdom: *Tracheobionta* – Vascular plants.

Super division: *Spermatophyte* – Seed plants.

Division: *Magnoliophyta* – Flowering plants.

Class: *Magnoliopsida* – Dicotyledons.

Subclass: *Asteridae.*

Order: *Lamiales.*

Family: *Verbenaceae* – Verbena family.

Genus: *Vitex* Linn.

Species: *Panjghust (vitex negundo)* Linn. – (Chaste tree) (Ladda, 2012).

General information

It is found throughout the greater part of India, ascending to an altitude of 1,500m. in the outer Himalayas. It is known under a variety of names in different languages.

Common names of *Vitex negunda* in different languages include:

- Arabic: *Aslag*
- Persian: Panjgusht (fanjangusht)
- Assamese: *Pochotia*
- Bengali: *Nirgundi*; *Nishinda*; *Samalu*
- Bontok: *Liñgei*
- Chinese: *Huang jing* (黃荆)
- English: *Five-leaved chaste tree*; *Horseshoe vitex*; *Chinese chaste tree*
- Filipino: *Lagundî*
- Gujarati: *Nagoda*; *Shamalic*
- Hindi: *Mewri*; *Nirgundi*; *Nisinda*; *Sambhalu*; *Sawbhalu* (निर्गुंडी)
- Ifugao: *Dabtan*
- Ilokano: *Dangla*
- Kannada: *Bile-nekki*
- Malayalam: *Indrani*
- Marathi: *Nirgunda*
- Punjabi: *Banna*; *Marwan*; *Maura*; *Mawa*; *Swanjan Torbanna*

- Sanskrit: *Nirgundi*; *Sephalika*; *Sindhuvara*; *Svetasurasa*; *Vrikshaha*(सिन्धुवार)
- Sinhala: *Nika*
- Tamil: *Chinduvaram*; *Nirnochchi*; *Nochchi*; *Notchi*; *Vellai-nochchi*
- Telugu: *Sindhuvara*; *Vavili*; *Nalla-vavili*; *Tella-vavili* (వావిలి / సిందువార) lekkali.

(Nadkarni, Wealth of India, 1976; Chopra,1956; CCRUM, 1987; Hakeem, 1311; Ibn-e-Sina, 1927; Ghani, 1921; Sing, M.P, 2005; Kabiruddin; Kritikar, 1996; Arya, 1996; Lubhaya, 1984; Multani.).

Panjghust (*vitex negundo*) is native to tropical Eastern and Southern Africa and Asia. It is widely cultivated and naturalized elsewhere(GRIN 2011).Countries it is indigenous to include Afghanistan, Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Japan, Kenya, Madagascar, Malaysia, Mozambique, Myanmar, Nepal, Pakistan, the Philippines, Sri Lanka, Taiwan, Tanzania, Thailand, and Vietnam (GRIN 2011). Panjghust *(vitex negundo)* are commonly found near bodies of water, recently disturbed land, grasslands, and mixed open forests (Nadkarni).

Morphology Description (Habit)

Panjghust *(vitex negundo)*, commonly known as the five-leaved chaste tree, is a large, erect, aromatic shrub or small tree growing from 2 to 8 m (6.6 to 26 ft) in height with quadrangular, densely whitish, tomentose branchlets, or sometimes, a small, slender tree. The bark is reddish-brown. Its leaves are digitate, with five lanceolate leaflets, sometimes three. Each leaflet is around 4 to 10 cm (1.6 to 3.9 in) in length, with the central leaflet being the largest and possessing a stalk. The leaf edges are toothed or serrated and the bottom surface is covered in hair. The flowers are bluish purple, forming large, terminal, often compound, pyramidal panicles, 10 to 20 cm (3.9 to 7.9 in) in length. The petals are of different lengths, with the middle lower lobe being the longest. Both the corolla and calyx are covered in dense hairs. The fruit is a succulent drupe, 4 mm (0.16 in) in diameter, rounded to egg-shaped. It is black or purple when ripe. (Nadkarni, Wealth of India 1976; CCRUM, 1987; Hakeem,1311; Ibn-e-Sina, 1927; Ghani, M., 1921; Sing, M.P., 2005; Kabiruddin; Kritikar, 1996; Arya, 1996; Lubhaya, R., 1984; Multani).

Principal Constituents

The principal constituents the leaf juice are casticin, isoorientin, chrysophenol D, luteolin, p–hydroxybenzoic acid and D-fructose and other constituents like vitamin C, carotene, β-sitosterol and C-glycoside. The main constituents of the oil are sabinene, linalool, terpinen-4-ol, β-caryophyllene, α-guaiene and globulol constituting 61.8% of the oil.the seeds contain hydrocarbons, β-sitosterol, benzoic acid and phthalic acid. (Vishal, 2005; Hussain, 1992).

Therapeutic constituents

The chemical constituents of *Vitex negundo* are the monoterpenes, agnuside, eurostoside and aucubin. The flavonoids casticin, chrysosplenol and vitexin are also present in the herb. Chrysosplenol D has antihistamine and muscle relaxant properties and is a compound found in *Vitex negundo* (*www.plantayurveda.com*). In vitro and animal studies have shown that chemicals isolated from the plant have potential anti-inflammatory, (Dharmasiri, 2003) antibacterial, (Perumal, 1998) antifungal (Sathiamoorthy, 2007; Damayanti, 1996) and analgesic (Gupta RK, 2005; Gupta M, 1997, 1999; Dharmasiri, 2003) activities.

Phytochemicals or secondary metabolites usually occur in complex mixtures that differ among plant organs and stages of development. Knowledge of the phytochemical constituents is very essential to enable investigation of the actual effectiveness of the plant in medicine. The different phytochemical constituents have been reported from different parts of Panjghust *(vitex negundo)*.

Leaves contain Hydroxy-3,6,7,3′,4′- pentamethoxyflavone (Banerji, 1969); hydroxybenzoyl mussaenosidic acid (Sehgal,1982,1983); trimethoxyflavanone;(Achari, 1984); viridiflorol; β-caryophyllene; sabinene; 4-terpineol; gamma-terpinene; caryophyllene oxide; 1-oceten-3-ol; globulol (Singh,V. 1999); betulinic acid; ursolic acid; n-hentriacontanol; β-sitosterol; p-hydroxybenzoic acid (Chandramu,2003) protocatechuic acid; oleanolic acid; flavonoids (Surveswaran,2007) angusid; casticin; vitamin-C; nishindine; gluco-nonitol; p-hydroxybenzoic acid; sitosterol (Khare,2004).

The seeds contain 3β -acetoxyolean-12-en-27-oic acid; 2α, 3α-dihydroxyoleana-5,12-dien-28-oic acid; 2β,3α diacetoxyoleana-5,12-dien-28-oic acid; 2α, 3β-diacetoxy-18-hydroxyoleana-5,12-dien-28-oic acid (Chawla,1992) vitedoin-A; vitedoin-B; a phenylnaphthalene-type lignan alkaloid, vitedoamine-A; five other lignan derivatives (Ono, 2004); 6-hydroxy-4-(4-hydroxy-3- methoxy-phenyl)-3-hydroxymethyl-7-methoxy-3, 4-

dihydro-2-naphthaldehyde; β-sitosterol; p-hydroxybenzoic acid; 5-oxyisophthalic acid; n-tritriacontane, n-hentriacontane; n-pentatriacontane; n-nonacosane (Khare,2004; Vishwanathan & Basavaraju, 2010).

Roots contain 2β, 3α-diacetoxyoleana-5,12-dien-28-oic acid; 2α,3α-dihydroxyoleana-5,12-dien-28-oic acid; 2α,3β -diacetoxy-18-hydroxyoleana-5,12-dien-28-oic acid; vitexin and isovitexin (Srinivas,2001); negundin-A; negundin-B; (+)-diasyringaresinol; (+)-lyoniresinol; vitrofolal-E and vitrofolal-F (Azhar-Ul, 2004); acetyl oleanolic acid; sitosterol; 3-formyl-4.5-dimethyl-8- oxo-5H-6,7-dihydronaphtho (2,3-b)furan (Vishnoi,1983).

Essential oil of *Vitex negundo* contains δ-guaiene; guaia-3,7-dienecaryophyllene epoxide; ethyl-hexadecenoate; α-selinene; germacren-4-ol; caryophyllene epoxide; (E)-nerolidol; β-selinene; α-cedrene; germacrene D; hexadecanoic acid; p-cymene and valencene. (Khokra, 2008).

Therapeutic actions: Table (A)

Vitex negundo extracts have been used in Unani System of Medicine as Anti-inflammatory (*Muhalil*), *Qabiz* (Astringent), *Mulatif* (demulcent), *Mufatteh* (Deobstruent), *Munafis* (Expectorant), tranquiliser, bronchial smooth muscle relaxant, anti-arthritic, antihelminthic and vermifuge, Anti-fungal, antipyretic, antihelminthic, *Muqawwi-e-Basar* (retino protective), *Mundamile qurooh* (wound healer), *Mujaffif* (Desiccant), *Jali* (cleanser), *Mulaiyan-e-Warm* (Resolvent), Antispasmodic, anti-bacterial, Anti pyretic, *Muffarah*, *Musakine Alam* (Analgesic), Anti septic (*dafe taaffun*), rejuvenating, anti-rheumatic, diuretic, expectorant and are useful as demolecent in dysentery, in cephalgia, otalgia, colic, uropathy, wound and ulcers. Bark is useful in odontalgia, veminosis and ophthalmopathy (Vishal,R. 2005). Flowers are cool, astringent, carminative, hepatoprotective, digestive, febrifuge, vermifuge and are useful in haemorrhages and cardiac disorders. Fruite is nervine, cephalic, aphrodisiac, emmenagogue and vermifuge (Hussain, 1992; Chopra, 1956). Bark is useful in odontalgia, veminosis and ophthalmopathy. The seeds are recommended for controlling premature ejaculation. In Unani medicine Khare (2004) outlines the applications of Panjghust *(vitex negundo)*, commonly known as *Nisinda* in Unani medicine. The seeds are administered internally with sugarcane vinegar for removal of swellings. Powdered seeds are used in spermatorrhoea and serve as an aphrodisiac when dispensed along with dry *Zingiber officinale* and milk (Vishwanathan & Basavaraju, 2010). Ayurvedic uses of *Panjghust* (vitex negundo) are described by Tirtha, 1998. People sleep on pillows stuffed with *Panjghust*

*(*vitex negundo*)* leaves to dispel catarrh and headache and smoke the leaves for relief. Crushed leaf poultice is applied to cure headaches, neck gland sores, tubercular neck swellings and sinusitis. Essential oil of the leaves is also effective in treatment of venereal diseases and other syphilitic skin disorders. A leaf decoction with *Piper nigrum* is used in catarrhal fever with heaviness of head and dull hearing. A tincture of the root-bark provides relief from irritability of bladder and rheumatism. Jadhav and Bhutani (2005) reported the Ayurvedic use of Panjghust *(vitex negundo)* in dysmenorrhea. Patkar (2008) refers to the formulations described in *Anubhoga Vaidya Bhaga*, a compendium of formulations in cosmetology, in outlining the use of Panjghust *(vitex negundo)* leaves along with those of *Azadirachta indica*, *Eclipta alba*, *Sphaeranthus indicus* and *Carum copticum* in a notable rejuvenation treatment known as *Kayakalpa*.

The Chinese Pharmacopoeia prescribes the fruit of Panjghust *(vitex negundo)* in the treatment of reddened, painful, and puffy eyes; headache and arthritic joints (Liu, 2005).

It has been claimed to possess many medicinal properties (Tandon, 2005). Leaves of panjghust (*vitex negundo*) have been investigated for its anti-inflammatory activity in past (Telang *et al.*, 1999; Jana, 1999; Sharma, 1980; Dharmasiri, 2003; Vishal & Gupta, 2006), including its mechanism of action (Telang, 1999; Dharmasiri, 2003). Telang et al (1999) first noticed non-steroidal anti-inflammatory drugs (NSAID) like activity of Panjghust *(vitex negundo).* Similarly, fresh leaves of Panjghust *(vitex negundo)* have been suggested to possess anti-inflammatory and pain suppressing activities possibly mediated via prostaglandin (PG) synthesis inhibition, antihistaminic, membrane stabilizing and antioxidant activities (Dharmasiri, 2003). The subeffective doses of Panjghust *(vitex negundo)* potentiated anti-inflammatory activity of phenylbutazone and ibuprofen in the respective inflammatory models as an adjuvant along with standard anti-inflammatory drug. It can possibly lower the dose requirement as well as adverse effects of standard anti-inflammatory drugs (Vishal, 2005).

Table (A):- Therapeutic Actions (*Af'aal -o-Khawas*)

S. N.	Pharmacological Action (*Afaal-o-Khawas*)	Unani Reference	Ethnobotanical Reference
1.	Discutient (*Muhalil*) Anti-inflammatory	Multani, N.A; Ibn-e-Sina (1927), Lubhaya, 1984; Kabiruddin. (1951).; Ghani, M. (1921); Hakeem,1311 A.H; CCRUM part 1, 1987;	Arya Vaidya Arya, (1996) Anonymous, 1976 Sing, M.P 2005;

2.	Analgesic	Ibn-e-Sina (1927), Kabiruddin. (1951).; Ghani, M. (1921); Hakeem,1311 A.H;	Ravishankar and Shukla2007; Gupta et al 1999; Telang et al 1999; Gupta and Tendon 2005;
3.	Astringent	Kabiruddin.(1951); CCRUM, 1987;	
4.	Demulcent	Ibn-e-Sina (1927), Hakeem,1311 A.H; CCRUM 1987;	
5.	Deobstruent	Kabirudin, N.A; Ibn-e-Sina (1927), Hakeem,1311 A.H; CCRUM, 1987;	
6.	Expectorant	CCRUM, 1987;	
7.	Anti-fungal		Guleria, 2006; Sathiamoorthy, 2007; Aswar, 2009.
8.	Anti-helminthic (*Qatile kiram shikam*)	Ibn-e-Sina (1927), Hakeem,1311 A.H; Multani, N.A; Prasad, 1994; Lubhaya,1984;	Arya 1996; Kirtikar 1996;
9.	Eye Tonic (*Muqawwi-e-Basar*)	Kabirudin, N.A; Ghani 1921;	Arya 1996; Kirtikar 1996;
10.	Wound-Healer (*Mundamile qurooh*)	Lubhaya 1984; Prasad 1994; Ghani 1921; Hakeem 1311 A.H;	Arya 1996; Kirtikar 1996;
11.	Dessicant (*Mujaffif*)	Kabiruddin. (1951). Ibn-e-Sina (1927), Ghani, M. (1921);	
12.	Cleanser	Kabiruddin. (1951). Ghani, M. (1921); Hakeem,1311 A.H;	
13.	Resolvent (*Mulaiyan-e-Warm*)	Kabiruddin. (1951). Ibn-e-Sina (1927), Hakeem,1311 A.H;	
14.	Antispasmodic	Prasad 1994;	Arya 1996; Anonymous,1976
15.	Anti bacterial	Prasad, 1994; Kabirudin,N.A;	Anonymous,1976
16.	Anti pyretic	Lubaya,1984; Prashad, 1994; Ibn-e-Sina (1927),	Arya 1996; Anonymous1976; Kirtikar 1996;
17.	Anti septic (*Dafe taaffun*)	Kabiruddin. (1951).	

Therapeutic Indications

The leaves possess discutient (*Muhalil*) properties and are applied to rheumatic swellings of the joints and in sprains. The juice of the leaves is used for the treatment of foetid discharges. They show anti-inflammatory, antibacterial and antifungal activity. Because of its anti-inflammatory, antibacterial and antifungal properties, the plant is useful in treating sores and skin infections. *Vitex negundo* relieves muscle aches and joint pains. The herb is effective in treating vaginal discharge. It also enhances the male lidibo. Table (B).

Table (B):- Therapeutic Indications			
S. No.	**Indications**	**Unani Reference**	**Ethnobotanical Reference**
1.	*Wajaul Mafasil* (Rheumatism and Musculoskeletal disorders)	Lubhaya1984; Multani,N.A; Zilur Rahman1974; Prasad, 1994; CCRUM 1987;	Kirtikar 1996; Singh MP 2005; Anonymous1976;
2.	*Suaal* (Cough)	CCRUM part 1, 1987;	
3.	Intestinal Worms	Multani, N.A; Prasad, 1994; Lubhaya,1984;	Kirtikar 1996; Anonymous1976
4.	Wound healing	Lubhaya 1984; Kabiruddin 1951; Ghani 1921;	Arya1996;
5.	Throat pain	Kabiruddin 1951; Ghani 1921	
6.	*Kula* (Stomatitis)	Kabiruddin 1951; Ghani 1921; Ibn-e-Sina 1927:	
7.	*Warm raham* (Metritis and Endometritis)	Multani, N.A; Prasad 1994; Kabiruddin 1951; Ghani 1921; Ibn-e-Sina 1927: Hakeem,1311 A.H;	
8.	Orchitis	Multani, N.A; Lubhaya 1984 ; Prasad 1994; Kabiruddin 1951; Ghani 1921; Ibn-e-Sina 1927	Arya 1996; Kirtikar 1996; Singh MP 2005;
9.	*Warm miqad* (Inflammation in ano)	Kabirudin1951; Ghani 1921;	
11.	Mumps	Multani, N.A; Lubhaya1984; Prashad 1994	
12	Bronchitis and pneumonia	Multani, N.A; Ghani 1921;	
13	Tuberculosis	Multani, N.A;	Singh MP 2005;
14.	Bone Tuberculosis	Multani, N.A;	
15.	Khanazeer (lymph node enlargement)	Lubhaya,1984;	
16.	Gonorrhoea	Lubhaya1984; Prasad, 1994;	Kirtikar 1996; Singh MP 2005;
17.	Gout		Arya1996;
18.	Spleen-o-hepatomegaly	Kabirudin1951; Ghani 1921; Ibn-e-Sina 1927; Hakeem,1311 A.H;	Arya 1996; Kirtikar 1996; Singh MP 2005;
19	Ottolgia		Arya 1996; Kirtikar 1996; Anonymous,1976
20.	Headache	Ibn-e-Sina 1927, Hakeem,1311 A.H;	Kirtikar 1996; Singh MP 2005; Anonymous,1976
21.	Jaundice	Ghani 1921; Ibn-e-Sina 1927,	
22.	Snake bite	Ibn-e-Sina 1927,	Kirtikar 1996;
23.	Bites of wild animals	Ibn-e-Sina1927,, Hakeem,1311 A.H;	
24.	Mania (*Junoon*)	Hakeem,1311 A.H;	
25.	Palpitation (*Khafkan*)	Hakeem,1311 A.H;	

Pharmacological evidences

Anti-inflammatory and analgesic activity

Anti-inflammatory properties of Panjghust *(vitex negundo)* extracts in acute and sub-acute inflammation were established by Yunos et al. (2005) and Jana et al. (1999) Anti-inflammatory and pain suppressing activities of fresh leaves of Panjghust *(vitex negundo)* are attributed to prostaglandin synthesis inhibition (Telang,1999), antihistamine, membrane stabilising and antioxidant activities (Dharmasiri, 2003).

Effect on oxidative stress

Leaf extracts of Panjghust *(vitex negundo)* were determined to possess anti-oxidant potential by (Tiwari, 2007). The extracts were useful in decreasing levels of superoxide dismutase, catalase and glutathione peroxidase in Freund's adjuvant induced arthritic-rats (Devi, 2007). The extracts also possess the ability to combat oxidative stress by reducing lipid peroxidation owing to the presence of flavones, vitamin C and carotene (Vishal, 2005). Rooban et al. evaluated the antioxidant and therapeutic potential of Panjghust *(vitex negundo)* flavonoids in modulating solenoid-induced cataract and found it to be effective.

Enzyme-inhibitory activity

Root extracts of *Panjghust (vitex negundo)* showed inhibitory activity against enzymes such as lipoxygenase and butyryl-cholinesterase (Azhar, 2004); α-chymotrypsin (Lodhi, 2008); xanthine-oxidase (Umamaheswari, 2007) and tyrosinase (Azhar, 2006). Woradulayapinij et al. (2005) reported the HIV type 1 reverse transcriptase inhibitory activity of the water extract of the aerial parts of Panjghust *(vitex negundo).*

Effect on reproductive potential

The flavonoid rich fraction of seeds of *Panjghust (vitex negundo)* caused disruption of the latter stages of spermatogenesis in dogs (Bhargava, 1989) and interfered with male reproductive function in rats (Das, 2004). It must however be noted that these findings are in sharp contrast with the traditional use of *Panjghust (vitex negundo)* as aphrodisiac (Khare, 2004). Hu et al. (2007) determined that ethanolic extracts of *Panjghust (vitex negundo)* showed oestrogen-like activity and propounded its use in hormone replacement therapy.

Histomorphological and cytotoxic effects

Tandon and Gupta (2004) studied the histomorphological effect of Panjghust *(vitex negundo)* extracts in rats and found the stomach tissue to be unaffected even by toxic doses; while

dose-dependent changes were observed in the heart, liver and lung tissues. Cytotoxic effect of leaf extracts of Panjghust *(vitex negundo)* was tested and affirmed using COLO-320 tumour cells (Smit, 1995). On one hand, Diaz et al. (2003) found the chloroform extracts of Panjghust *(vitex negundo)* leaves to be toxic to a human cancer cell line panel while on the other; Yunos et al. (2005) reported that Panjghust *(vitex negundo)* extracts were non-cytotoxic on mammary and genito-urinary cells of mice.

Drug potentiating ability

Administration of Panjghust *(vitex negundo)* extracts potentiated the effect of commonly used anti-inflammatory drugs such as ibuprofen and phenylbutazone (Tandon, 2006); analgesics such as meperidine, aspirin (Gupta, 2005), morphine and pethidine; sedative-hypnotic drugs like pentobarbitone, diazepam (Gupta, M.1997) and chlorpromazine (Gupta, M.1999); anti-convulsive agents such diphenylhydantoin and valporic acid (Tandon, 2005).

In addition to the above mentioned activities Panjghust *(vitex negundo)* extracts have also been tested for a range of other systemic effects. Leaf extracts of Panjghust *(vitex negundo)* were found to possess hepato-protective activity against liver damage induced by d-galactosamine (Yang, 1987), commonly used tubercular drugs (Tandon, 2008) and carbon tetrachloride (Tasduq, 2008; Raj, 2008). Villasenor and Lamadrid (2006) have provided an account of the anti-hyperglycemic activity of Panjghust *(vitex negundo)* leaf extracts. Laxative activity of Panjghust *(vitex negundo)* leaf extracts was exhibited in rats by Adnaik et al. (2008). Methanolic root extracts of Panjghust *(vitex negundo)* showed antagonization of the lethal activity induced by venom of *Vipera russellii* and *Naja kaouthia* (Alam, 2003). Immunomodulatory effect of Panjghust *(vitex negundo)* extracts has been reported by Ravishankar and Shukla (2007).

Biological activity

Panjghust*(vitex negundo)* is an effective bio-control agent. The extracts of *Panjghust (vitex negundo)* possess Anti-bacterial (Samy, 1998), Anti-feedant (Sahayaraj, 1998), Anti-filarial (Sahare, 2008), Anti-fungal (Guleria, 2006; Sathiamoorthy, 2007; Aswar, 2009), Anti-larval (Nathan, 2006), Anti-viral (Nguyen-Pouplin, 2007), Insecticidal (Paneru, 2001; Raja,2000), Larvicidal (Rajendran, 2008, En-shun, 2009, Kamaraj, 2008; Vishwanathan & Basavaraju, 2010), Mosquito repellent (Karmegam,1997; Kannathasan, 2007, 2008; Rahuman, 2009; Pushpalatha, 1995.

Commercial formulationscontaining *V. negundo*

Panjghust (vitex negundo) has been used effectively in formulating commercial products by various Pharma companies for inflammatory musculoskeletal disorders (Rajanna, 2005; Dutta, 1974; Sharma, 2005; Vishwanathan & Basavaraju, 2010), Rheumatic disorders (Venkataranganna, 2000), skin eruptions (Ravichandran, 2004), Haemorrhoids (Sahu,2001; Reddy,1984), Vaginitis & Cervicitis (Singh, 2001), Liver ailments (Ahmad, 2002; Najmi, 2005.) and eye ailments (Mitra, 1986).

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