International Journal of Pharmaceutics & Drug Research

Available online at http://ijpdr.com ISSN: 2347-6346

Review Article

A REVIEW ON *CELASTRUS PANICULATUS*WILLD.

M.P. Kabra*, S.S. Bhandri, M.K. Vaishnav, R.B. Gupta

Department of Pharmacology, Kota College of Pharmacy, Kota (Rajasthan)

Corresponding Author's Email: sanskarkabra@gmail.com

Received 13 June 2013; Revised 25 June 2013; Accepted 12 August 2013

ABSTRACT

Celastrus paniculatus linn. belongs to the family Celastraceae commonly known as Malkanguni. It is found as a large climbing shrub with yellow fruits in the sub himalayan tract & all over hilly parts. It contains carboxylic acids, fatty acids, sterols, triterpenoids, etc. According to the ayurvedic system of medicine it is used to remove 'Vata' and 'Kapla'. Malkanguni oil is reported to be toxic to rats. LD50 i.p. of the malkanguni oil is 1.75 gm/kg. It enriches blood and cures abdominal complaint. It is also used as appetizer, laxative, emetic, aphrodisiac, powerful brain tonic, in diarrhoea& dysentery. Seeds supposed to have good stimulating properties, for sharpening the memory & used in rheumatism, gout and leprosy. The bark is abortifacient, depurative and brain tonic, leaves are emmenagogue, and leaf juice is used in dysentery. It is reported to be a good antidote for opium poisoning.

KEY WORDS: *Celastrus paniculatus*, Malkanguni, brain tonic, emmenagogue, abortifacient.

INTRODUCTION:

Botanical Name:

*Celastruspaniculatus*Willd.

Classification:

Kingdom	:	Plantae
Division	:	Angiospermae
Class	:	Dicotyledonae
Family	:	Celastraceae
Genus	:	Celastrus
Species	:	paniculatusWilld.

NAMANCLATURE:

Classical name:

Jyotishmati, Katabhi, Jyotishka, Kanguni, Kangunika, PinyaLata, Kakundani, Kakandaki, Katavika, Vega, Peetataila.

Vernacular Names:

English - Climbing staff plant.

Hindi - Malkangani, Malkunki, Malkungi,

Bengali - Kondgaidh, Malkangni, Sankhu.

Gujarati- Malkangana

Kannad- Kariganne

Marathi - Malkangoni, Dhimarbel, Kanguni, Pigavi,

Punjabi - Sankhu, Sankhii.

Tamil - Valuluvai, Siruvaluluvai, Adibaricham, Kaligam, Manjakodi, Sodiyam.

Telagu-Danti, Cettu, Gundumida, Malkanguni-vittulu, Bavungie, Maneru, Moierikata, Maiyalaerikut.

Oriya - Korsana, Pengnavbadhu,

Santhal- Kujari, Kujri

Figure 1: plants of *Celastrus paniculatus*

DISTRIBUTION:

- It is distributed throughout India, up to an attitude of 1600 m, outer Himalaya from Jhelum to Assam, Eastern Bengal, Bihar, hilly parts of Eastward of Punjab, in dry deciduous forests of Aravalli, Gujarat, Kontan, South India including Karnataka (Kokate, 1999).

PROPAGATION AND CULTIVATION:

- *Celastruspaniculatus*can be propagated by seeds. However seed germination is very poor if sown directly without any presowing treatment. The dormancy of freshly harvested seeds of *Celastruspaniculatus*is reported to be preliminarily related to inhibitory influence of hard seed coat. Treatment of seed with petroleum ether or alcohol increased the germination percentage. Germination was further augmented by GA treatment. The maximum germination has been observed in seeds pretreated with 350 mg/1 GA3 solution. The best season of germination is spring (Kokate, 1999; Kirtikar and Basu, 2005).

PARTS USED:

- Root, bark, leaf, seed, seed oil

BOTANICAL DESCRIPTION:

a) Macroscopic: Dried ripe seeds more or less covered by orange-red crusty aril, seed without aril also present, measuring 5-6 mm in length and 2.5-3.35 mm in breadth, a few roughly three sided being convex on the sides and a few two sided

with one convex and other more or less flat side, one edge of many seeds show a faint ridge or raphe on the whole margin; surface generally smooth and hard; colour, light to dark brown; odour, unpleasant; taste, bitter (Kokate,1999; Kirtikar and Basu, 2005).

b) Microscopic:

1) **SEED-** Shows single layered epidermis covered externally with thick cuticle and filled with tannin, followed by 4-6 layers of thin-walled, collapsed parenchymatous cells and layer of radially elongated stone cells; parenchyma of top one or two layers longer than of the below with triangular intercellular spaces; inner most layer of parenchyma containing prismatic crystals of calcium oxalate; beneath stone cells layer quadrangular to octagonal, tangentially elongated cells filled with brownish contents; endosperm composed of polygonal, thin-walled, parenchymatous cells having oil globules and aleurone grains; embryo spathulate in fleshly endosperm containing oil globules and aleurone grains (Kokate,1999)

.

2) **POWDER**- Oily, dark brown; under microscope shows groups or endospermic parenchyma, stone cells, oil globules and aleurone grains and shows fluorescence under U.V. light as following:-

Powder as such: Greenish- brown

Powder + 1 N NaOH in Methanol: Light green

Powder + Nitrocellulose in Amyl Acetate: Yellowish-green (Kirtikar and Basu, 2005).

INDENTITY, PURITY AND STRENGTH:

- Foreign matter - Not more than 2 per cent.
- Total ash - Not more than 6 per cent.
- Acid-insoluble ash- Not more than 1.5 per cent.
- Alcohol-soluble extractive- Not less than 20 per cent.
- Water-soluble extractive- Not less than 9 per cent.
- Oil Contents- Not less than 45 per cent.

T.L.C.:

T.L.C. of alcoholic extract of drug on Silica gel G plate using Toluene: Ethylacetate (90: 10) shows two spots at Rf. 0.82 (pink) & 0.94 (yellow) in visible light. Under U.V. (366 nm) four fluorescent zones visible at Rf. 0.54, 0.82, 0.89, (all blue) & 0.94 (yellow). On exposure to Iodine vapour eight spots appear

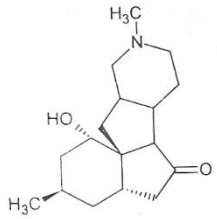
at Rf. 0.04, 0.15, 0.20, 0.35, 0.54, 0.63, 0.82 & 0.89 (all yellow). On spraying with Vanillin-Sulphuric acid reagent and heating the plate at 105^0C for ten minutes four spots appear at Rf. 0.35, 0.54 (both blue), 0.82, 0.89 (both greenish blue) (Kirtikar and Basu, 2005).

CHEMICAL CONSTITUENTS:

It contains acetic acid, benzoic acid, formic acid, linoleic acid, linolenic acid, palmitic acid and stearic acid. It also contains celapagine, celapanigine, celapanine, celastrol, celastrine, paniculatine, malkanguniol and related polyalcohals, malkangunin (sesquiterpene ester), paniculatadiol, β amyrin, β sitosterol, 5-stigmasten-3 β -01 (seed), pristimerin; (stem, root bark); hydrocarbon; n-triacontanol, zeylasterol and zeylasterone (root bark); malkanguni oil, malkanguniol, sesquiterpene ester- malkangunin, two sesquiterpenoid tetra esters-celapanine and celapanigine, triterpenediol, paniculatidiol, β- amyrin, β-sitosterol and fatty acids (seed oil) ; β-dishydroagarofuramsesquiterpene polyesters (whole plant) (Kokate,1999; Kirtikar and Basu, 2005).

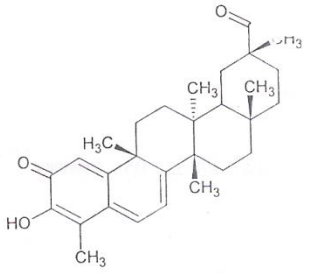
Structure of Important Chemical Constituents:

Paniculatine



Pristimerin

latus. RBA: Antimalarial.



PHARMACOLOGICAL ACTIVITIES:

Antihistaminic, sedative, anticonvulsant, antiprotozoal, antiviral, antipyretic, antiulcerogenic, anti-emetic, antibacterial, schizontocidal, emmenagogue, hypotensive, stimulant, central muscle relaxant, hypolipidaemic, antiatherosclerotic, spasmolytic, tranquillizar, anti-inflammatroy, antifertility (antispermatogenic) (Kokate,1999).

TOXICOLOGY:

Malkanguni oil is reported to be toxic to rats. LD50 i.p. of the malkanguni oil is 1.75 gm/kg (Khandelwal, 2003).

THERAPEUTIC EVALUATION:

A clinical trial was taken on 30 patients of residual schizophrenia to assess the effect of Smritisagara rasa, an Ayurvedicherbomineral preparation consisting *Celastruspaniculatus*as one of the ingredients. It was administered in doses of 250 mg TDS with honey for three months. Clinical studies revealed that 11 out of 30 patients showed significant improvement and approximately similar number showed moderate improvement (Khandelwal, 2003; Kirtikar and Basu, 2005).

Formulations and preparations:

Smritisagara rasa, Laghuvishagarbhataila, Chitrakaditaila, Mahapaishachikaghrila.

Substitutes and adulterants:

Clove oil is used as substitute to Celastrus oil.

Actions and uses:

The bark is abortifacient, depurative and brain tonic, leaves are emmenagogue, and leaf juice is used in dysentery. It is reported to be a good antidote for opium poisoning. Seeds are acrid, bitter, laxative, thermogenic, emollient rubifacient stimulant, intellect promoting digestive emetic, expectorant, appetizer, aphrodisiac, cardiotonic, anti-inflammatory, diuretic, emmenagogue, diaphoretic, febrifuge and tonic. They are useful in abdominal disorders leprosy, pruritus, leucoderma, skin diseases, paralysis, cerebral disorders, depression, arthritis, asthma, cardiac debility, inflammation, strangury nephropathy, amenorrhoea, dysmenorrhoea and fever. They are reported to sharpen the memory. The seed oil is better, thermogenic, intellect promoting, useful in abdominal disorders, beri-beri, rheumatic pains, sores, wound, eczema. The crushed root is used for pneumonia (Kokate, 1999; Kirtikar and Basu, 2005)

Ayurvedic properties:

Rasa-*katu, Tikta*

Guna-*Tikshna*

Veerya-*Ushna*

Vipaka-*Katu*

Prabhava-*Medhya*

Doshaghnata-*Vatakaphashamaka*

Rogaghnata-*Adrita, Sandhivata, Katishoola, Gandamala, Gulma, Shotha, Kasa, Shwasa, Kashtrtava, Kushtha, Kandu, Jwara*.

Karma-*Vatahara, Medhya, Deepana, Mootrala, Jwaraghna*

DOSES:

Seed – 1-2 gm;

Seed oil – 5-15 drops.

(If seeds are administered in more than prescribed doses, it can cause diarrhea and vomiting).

Storage:

To be stored in the air-tight containers in a cool and dark place (Kokate, 1999).

Description of the pharmacological activities:

1. **Nervine tonic activity:** Pharmacological studies in cats and dogs have been shown that *Celastruspaniculatus*has sedative and tranquillizing properties. Seed extracts increased the total lipid and phospholipid contents of the brain of rats treated for 30 days (Bidwai*et al*., 1987).

2. **Memory enhancement activity:** The effects of Celastrus oil extracted from the seeds of *Celastruspaniculatus*on learning and memory in a two compartment passive avoidance task has been studied in albino rats. The effects on contents of norepinephrine (NE), dopamine (DA) and serotonin (5-HT) in the brain and on the levels of their metabolites both in the brain and urine has been assessed. Significant improvement has been observed in the retention ability of the drug treated rats compared with saline administered controls. The contents of NE, DA and 5-HT and their metabolites in the brain have been significantly decreased in the drug treated group. These data indicate that Celastrus oil causes an overall decrease in the turn over of all the three central monoamines and implicate the involvement of these aminergic systems in the learning and memory process (Nalini*et al*., 1992).

3. **Anti–spermatogenic activity:** Oil from seeds of *Celastruspaniculatus*may have useful anti–fertility effects (Bidwai*et al*., 1990). Also strong effects of a seed extract in damaging the seminiferous tubules and impairing the spermatogenesis of rats has been reported (Wangoo*et al*., 1988).

4. **Muscle relaxing activity:** The muscle relaxing activity of the *Celastruspaniculatus*has been studied in vitro on the isolated preparations of rat intestine. *Celastruspaniculatus*seeds extract has been produced a concentrate related relaxation of the rat ileum. Three

new sesquiterpenepolyol esters has been isolated from the carbon tetrachloride fraction of methanolic extract of *Celastruspaniculatus*which has been reported to show the relaxant effect (Borrelli*et al*., 2004).

5. **Anti–myelosuppressive activity:** Seeds of *Celastruspaniculatus*has been tested for the drug induced myelosuppression test using the cyclophosphamide as cytotoxic drug. Ethanolic extract and its chloroform soluble fraction & insoluble fraction has been studied on the albino rats. Results of the present finding suggest the ethanolic extract and its both chloroform soluble and insoluble fractions significantly protect the effect of cyclophosphamide as it has been observed by the hematological studies (Nayak, 2006).

6. **Immunomodulatory activity:** Seeds of *Celastruspaniculatus*has been studied for the immunomodulatory activities in the phagocytic activity, cell mediated and humoral immune system on albino rats. Ethanolic extract, its chloroform soluble fraction & insoluble fraction has been tested in the carbon clearance test, delayed type of hypersensitivity activity, T-cell population test and sheep erythrocyte agglutination test. It has been reported to stimulate the immune system in the dose dependent manner .These findings indicate that drug may activate CD_4 and CD_8 cells which influence the mechanism of the T-cell resulting in the increase in the T-cell immune response significantly (Nayak, 2008).

7. **Anti–anxiety activity:** The petroleum ether extract of the *Celastruspaniculatus*seeds has been evaluated for anti-anxiety activity by using the 'operant behaviour' (behavioural distribution) model of the anxiety in rats. It exerts significant antipunishment and antifrustration activities. Both these activities has been found to be less potent than diazepam (Jadhav, 1998).

8. **DNA cleavage protecting activity:** The effect of the *Celastruspaniculatus*methanolic extracts on the DNA cleavage induced by H_2O_2 UV-photolysis has been investigated. The extract has been reported to show a dose dependent protective effect on the DNA cleavage (Russo *et al*., 2001).

9. **Anti-arthritis activity:** In this study, the anti-arthritic effect on the oral

administration of the petroleum ether, alcoholic extracts of the *Celastruspaniculatus*Willd seeds on the Freund's adjuvant arthritis has been studied in the wistar albino rats. The body weight loss that has been found during the arthritic condition has been corrected on the treatment with petroleum ether, alcoholic extracts of the *Celastruspaniculatus*Willd seeds. The swelling of the paw during the secondary lesions has been markedly reduced. The results indicated that the seeds of *Celastruspaniculatus*have been endowed with anti-arthritic activity (Patil, 2007).

10. **Neuroprotective activity:** Aqueous extracts of *Celastruspaniculatus*seed has been reported to improve the learning and memory in rats. In addition these extracts has shown to have anti-oxidant properties, augmented endogenous anti-oxidant enzymes and decreased lipid peroxidation in rat brain. In the present study enriched forebrain primary neuronal cell cultures has been reported to use for the study of the neuroprotective effects of *Celastruspaniculatus*water soluble extract. The results suggest that *Celastruspaniculatus*water soluble extract protected the neuronal cells against glutamate-induced toxicity by modulating glutamate receptor function (Godkar*et al*., 2004).

11. **Analgesic and anti–inflammatory activity:** Methanolic extracts of *Celastruspaniculatus*and Tecomella undulate has been screened form their analgesic and anti-inflammatory activities (Ahmed, 1994).

12. **Schizontocidal activity:** *Celastruspaniculatus*Willd has been reported to have schizontocidal activity against plasmodium falciparum in vitro (Pavanad*et al*., 1989).

References:

1. Ahmed F., Khan R. A., Rasheed S. Preliminary screening of methanolic extracts of *Celastruspaniculatus*&*Tecomella undulate* for analgesic and anti-inflammatory activities. *Journal of Ethanopharmacology*. 1994, 42(3), 193-198.
2. Bidwai P. P., Wangoo D., Bhullar N. K. Antispermatogenic action of *Celastruspaniculatus*seed extract in the rat with reversible changes in the liver.

Journal of Ethanopharmacology. 1990, 28(2), 293-303.

3. Bidwai P. P., Wangoo D., Bhullar N. K. Effect of *Celastruspaniculatus* seed extract on the brain of the rats. *Journal of Ethanopharmacology*. 1987, 21(3), 307-314.
4. Borrelli F., Borbone N., Capasso R., Montesano D., Capasso F., Ferrara L., Longo r., Zollo F. New sesquiterpenes with intestinal relaxant effect from *Celastruspaniculatus*. *PlantaMedica*. 2004, 70(7), 652-656.
5. Godkar P. B., Gordon R. K., Ravindran, Doctor B. P. *Celastruspaniculatus* seed water soluble extract protect against glutamate toxicity in the neuronal cultures from rat forbrain. Phytomedicine. *International journal of Phytotherapy&Phytopharmacology*. 2004, 12(2), 172-179.
6. Jadhav R. B., Patwardhan B. Antianxiety activity of *Celastruspaniculatus Linn*. Seeds. *Indian Journal of Natural Products*. 1998, 19(3), 16-21.
7. Khandelwal K. R. Practical Pharmacognosy, Techniques and Experiments, sixteenth ed. NiraliPrakashan, Pune, India. 2006, 149-156.
8. Kirtikar K.R., Basu B.D. Indian Medicinal plants. Second ed. vol-I, International Book Distributors, Dehradun. 2005, 763-767.
9. Kokate C.K., Purohit A.P., Gokhale S.B.Pharmacognosy.NiraliPrakashan, Pune. 1999, 549-552.
10. Nalini K. Effect of *Centellaasiatica* fresh leaf extract on the learning and biogenic amine turnover in albino rats. *Fitoterapia*. 1992, 63(3), 232-237.
11. Nalini K., Karanth K. S., Rao A. Effect of *Celastruspaniculatus* on passive avoidance performance and biogenic amine turnover in albino rats. Fitoterapia. 1992, 63(3), 207-210.
12. Nayak S., Dixit V.K. Immunomodulatory activities of the seeds of *Celastruspaniculatus Linn. International journal of Pharmacology Biological Sciences*. 2008, 2, 1-12.
13. Nayak S., Dixit V.K. Studies of *Celastruspaniculatus Linn*. Seeds for Drug induced myelosuppression test on albino rats. *PlantaIndica*. 2006, 2, 27-31.
14. Patil K. S., Suryavanshi J. Effect of *CelastruspaniculatusWilld*. Seed on the adjuvant induced arthritis in rats. *Pharmacognosy Magazine*. 2007, 3(11), 177-181.

15. Pavanand K. Schizontal activity of *CelastruspaniculatusWilld*. against Plasmodium falciparum in vitro. *Phytotherapy* Research. 1989, 3, 136-139.
16. Russo A., Izzo A. A., Cardila V., Borrelli F., Vanella A. Indian medicinal plants as antiradicals and DNA cleavage protectors. *Phytomedicine*. 2001, 8(2), 125-132.
17. Wangoo D., Sharma V. Antispermatogenic effect of *Celastruspaniculatus* seed extract on testes of albino rats. *Fitoterapia* 1988, 59(5), 377-382.