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Review Article

A Comprehensive Overview of *Celastrus paniculatus* Seed Oil Intended for the Management of Human Ailments

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Abstract

Celastrus paniculatus belonging to the family Celastraceae generally known as the black oil plant or Malkangani or Jyotishmati. The scrambling through a yellowish corky bark, climbing poly gamodioecious category of shrub requires support to climbs up and distributed almost all over India at the altitude of 2000 m. The seeds are also reported as anxiolytic and anticonvulsant properties, while the root and its bark considered being useful for the treatment of malaria, cancer, and brain-tonic. Plant of Jyotishmati are broadly used in the Ayurvedic system of the medicine to cure many diseases such as; appetizer, aphrodisiac, arthritis, asthma, antipyretic, amenorrhea, anti-inflammatory, acrid, arthralgia, beriberi, cardiotonic, diuretic, diaphoretic, depression, emollient, skin-diseases, paralysis, thermogenic, intellect-promoting, emetic, expectorant, leprosy, leucoderma, cephalalgia, nephropathy, abdominal disorders, sores abortifacient, and treatment of the snake bite. These plants are naturally used in the treatment of vaginal discharge, a sensation of burning, blood purification after delivery, menstruation cycle, and abortion. The seed oil contains steroid alkaloids and bright natural coloring matter, celapanine, celapanigine, celapagine, celastrine, and paniculatine are the important alkaloids. It contains the fatty acid it's in founding; oleic acid (54.42%), palmitic acid (20.0%), linoleic acid (15.51%), and stearic acid (4.18%). The sesquiterpene alkaloids are derived from a new sesquiterpene (celapanol) which is alternately esterified by acetic, benzoic, nicotinic, and β- furoic acids.

Introduction

Celastrus paniculatus Wild. belonging to family Celastraceae is generally known as black oil plant (Malkangani). It is important medicinal plant the ability to improve memory, that having large woody climber (called a climbing shrub) scrambling with a yellow corky bark, shrub are climbing poly gamodioecious category requires support or grown a nearby tree, climbs up to over 10 m. It distributed almost all over India up to an altitude of 2000 m in the subtropical Himalaya region [1].

The stem is approximately 23 cm in diameter which a covered with lenticels, alternate, oblong and elliptic leaves; paniculate is a type of inflorescence with unisexual flowers[2]. The leaves of Malkangani are broadly ovate shape in nature. The flowers are yellowish green, unisexual, borne in terminal, pendulous panicles (flowering throughout the year). The fruit is the capsule, globose, 3-valved, 3-celled, 3 to 6 seeded; seeds areenclosed in the complete red arillus, ovoid, and brown (Fig. 1)[3].

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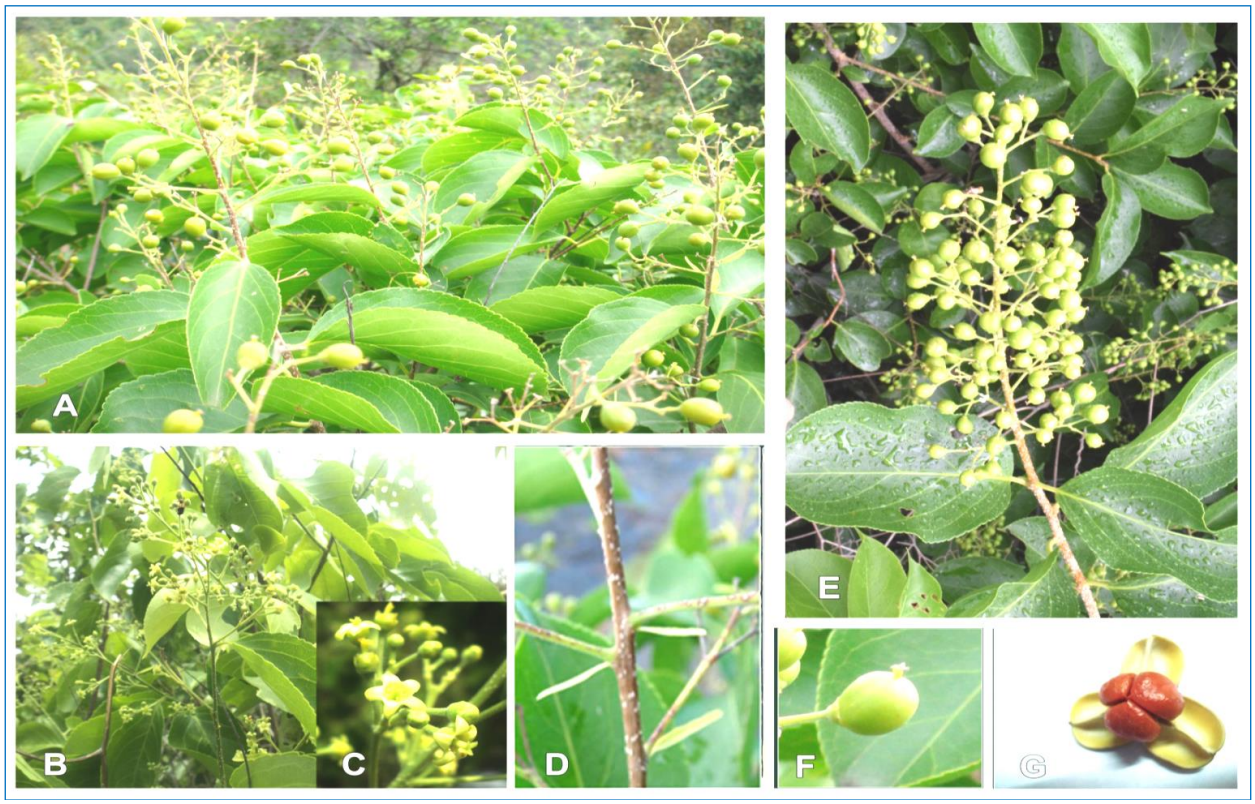

Fig.1:- Celastrus paniculatus Wild. ssp. angladeanusSJ. Britto, B. Mani and S. Thomas.**A**: The plant habit with young fruits. **B**: Flowering branchlets. **C:** Close-up of flowers. **D**: An Inflorescence with bracts. **E**: An Infructescence. **F**: Close-up of a capsule. **G**: Capsule with seeds[22].

Source: https://www.researchgate.net/publication/318882459/figure/fig2/AS:525142481739778@1502215132942/Celastrus-paniculatus-Willd-ssp-angladeanus-SJ-Britto-B-Mani-S-Thomas-A-The.png.

Celastrus paniculatus plant is broadly used in the Ayurvedic system of medicine to cure many diseases such as leprosy, skin diseases, asthma, depression, fever, paralysis, and arthritis[4].Celastrus paniculatus is one of such classical plant which is being used by the tribal people from different regions of India. *Celastrus paniculatus* would be collected in the month of October-November from Himalayan region. *Celastrus paniculatus* would be collected in the month of October-November from Himalayan region. It is a native of the Indian continent but is known to grow wildly in Indonesia, Laos, Maharashtra, Orissa, and Andaman Nicobar group of Islands[5,6].

Celastrus paniculatus is used to treat diseases like burning sensation, delivery before blood purification, inducing menstruation and abortion. Root, leaves, bark, and seeds oil are used against various diseases[7]. The seeds reported as a sedative, anxiolytic and anticonvulsant properties, while the root and bark considered being useful in the treatment of malaria, cancerous tumors in brain, brain-tonic, abortifacient, and taken internally for snake bite [8].

ntellect-promoting, improve hepatitis, laxative, emetic, expectorant, aphrodisiac, cardiotonic, diuretic, diaphoretic, febrifuge, moisturizer, leprosy, skin diseases, paralysis, migraine, arthralgia, asthma, leucoderma, antiulcer, cardiac-debility, nephropathy, dysmenorrhea[9,10].*Celastrus paniculatus* seed oil is unpleasant, blistering and intellect promoting and is useful in abdominal disorders, beri-beri and reduced the rate of gastric emptying but had no effect on gastrointestinal transit[11].

Celastrus paniculatus oil is extracted from seeds contains alkaloids, sterols, and bright coloring substance, celapanine, celapanigine, celapagine, celastrine, and paniculatine are some of the important alkaloids is rich in oleic acid (54.42%), which is the main fatty acid in the oil, together with linoleic acid (15.51%), palmitic acid (20.0%) and stearic acid (4.18%)[12,13]. *Celastrus paniculatus* also contains sesquiterpene like dipalmitoyl glycerol and alkaloids. Jyotishmati leaf has a good analgesic activity[14].

A new sesquiterpene (ester) and three sesquiterpene alkaloids (celapanin, celapanigin, celapagin) are isolated from Celastrus paniculatus. The sesquiterpene alkaloids are derived from a new sesquiterpene tetra-ol (celapanol) that alternately esterified with acetic, benzoic, nicotinic and β- furoic acids[15].

The components of the *Celastrus paniculatus* by formulated syrup are highly recommended for memory improvement and mental disorders. The extracts of methanolic are exhibits free-

radical scavenging properties and antioxidant effects in human non-immortalized fibroblasts[16].

A new sesquiterpene categorized as in 1α,6β,8β-triacetoxy-9β-benzoyloxydihydro-β-agarofuran, along with the 3 known compounds (1). 1α,6β,8α-triacetoxy-9α- benzoyloxydihydro-β-agarofuran, (2). AngulatueoidC (3). 1α,6β,8β,14-tetraacetoxy-9α-benzoyloxydihydro-β-agarofuran, was isolated from the carbon tetrachloride solution[17].

The leaves of Malkangani as a good antidote for opium poisoning and contains alkaloids, glycoside, and coloring matter[18].*Celastrus paniculatus* plant of leaves are need for standardization and development for Ayurvedic preparation using modern techniques of analysis[19].

Botanical Aspects

Scientific Name: *Celastrus paniculatus* wild., **Family-** Celastraceae, **Species-**Paniculatus, **Kingdom**- Plantae,**Class-** Angiospermae, **Genus-**Celastrus, **Order-** Celastrales,
Synonym: Celastrus dependent
Common Name:
Hindi-Malkakni, Malkagni, Malkamni
English- Black-oil tree, Intellect tree, Climbing-staff plant.
Sanskrit-Jyotishmati, Svarnalota, Sphutabandhani
Gujarati- Malkangana
Marathi- Kangani, Malkangoni
Telugu- Teegapalleru, Teega
Bengali-Malkanjri
Malayalam- Polulavam
Tamil-Valuluvai
Kannada- Kariganne[20,21]

Phytochemical Constituents

The phytochemical screening analysis of Leaf and seed extract of *Celastrus paniculatus* has shown in the presence of different constituents. That consist in alkaloids, glycosides, proteins & amino acids, phenolic compounds, tannins, fixed oil, carbohydrates, phenolic compounds, flavonoids, and saponins are present in only aqueous extract while Sterols and triterpenoids are present in aqueous and ethanolic extracts (Table 1)[23,24].
Table 1: Phytoconstituents present in different part of C. paniculatus.

S.N.	Chemical constituents	Leaf	Seed
1	Alkaloids	+	+
2	Carbohydrates	+	+
3	Glycosides	-	+
4	Proteins & Amino acids	-	-
5	Sterols &Triterpenoids	+	+
6	Phenolic Compounds	+	+
7	Flavonoids	+	+
8	Saponins	+	+
9	Tannins	+	+
10	fixed oil	+	+

Therapeutic Uses
Celastrus paniculatus plant of different parts used to overcome pain, local inflammations, anti-fungal etc. However, In Ayurveda recognizes used as an effective nervine tonic, sedative, and antidepressant. It's also used in the chronic debilitating diseases of the nervous system (Table 2)[25, 26].
Table 2: Bioactive components and therapeutic benefits of different parts of *C. paniculatus*

Plant part	Bio-active component	Therapeutic benefits
Leaves	Saponin	Shows anti-fungal and anti-microbial activity. Used in a cough and infections by decoctions of tea.
Root-Bark	β-sitosterol, Pristimerin, Zeylasteral, Terpenes, Zeylasterone, Celastrol.	Used in the treatment of malaria.
Seed	Alkaloids like Celastrine and Paniculatin, Fatty acids, Acetic acids, Benzoic acids, Sterol and tetracasanol.	Sedative and antidepressant actions, febrifugal, emetic, tranquilizer and diaphoretic properties. It is also used to treat ulcers desease, infections, and sores.

Pharmacological Activity
The pharmacological activity of Jyotishmati, scientifically known as *Celastrus paniculatus* Wild (Celastraceae) is one of the most important medicinal plants in Ayurvedic. The C. paniculatus plant has shown significant pharmacological activities like anti-arthritic, hypolipidemic and antioxidant, central nervous system, antifertility, analgesic, and anti-inflammatory and cardiovascular (Table 3).

Table 3: Pharmacological activity in *Celastrus paniculatus* (seed oil)

S.N.	Activity	Animal/ dose	Rout of administration	Pharmacology action	Reference
1	Central nervous system	Rats (1 g/kg)	Oral, i.m., i.p.	Produced sedation.	Saini et al. 2012[27]
		Rabbits (100mg/kg)	Oral	No sedative effect.	
		mice (1g/kg)	i.p. or i.m.	Mild sedation, Reduction of movement.	
2	Antifertility	Albino rats (0.2ml/animal/48 h)	i.p.	Repair and regenerative change in testis of rats, vacuolization, depletion of germ cell and arrest of spermatogenesis.	Godkar et al. 2006[28]
3	Antifungal Activity	(Albino Rat) 5ml/kg	Oral, ointment	Showed a strong inhibitory effect.	Bidwai et al. 1990[29]
4	NSAIDs	Albino Rat (5-10 ml/kg)	i.v.	Anti-inflammation and analgesic activity.	Parcha et al. 2003[30]
5	Hypo-lipidaemic	(500mg/kg/d1-120) rabbits	Oral	Increased fecal excretion of cholesterol.	Shashank et al. 2017[31]
6	Antimalarial	(Albino Rat) 10mg/kg	Root bark and stem	Highest antimalarial activity.	Pavanandt et al. 1989[32]
8	Antibacterial	(Albino Rat) 0.4-1% v/v	Oral	Showed good antibacterial effect against microbes.	Russo et al. 2001[33]
9	Anti-Arthritic Activity	Wistar albino rats	Oral	Reduce arthritic progression.	Patil et al. 2007[34]
10	Antidepressant	Swiss young albino mice (50mg/kg)	Oral	Antidepressant, MAO-inhibitor activity & decrease plasma corticosterone levels.	R.Valecha et al. 2017[35]
11	Cardiovascular	(50-100 mg/kg in cat) (1 gm/kg in dog)	Oral	Gradual fall in cardiac output, bradycardia and increase in pulse pressure on isolated heart	Gaitonde et al. 1957[27]
12	Wound Healing Activity	(Swiss albino rats) 8mg/ml of 0.2% sodium alginate gel	Ointment, (leaves oil)	Screened for wound healing.	Harish et al. 2008[4]

Traditional Uses

1. *Celastrus paniculatus* plant are used too many different diseases and used as a powerful brain tonic, increase mental activity, minor joint pains. It is Improve memory and brain power as well as retention and recalling power appetite stimulant as well as the emetic.
2. These are facilitated in overcoming physical weakness and mental confusion; played an important role in relieving asthma symptoms, reducing headaches and joint pain due to arthritis.
3. Celastrus seeds oil used to the patients suffering from forgetfulness in the dosage of one seed daily in their diet and then gradually increasing it up to 100 seeds/d.
4. Ayurvedic herbal medicines are used to treat cognitive deficits in mentally retarded children. CP oil has been used to have neuroprotective and antioxidant activities[36,37].

Conclusion

The above information in the phytochemical screening analysis of seed and Leaf extract has shown in the presence of different constituents. That consist as; alkaloids, glycosides, proteins & amino acids, phenolic compounds, tannins, fixed oil, carbohydrates, phenolic compounds, flavonoids, and saponins are present in only aqueous extract while Sterols and triterpenoids are present in aqueous, ethanolic extracts. The pharmacological activities of the plant used in the most important medicinal plants used in the Ayurveda. The plant has been shown in pharmacological activities like anti-arthritic, hypolipidemic and antioxidant, antifertility, analgesic, and cardiovascular.

Celastrus paniculatus is being used traditionally and several other uses are practiced in the tribal populations. *Celastrus paniculatus* seed oil has effects, i.e. improving learning and memory and antioxidant properties by decreasing the lipid peroxidation. The mechanism by which *Celastrus paniculatus* seed oil enhances cognition can be attributed at least in part to antioxidant properties.

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