



A comprehensive review on *Embelia tsjeriam-cottam* A.DC

Huda Nafees^{a*}, Sana Nafees^b, S. Nizamudeen^c

^aDepartment of Saidla, Ajmal Khan Tibbiya College, Aligarh Muslim University, Aligarh, India.

^bDepartment of Biochemistry, All India Institute of Medical Sciences, New Delhi, India.

^cGovernment Unani Medical College, Chennai, India.



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ABSTRACT

Embelia tsjeriam-cottam A.DC is found in most of the parts of south India. It is commonly named as false black pepper because it look a lot like black pepper and that's why mostly used adulterant for black pepper. It belongs to the family Myrsinaceae, the commonly used medicinal plant in the name of vidang, in local it is called red vidang. But irony is, it is not the true plant of vidang, the true vidang is *Embelia ribes* Burm f. which is mentioned in ayurvedic manuscript being first identified by Susruta. Its fruit which is globose in shape and is used medicinally and possesses similar actions & chemical constituents of *Embelia ribes* Burm f. Embelin is the major alkaloid present in it with other chemical components like cardiac glycosides, phenols, flavonoids etc. Few studies have revealed that it possess several pharmacological activities such as Antidiabetic, anti-tubercular, antibacterial, anti-inflammatory etc. Many pharmacognostical and pharmacological studies have been done on *Embelia ribes* Burm f. however only few studies has been done on *Embelia tsjeriam cottam*, this review, is taken over with an attempt to explore the pharmacognosy with pharmacological profile of *Embelia tsjeriam-cottam* A.DC.

1. INTRODUCTION

The plant of *Embelia tsjeriam-cottam* A.DC. is a shrub or small tree with pale & greenish yellow flowers & red, (Syn-E.robusta C.B. Clark)) globose fruits belonging to family myrsinaceae. *Embelia tsjeriam-cottam* A.DC. is often used as substitute for the drug Vidang (*Embelia ribes*) as this plant also bears the similar vernacular names. It is commonly found in South India and belongs to the family Myrsinaceae. The Family comprises of about 30 genera and 1,000 species. *Embelia tsjeriam-cottam* is also known as False Black pepper due to its great resemblance with black pepper (*Piper nigrum*) and it is frequently used as an adulterant for black pepper. Its fruit is used as medicinally (Dar *et al.*, 2016).

Embelia species identified by Susruta (Father of surgery) has been written in ayurvedic manuscripts for its anthelmintic, & tonic properties. Further Dr. Harris found in ancient Arabian writing *Embelia tsjeriam-cottam* as birang-i-kabauli for the remedy of tapeworm. In Tribal societies being used to change the uterine environment which will then inhibit the process of implantation (Asadulla *et al.*, 2011).

1.1. Scientific Classification

Kingdom: Plantae
Phylum: Angiosperms
Class: Eudicots
Order: Ericales
Family: Myrsinaceae
Genus: *Embelia*
Species: *Tsjeriamcottam* (Germplasm Resources Information Network)

1.2. Vernaculars

Hindi: Baberang
Kannada: Vayuvilanga, Vayuvilanga
Malayalam: Vishalam, Tiruvittikanni

* Corresponding Author: Huda Nafees

E-mail Address: dr.hudanafees@gmail.com

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Marathi: Karkannie

Sanskrit: Jantughna, Kirmighna, Vidanga, Amogha, Vella

Tamil: Vayuvilangam, Vayuvidangam

Telugu: Vaividungalu

Urdu : Baobarang, Babrang (Kulkarniet al., 2015)

1.3. Distribution

It is widely distributed in the moist deciduous forests of the Western Ghats, India, Sri Lanka, Malaysia and South China. In India, it is found in Maharashtra, Karnataka, Kerala, Tamil Nadu and Andhra Pradesh up to an altitude of 1600 m (Sainiet al., 2017).

2. BOTANICAL DESCRIPTION

2.1. Macroscopic Features

In T.S. the cells of the epicarp are not distinguished but in surface view they are polygonal to elongated and with striated cuticle. In mesocarp the outer region of 5-7 layers is parenchymatous and contain tannin. Tangentially elongated oil glands measuring 113-238-417 upto 58 are present in this region. These glands are situated mostly below each of the outer longitudinal wrinkle. The fibrovascular bundles are situated below the parenchymatous region. Pericycle is a complete ring consisting of mostly pitted thick walled fibres. Xylem vessels are in a group and are situated in the centre surrounded by indistinct phloem. In the inner mesocarp are 3.5 layers of stone cells measuring 42 to 62 upto 93. Endocarp consists of a single row of palisade like stone cells, measuring 63 to 94. Isolated elements of the fruits consist of fibres, which are long. Thick-walled and lignified. Sclerenchymatous cells are pitted and stone cells are rectangular in shape. The structure of the seed is same as in the case of *E. ribes* (Shah and Khanna, 1961)

2.2. Microscopic

Transverse section of fruit shows epicarp pink in colour consisting of 2-3 layers of tabular cells of epidermis, usually obliterated, in surface view. Cells are rounded; mesocarp consists of many layers of brown coloured cells of irregular shape. The inner part of mesocarp and endocarp is composed of bradyscleroid cells. Seed testa composed of 6-7 layered reddish-brown coloured cells. Perisperm consisting of bradyscleroid cells with no intercellular space & radially distributed on the outer surface of the endosperm. Endosperm occupies a major portion of the seed. Numerous endosperm cells, irregular in shape are present with dense cytoplasm containing fixed oil and proteinous masses, embryo small when present, otherwise most of the seeds sterile (Khare-2007).

2.3. Pharmacological Actions

Anticancer, antioxidant, anti-inflammatory, antipyretic, hepatoprotective, antibacterial, analgesic, antifertility, antioestrogenic, carminative, anthelmintic, antispasmodic, carminative, stomachic (Chandrappa et al., 2013).

2.4. Phytochemistry

It contains embelin, quercitol, christembin, resinoids, tannins and volatile oils (Saini et al., 2017). It also contains Cardiac glycoside, flavonoids, phenols, tannins, terpenoids, cardenolids, saponins, vilangin, gallic acid, vanillic acid and salicylic acid (Asadulla et al., 2011).

2.5. Scientific Studies

2.5.1. Antibacterial Activity

In a study, four different fungal endophytes namely *Cladosporium cladosporioides*, *Penicillium* species, *Aspergillus niger*, and *Alternaria* species were isolated from leaf and bud of *Embelia tsjeriam-cottam*. The antibacterial activity has been seen against *Staphylococcus aureus*, *Diphtheria* sps, *Candida krusei*, *Aspergillus flavus*. The ethyl acetate extract strongly inhibited the growth of *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Shigella flexneri* while hexane extract inhibit the growth of *Klebsiella pneumoniae* and *Bacillus subtilis* and ethyl acetate extract of *Alternaria* species controlled the growth of *Klebsiella pneumoniae* and *Bacillus subtilis* (Mohapatra et al., 2017).

2.5.2. Antioxidant Activity

Methanolic extract of the plant demonstrated significant antioxidant activity. More potent antioxidant activity has been shown in fruit followed by root, stem bark and leaf (Viteet al., 2011).

2.5.3. Anti-Inflammatory Activity

The ethanolic extract of *Embelia tsjeriam-cottam* exhibited significant anti-inflammatory effect at the dose 75 and 150 mg/kg the maximum inhibition (37.68%) was seen at the dose of 150mg/kg after 3 hours of drug treatment in carrageenan-induced rat paw oedema while the indomethacin 10mg/kg (standard drug) produced 80.29% of inhibition. In chronic model (cotton pellet induced granuloma) the ethanolic extract of *embelia tsjeriam-cottam* at doses 150 & 300mg/kg showed the decreased formation of granuloma tissue by 28.93 % (P<0.01) and 25.42% (P, 0.05) respectively (Triantafi Llidisa et al., 2011).

2.6. Inflammatory Bowel Disease

In a Dextran sodium sulphate colitis in rats, embelin administered for 7 days at a dose of 10, 30 or 50 mg/kg bw showed significant anti-inflammatory effects with down regulation of the production and expression of inflammatory mediators and reduction in the histological score (Viteet al., 2011).

2.6.1. Anticancer activity

Embelin inhibits cell growth, induces apoptosis, and activates caspase-9 in prostate cancer cells (Seekonda et al., 2016)

2.6.2. Anti-diabetic activity

The methanolic seed extract of *E.robusta*(*Embelia tsjeriam-cottam*) showed dose-dependent anti-diabetic activity in an animal model. The histopathological study has shown the regeneration of β -cells of the pancreas in all treated groups Maity *et al.*, 2012.

2.6.3. Hepatoprotective Activity

The Alcoholic and aqueous fruit extract of *Embelia tsjeriam-cottam* has shown hepato protective activity in isoniazid induced liver damage in rats. The groups treated with isoniazid (50gm/kg, for 30days) showed a significantly elevated level of ALT, AST, bilirubin and significantly decreased total protein content as compared to normal control animals. The animals treated with aqueous, alcoholic extract showed significant reverse action in all the biochemical parameters. Hence, both the extracts (alcoholic and aqueous) of *Embelia tsjeriam-cottam* were reduced the isoniazid induced liver toxicity(Poojari *et al.*, 2011).

2.6.4. Anti-Tubercular Activity

Embelia tsjeriam-cottam exhibited potent inhibitory effects against *Mycobacterium tuberculosis* strains showing antitubercular activity(Ramírez-Marroquín *et al.*, 2019).

2.7. CONCLUSION

Embelia tsjeriam-cottam is a shrub and its seeds used medicinally in traditional medicine since ancient times as an anthelmintic. It is commonly found in southern states of India like Maharashtra, Karnataka, Kerala. Several pharmacological studies have been done like Anti diabetes, Hepatoprotective, Anti tubercular and many others.

Conflict of Interest

The authors declared no conflict of interest

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