

Medicinal effects of *Embelia tsjeriam cottam*: A Review

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ABSTRACT

Our nature consists of many herbal drug which has been used to treat different types of diseases and ailments among them *Embelia tsjeriam cottam* is one. *Embelia tsjeriam cottam* popularly known as vaividang, is a forest species belonging to family myrsinaceae(primulaceae). Fruits are widely used as medicinal purpose like as anthelmintic. Its fruit look like berries. Non ripe fruits are green and on ripening its color changes to dark red the fruits are generally matured in month of November and December in Karnataka.

It is commonly known as false black pepper because it look like black pepper and commonly used as adulterant for black pepper. This plant is distributed in India and it is found in some parts of India like Kerala, Tamil Nadu, Maharastra, goa, Karnataka and Andra Pradesh. *Embelia tsjeriam cottam* is widely used in ayurveda and unani as anthelmintic and to cure skin disease. Few studies reveals that it posses activity like antibacterial, antitubercular, antidiabetic, anti-inflammatory etc. This studies will provide information on medicinal effects and pharmacological profile of *Embelia tsjeriam cottam*.

Keywords: *Embelia tsjeriam cottam*, Anti-inflammatory, Black pepper, Anthelmintic, fruits

I. INTRODUCTION

It is a threatened woody and large scandent shrub belonging to family Myrsinaceae. They are sparsely distributed in moist deciduous forests of western ghats, India, Srilanka Malaysia and South China. The family comprises of about 30 genera and 1000 species. Plant is traditionally used to treat intestinal parasite, skin and respiratory tract infection, cancer, Git problem and mental disorder. *Embelia* species identified by susrutha has written in ayurvedic manuscripts for its anthelmintic and tonic properties from ancient times. Seed paste is smeared in poisonous snake and insects bites. Leaves are astringent and decoction of leaves is used in tooth ache.^{4,5,6}

II. SCIENTIFIC CLASSIFICATION

Kingdom: plantae

Division : Tracheophyta

Phylum: Angiosperm

Family: Myrsinaceae

Class: Eudicots

Order: Ericales

Genus: *Embelia*

Species: *Embelia tsjeriam cottam*.^{1,2}

2.1.Vernicular names

Hindi: babrang

Malayalam: vilal, ammimuriyan

Kannada : vayuvidang

Sanskrit: bidanga

Tamil: vaivilangam^{1,2}

III. MORPHOLOGY:

3.1. Macroscopic character:

It is deciduous shrubs, it consists of young stem which is densely brown pubescent. Leaves are 3-7 cm to 2-4cm, elliptical ovate, attenuate at basemargin serrulate, caudate acuminate at apex, glabrous, venation prominent below;petiole is 1cm long. Racemes axillary,2.5-4cm long, appear along with leaves. pedical c.1mm long.

Fruits were globular, reddish black, and diameter of fruit is 3-5mm. It has beak like projection at apex and consists of warty surface. Pericarp was brittle enclosing a single seed covered by thin membrane. The entire seed was brown and covered with yellowish spots. Its odour is characteristics taste sweet and slightly astringent.⁵

SN	Parameter	Embelia tsjeriam cottam
1	Color	Reddish black
2	Size	3-5mm
3	Seed color	Reddish brown
4	Spots	Numerous spots
5	Odour	Characteristics
6	Taste	Sweet and slight astringent

3.2. Macroscopic characteristic:

Transverse section of fruit shows epicarp which was pink in color and it consists of 2-3 layer of tabular cells of epidermis usually obliterated. cells are seen rounded in surface view. Number of layer of brown colored cells of irregular shape is seen in mesocarp. Inner part of mesocarp and endocarp composed of bradyscleroid cells. Seed testa shows 6-7 layered reddish brown coloured cells. Perisperm consisting of bradyscleroid cells with no intracellular space which was radially distributed on outersurface of endosperm.

Numerous endosperm cells which are irregular in shape were present with dense cytoplasm.⁵

IV. CHEMICAL CONSTITUENTS:

The phytochemical analysis of Embelia tsjeriam cottam fruit contain phenolic compound called embelin and various phytochemical including alkaloid, flavanoid, tannins, saponin, steroid, cardenoids and resinoids. Other constituent include gallic acid, vanillic acid, quercitor, christembin, vilangin and salicyclic acid.^{10,11}

V. THERAPEUTIC ACTIVITY

Plant parts	Uses
Fruit	Tonic, blood purifier, antispasmodic and carminative, good appetizer, cures tumors, Ascites, bronchitis, jaundice and mental disorder.
Seed	Paste is smeared at snake bites and swelling spot, anthelmintic especially for flatworms, antibiotic, antituberculosis and stimulant.
Root bark	Tootache and poisonous animal bites, paste of root bark is used to treat pneumonia. Infusion of stem bark and leaves is used to treat tonsillitis.
Leaves	Astringent, Demulcent and useful in Pruritus, sore throat, skin disease and leprosy. Decoction of leaves is used as blood purifier. ^{3,6}

VI. PHARMACOLOGICAL ACTION

6.1. Anti inflammatory activity

The extract of Embelia tsjeriam cottam were investigated for anti inflammatory activity. At a dose of 150 mg/kg ethanolic extract of Embelia tsjeriam cottam had exhibited significant anti inflammatory activity after 3hr of drug treatment in carrageenan induced paw oedema, whereas 80.25% of inhibition was produced by standard drug Indomethacin. In chronic model(cotton pellet induced granuloma) the ethanolic extract of embelia tsjeriam cottam at a dose of 150 mg/kg and 300mg/kg had shown decrease formation of granuloma tissue by 28.93% (p<0.001)** and 25.42% (p<0.05)* respectively. Thus on the basic of present study the ethanolic extract of embelia tsjeriam cottam had exhibited anti inflammatory activity.^{7,12}

6.2. Hepatoprotective activity

Positive control(group treated with isoniazid) had showed elevated level of ALT, AST, bilirubin and also decreases total protein content as compared to negative control. There had been significant reduction in all biochemical parameter of animal treated with aqueous extract, alcoholic extract and liv52. In vivo lipid peroxidation study showed that rat of treated group(paracetamol) had showed increase in MDA(malondialdehyde) level as compared to normal groups. Activities of SOD and CAT and level of GSH decreases in isoniazid treated group as compared with normal group. Activities of SOD, CAT and level of GSH were increased in alcoholic and aqueous treated group.

After doing histopathological analysis the liver of normal group showed normal hepatic hexagonal lobules and normal morphology. In

isoniazid treated group there is vacuolation, sinus congestion, mild inflammation and centrilobular degeneration with centrilobular necrosis. Isoniazid induced hepatotoxicity was prevented by alcoholic extract, aqueous extract and liv52 of *Embelia tsjeriam cottam*.⁸

6.3. Antidiabetic activity

Blood glucose:

Methanolic extract of seeds of *E.robusta*(*Embelia tsjeriam cottam*) has shown reduction in glucose level in diabetic rat treated with 2 different concentration of extract. On 7th, 14th, 21th and 28th day both dose reduce the blood glucose level when compared with standard control. At a dose of 50mg/kg body weight the percentage of glucose reduction was found to be 41.94%. On 28th day at a dose of 100mg/kg the percentage of glucose reduction was found to be 53.84%.

Histopathology:

Normal healthy control group rats showed normal extensive damage of islet of langerhans of pancreas in histopathological analysis. On treating with Gliclazide (50mg/kg body weight) regeneration of beta cells of islets of langerhans is seen. Restoration and regeneration of beta cells of islets of langerhans is seen on treating with *Embelia robusta*.¹³

6.4. Anti tubercular activity

Embelia tsjeriam cottam was found to be active against all 3 strains of mycobacterium tuberculosis at a concentration of 0.5 – 5.0 mg/ml control. No inhibitor zone was seen in control wells or slants with solvent alone.⁹

6.5. Antibacterial activity

Embelia tsjeriam cottam has showed antibacterial activity. ETCHE(*Embelia tsjeriam cottam* n-hexane extract) was active at concentration of 100mg/ml against *E.coli* whereas ETCCE(*Embelia tsjeriam cottam* chloroform extract) has shown activity against both *E.coli* and *B.subtilis*. ETCME (*Embelia tsjeriam cottam* methanol extract) showed broad spectrum and large zone of inhibition. ETCME had showed highest activity against *B.subtilis* where it had produced zone of inhibition at 100mg/ml. Overall the result shows the presence of significant antibacterial activity.^{9,4}

6.6. Antioxidant activity

Three different technique had been used to test antioxidant activity of *Embelia tsjeriam cottam*. They are DPPH free radical scavenging assay, beta carotene method and ascorbic acid method. The activity of three samples was found to be very close to each other in case of DPPH assay. ETCHE % scavenging was found to be 57.13% whereas that of ETCCE and ETCME was 56.25% and 58.34 % respectively. Activity of all 3 samples were comparable with that of standard drug ascorbic acid.⁴

6.7. Anti cancer activity

Embelia tsjeriam cottam was evaluated for anti cancer activity. Root extract was taken and cytotoxicity of extract was tested against human colon cancer and breast cancer cell lines using sulfarhodamine b assay. Methanolic extract shows significant anticancer effect by inhibiting 50% of tumor cell proliferation at a dose of 6.25-400mg/ml. The result of study shows that *Embelia tsjeriam cottam* posses significant anticancer activity.

6.8. Inflammatory bowel disease

Embelin was administered at a dose of 10,30 or 50mg/ml for 7 days in dextran sodium sulphate colitis rat. After sometime it showed significant anti-inflammatory effect with down regulation of expression and production of chemical mediator.⁷

VII. CONCLUSION :

In ayurveda *Embelia tsjeriam cottam* is widely used as anthelmintic. It is shrub that is found in country like Srilanka, Pakistan, South China etc. It is found in Maharastra, Karnataka, Kerela etc. Its fruits is widely used for medicinal purpose like tonic , blood purifier, antispasmodic etc. leaves are astringent and decoction of leaves can be used in tonsillitis and toothache. Seed paste is smeared in poisonous snake bite. Several pharmacological activities have been done like anti inflammatory, antidiabetic, hepatoprotective, antibacterial and many other. The scientific analysis accomplishes many of activites as mentioned in ayurveda. Further investigation are necessary to find out the active principle, mechanism of action, and utility of *Embelia tsjeriam cottam*.

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