

**EMBELIA RIBES: A POTENTIAL MEDICINAL PLANT****Chanchal Jain\*<sup>1</sup>, Sonal Gupta<sup>2</sup> and Dr. A. K. Singhai<sup>3</sup>**

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**ABSTRACT**

Plants have been used for medicinal purposes long before prehistoric period. Medicinal plants are considered as a rich resources of ingredients which can be used in drug development either pharmacopoeial, non- pharmacopoeial or synthetic drugs. Treatment with medicinal plants is considered very safe as there is no or minimal side effects. These remedies are in sync with nature, which is the biggest advantage. Recently, WHO (World Health Organization) estimated that 80 percent of people worldwide rely on herbal medicines for some aspect of their primary health care needs. According to WHO, around 21,000 plant species have the potential for

being used as medicinal plants. *Embelia ribes* Burm F a medicinal woody climber belongs to the Myrsinaceae family. It is also commonly known as false black pepper or vidanga. *E. ribes* is one of the 32 medicinal plant species identified by the Medicinal Board, Govt. of India, New Delhi. The root, berries and leaves of *Embelia ribes* is used in herbal formulas. Fresh juice is cooling, diuretic and laxative. The root acts as be chic and anti-diarrheal. The seeds are spermicidal, oxytoxic and diuretic. The plant is also useful and known for its blood purifying properties.

**KEYWORDS:** *Embelia ribes*, hydroalcoholic extract, antioxidant, antidiabetic.

**INTRODUCTION**

Fruits of *Embelia ribes* (*E.ribes*) belong to family Myrsinaceae It is commonly known as false black pepper or Vidanga. *E. ribes* grows in semi-evergreen and deciduous forests at an altitude of 1,500m found in central and lower Himalayas, Arunachal Pradesh, Assam, Bengal, Orissa, Andhra Pradesh and Madhya Pradesh throughout India. It is considered to be vulnerable due to excessive harvesting. Commonly it is known as false black pepper. It is

listed in red book as threatened species. In various literatures, it is found that the fruits of that plant used as an anthelmintic, diuretic, carminative, contraceptive, anti-bacterial, anti-inflammatory astringent, antioxidant, anticancer agents and seed possessed antibiotic and antitubercular properties. *Embelia ribes* have a long history of use in ayurvedic system of medicine in various forms like churna, asava, aristha, lauha and taila. Notes on the drug under the names of Birang-I-kabuli and Biranj-I-kabuli were found in Arabian writing. Dr. Harris had directed attention to the value of this drug as a remedy for tapeworm. He stated that he had administered it for several years with good results to natives of India and Europe.



**Figure 1: *Embelia Ribe* Fruits.**

### **Synonym**

Lakshmana, Amalaki, Patala, Vidanga, Tandula, Jantuhantri, Gahvara, Krmighna, Citrtandula, Amogha, Vella, Kairali.

### **Habitat**

These climbers are found in the hilly parts of India from the central and lower Himalayas down. It is commonly seen in places up to the height of 1500 m (5000 ft), it is generally seen in areas of eastern India to Ceylon (Sri Lanka) and Singapore. & Ranges from India to Southern China and south to Indonesia; East Africa & identified on Malayan estates etc.

### **Distribution**

It is an Indo-Malaysian species, reported from India, Sri Lanka, Singapore, Malaysia and S. China. It is found to occur throughout India in Central Himalayas, Arunachal Pradesh, Assam, Maharashtra, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. This species is

globally distributed in Indo-Malaysia. Within India, it is found throughout up to an altitude of 1500 m (5000 ft) 42.

### Parts Used

Berries (fruit), leaves, root bark.

### Origin and distribution

These climbing herbs are found in India, central and lower Himalayas, Sri Lanka and Singapore. It is available throughout India up to an altitude of 5,000 ft.

**Table 1: Organoleptic Evaluation Of Embelia Ribes Fruits.**

<b>Size</b>	<b>2.4-4 mm</b>
<b>Color</b>	Blackish brown
<b>Shape</b>	Sub globular
<b>Odour</b>	Distinct
<b>Texture</b>	Wrinkled
<b>Taste</b>	Astringent

### Chemicals constituent

The main active components in the plant extract is Embelin (Embelic acid: 2,5-dihydroxy-3undecy-1, 4-Benzoquinone. Other components are christembeline, an alkaloid and a resinoid and volatile oil. Embeline reacts quantitatively with formaldehyde to give vidangin, methylene-bis-25-dihydroxy-4-undecyl-3-6-.

### Phytochemical Constituents of Embelia ribes:

Embelia ribes berries contain several chemical constituents like embelin, volatile oil, fixed oil, resin, tannin, christembine (alkaloid), phenolic acids like caffeic acid, vanillic acid, chlorogenic acid, cinnamic acid, o-cumaric acid. 4.33% of the embelin content is observed in the berries of Embelia ribes Burm F.

**Table 2: Phytochemical Screening of Embelia Ribes.**

<b>Test For</b>	<b>Observation</b>
Reducing sugars	+ve
Non-reducing polysaccharides	-ve
Gums	-ve
Mucilage	+ve
Proteins	+ve
Amino acids	+ve
Fats and oils	+ve
Steroids	-ve

Glycosides	-ve
Saponin	+ve
Flavonoids	-ve
Alkaloids	+ve
Tannins	+ve
Volatile oil	-ve

## USES OF EMBELIA RIBES

### General uses

It acts as ascaricidal, anthelmintic, carminative, diuretic, astringent, anti-inflammatory, antibacterial and febrifuge. Active principles are found to be estrogenic and weakly progestogenic. Pulp is purgative. Fresh juice is cooling, diuretic and laxative. The root acts as astringent and anti-diarrheal. The seeds are spermicidal, oxytocic and diuretic. The plant is also useful and known for its blood purifying properties. The effect of di-isobutyl amino derivatives shows anti-inflammatory, hypotensive and anti-pyretic effects. Aqueous extract of the fruit shows anthelmintic against tapeworms.

### Traditional medicinal uses

Embelia root bark is acrid, astringent anthelmintic, anti fertility, antiestrogenic carminative, digestive laxative, soothing, stimulant, stomachic, and thermogenic. It is effective against intestinal parasites and intestinal worms. It is used in abdominal disorders, skin fungal infections, flatulence, constipation indigestion, headache, hemorrhoids, lung diseases, obesity, piles, pneumonia, mouth ulcers, toothache and sore throat. Its decoction is useful in insanity and heart diseases. Leaves are astringent, thermogenic, demulcent and depurative in nature. benoquinones. Querctiol and fatty ingredients are also found.

### Ancient Uses

- 1. Paste** – it is being used for mouth wash and avoiding cavities. It is being also used in skin related problems.
- 2. Powder** – it is being used in worms infestation, infections in body, indigestion, constipation, paralysis, convulsions, epilepsy etc. it also helps in purifying the blood.
- 3. Oil** – it is used in skin related problems and wound infections.
- 4. Decoction** - Decoction of the roots is given in insanity and heart diseases.

### Toxicology

It does not have any toxic effect on human body when consumed in normal doses.

### Hydroalcoholic extraction method

The dried powder of plant parts was individually extracted by hydroalcoholic cold percolation method. 10 g of dried powder was taken in 100 mL of petroleum ether in a conical flask, plugged with cotton wool and then kept on a rotary shaker at 120 rpm for 24 h. After 24 h, it was filtered through eight layers of muslin cloth, centrifuged at 5 000 rpm for 15 min and the supernatant was collected and air dried under reduced pressure to obtain the dried residue. Petroleum ether was evaporated from the powder. This dry powder was then taken individually in 100 mL of each solvent *i.e.* methanol (ME), 75% ME, 50% ME, 25% ME and water and was kept on a rotary shaker at 120 rpm for 24 h. Then the procedure followed was same as above, and the residues were weighed to obtain the extractive yield of all the extracts and were stored in air tight bottles at 4 °C.

## PHARMACOLOGICAL ACTIVITY OF *EMBELIA RIBES*

### Antioxidant Activity

Embelin (from *Embelia ribes*) is a component of herbal drugs and possess wide range of medicinal properties. It has been found to scavenge DPPH radical and inhibit hydroxyl radical induced deoxyribose degradation. It was also found to inhibit lipid peroxidation and restore impaired Manganese-superoxide dismutase in rat liver mitochondria. Further, kinetics and mechanism of the reactions of embelin with hydroxyl, one-electron oxidizing, and organohaloperoxy and thiyl radicals were studied using nanosecond pulse radiolysis technique.

In Vitro DPPH Scavenging Activity DPPH (2, 2-Diphenyl -1- picrylhydrazyl, 4.3mg) was dissolved in methanol (6.6 ml); it was protected from light by covering the test tubes with aluminum foil. DPPH solution (150 µl) was added to 3ml methanol and absorbance was noticed immediately at 516nm for control reading. A different volume of test samples that is 50 µl, 100 µl, 150 µl, 200 µl, 250 µl 300 µl and 350 µl was taken. Each of the sample was diluted with methanol up to 3ml and to it 150 µl DPPH was added. Absorbance was observed after 15 minutes at 516 nm using methanol as blank. IC50 values for the samples were calculated and compared with Ascorbic acid as a positive control [16-17]. The % reduction and IC50 values were calculated as follows. The free radical scavenging activity (% antiradical activity) was calculated using the equation:

$$\% \text{ Antiradical Activity} = \frac{\text{Control Abs.} - \text{Sample Abs.}}{\text{Control Absorbance}} \times 100$$

Each experiment was carried out in triplicates and results were recorded as mean % antiradical activity  $\pm$  SD.

### **Anti - diabetic activity**

Aqueous extract of *Embelia ribes* fruits at doses 100 and 200 mg/kg orally fed for forty days produced significant ( $p < 0.01$ ) decrease in heart rate, systolic blood pressure, blood glucose, blood glycosylated haemoglobin, serum lactate dehydrogenase, creatine kinase and increase in blood glutathione levels in streptozotocin (administered at a dose of 40 mg/kg, intravenously single dose) induced diabetic rats. Gliclazide is used as standard in this study.

Administration of ethanolic extract of *Embelia ribes* berries orally for 6 weeks at a dose of 100 mg/kg and 200 mg/kg significantly ( $p < 0.01$ ) reduced the levels of blood glucose, heart rate (HR) and systolic blood pressure (SBP) in streptozotocin induced diabetic Wistar albino rats. Gliclazide at a dose 25 mg/day is the standard used in this study<sup>28</sup>. Further studies revealed that ethanolic extract of *Embelia ribes* fruits significantly ( $p < 0.01$ ) reduced the pancreatic thiobarbituric acid reactive substances (TBARS) in pancreatic tissue of diabetic rats.

### **CONCLUSION**

*Embelia ribes* Burm F a medicinal woody climber belongs to the Myrsinaceae family. *Embelia ribes* contain embelin as an active constituent so it show its activity like antioxidant, antidiabetic. The traditional use and research work on biological activity of *Embelia ribes* suggest that it could be used in treatment of several ailments.

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