



## Pharmacognostic, phytochemical, pharmacological, potential of *elaecarpus ganitrus*

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### Abstract

*Elaecarpus ganitrus* is the king of herbal medicines which belongs to family *Elaeocarpaceae*. It is commonly known as *Rudraksha* and is popularly used in Ayurveda, Siddha and Unani system of medicine. It is a large evergreen tree which is found in himalyan region and also in area of gangetic plain. The plant reaches the height of 50-200feet. The main trunk of tree is rough textured, cylindrical and grayish-white in colour. The leaves are shining, green, oblong, lanceolate, acute or acuminate, minutely crenate or serrate and almost glabrous in nature. The inflorescence is mainly racemes and mostly from the axils off all enleaves. Fullyripe fruits are blue in color which bears seeds in it and so they are also known as blueberry beads. The seeds are hard and contain tubercles. Traditionally *rudraksha* is used in the treatment of hypertension, anxiety, epilepsy, migraine, depression, palpitation, nervepain, asthma, arthritis and liver disease. In ayurvedic medicinal system, Wearing of *Rudraksha* can have a positive effect on heart and nerves. The present review is an effort to compile all the relevant information and to enlighten the need of research of this plant.

**Keywords:** *Rudraksha*, *elaecarpus ganitrus*, *elaecarpus sphaericus*, *elaecarpine*

### Introduction

"*Elaecarpus ganitrus*" commonly called *Rudraksha* belongs to the *Elaecarpus* family in India and it grows mainly in the Himalayan region<sup>[1]</sup>. *Rudrakshas* are considered to be sacred and King of herbal medicine having many spiritual and medicinal values both as preventive and curative<sup>[2]</sup>. Type *Elaecarpus* has about 360species, found over Australia, East Asia, Malaysia and the Pacific islands. About 120 species belonging to this genus from parts of asia and out of this 25 species occurs in India alone. According to Hindu mythology, *Rudraksha* beads bear a great religious, spiritual, and materialistic significance; also considers *Rudraksha* as symbol of link between earth and heaven. It is believed that it contains the secrets of evolution of entire cosmos within itself<sup>[3]</sup>. *Rudraksha* is a valuable and magical bead of Hindu tradition & meditation. In Sanskrit *rudraksham* fruit as well as *rudraksha* tree. The power of *Rudraksha* is felt quickly and effectively by the persons who are devoted to religion, have strong belief in god and capitulate themselves to complete vedic life style. Others who are *Gurumukhi* blessed by spiritual master feel that the *rudraksha* affects very quickly and effectively *rudraksha* means "the eyes of *rudra shiva*" and is considered to be the most potent manifestation of the cosmic force. Hence *Rudraksha* is the object of admiration and also the source to accomplish the higher self.

### Botanical Description

It is a large evergreen tree having large leaves. Its height ranges from 50–200 feet. Leaves are large and shining green on the sun facing side and dull stringy on earth facing side. Flowers become visible in the month of April-May and are white or yellow in colour<sup>[4-5]</sup>.

### Identific Classification

- Kingdom: Plantae
- Sub kingdom: Viridiplantae
- Super division: Embryophyta
- Division: Tracheophyta
- Sub division: Spermatophytina
- Class: Magnoliopsida
- Order: Oxalidales
- Family: *Elaeocarpaceae*
- Genus: *Elaecarpus*
- Species: *Ganitrus*

### Morphological and Macroscopical Description

The morphological characters of plant are shown below as follow as, and macroscopically description given in the table 1 and 2. Leaves- Simple, glabrous, oblong- lanceolate, sub-entire or irregularly crenate, acute or

acuminate. Flower- White or yellow colored, in dense racemes and mostly from axils of fallen leaves, fringed petals, anthers are linear, appear in April-may Fruits-Round or- oval, small, violet or blue colored and acidic in taste Endocarp-Stony endocarp is hard, globular, strongly tubercule, marked with 5 to longitudinal ridges, rarely 1 to 4, reddish brown in color

**Table 1:** Macroscopically Examination of leaf

Sr. No.	Leaf	Inspection/observation
1	Apex	Acute
2	Base	Symmetric
3	Colour	Shining green
4	Margin	Undulate
5	Shape	Ovate
6	Size	5-6 inch in length, 2 Inch broad

**Table 2:** Macroscopically Examination of seed

Sr. No.	Seed	Inspection/ Observation
1	Colour	Blue(on fully ripening)
2	Texture	Hard
3	Taste	Sour
4	Shape	Round, Bulbous
5	Size	½-1inch

### Chemical composition

Rudraksha is a plant product which contains carbon (50.024 %), hydrogen (17.798%), oxygen (30.453%), nitrogen (0.9461%) and different trace element in a combined form. The major chemicals which are present in it are palmitic acid and stearic acid. The others chemicals are oleic, linoleic, myristic, isopalmitic, isostearic, lauric, tetradecanoic, palmitoleic and 9-octadecanoic acids. The leaves have shown. The presence of various alkaloid, tannin and flavanoid.

### Identity, Purity and Strength

The Rudraksha should have foreign matter as nil, total ash should not be more than 1.2%, acid-insoluble ash should not be more than 0.4 %, alcohol soluble extractive value should not be more than 2% and water soluble extractive value should not be More than 1%.

### Rasa- Panchak

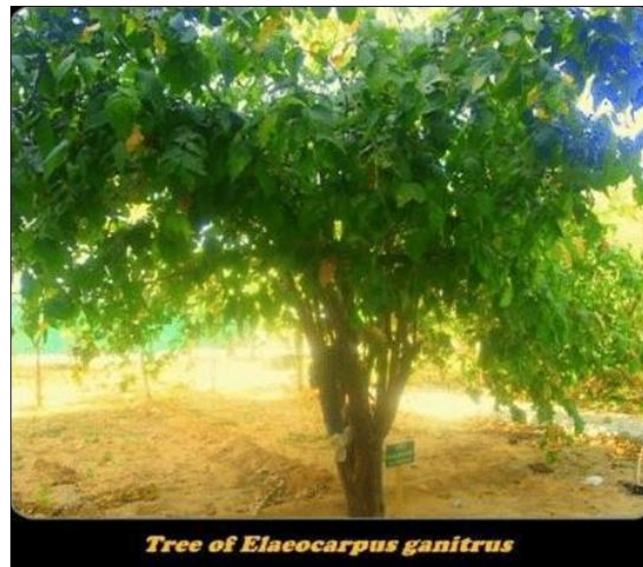
The rasa (taste) of Rudraksha is madhur (sweet). Its guna (properties) is snigdha (unctuous) and sthool (bulky). The veerya (potency) is mentioned as ushna (hot) as well as sheeta (cold). The vipak (metabolic property) is madha (sweet). The karma (action) of the drug is raksoghna (disinfectant), medya (intelligence), hradyam (cardiotonic) <sup>[5-14]</sup>.

### Important Formulations of Elaeocarpus Ganitrus

- Dhanwantharam gulika
- Chukkumtipalyadi gulika
- GoroChanadi gulika
- Mritasanjeevani gulika
- Suwarnamuktaadi gulika
- Rudraksha Churna
- Rudraksha Hima
- Rudraksha Lehyam
- Rudraksha Vibhuti
- Rudraksha tailam
- Rudraksha Bhasma

### Dosage

- Children: 500mg – 1gm
- Adults: 1gm – 3gm



**Fig 1:** Bioactive Compounds in Elaeocarpus

The *Elaeocarpus ganitrus* fruit have many phytoconstituents such as alkaloids, flavonoids, tannins, steroids, triterpenoids, carbohydrates and cardiac glycosides. Singh <sup>[10]</sup> says that a significant amount of phytoconstituents such as isoelaecarpicine, elaeocarpine, isoelaecarpine and quercetin, gallic, ellagic acids and rudrakine. Three new ellagic acid derivatives of eleocarpaceae, 4-O-methylellagic acid 3-O- $\alpha$ -rhamnoside, 4-O-methylellagic acid and 4-O-methylellagic acid in addition to the known ellagic acid derivative, 4-O-methylellagic acid  $\alpha$ -rhamnoside are used in multibioses therapy of cancer and a significant antioxidant ability due to its wealthy content of tannins and flavonoids. *Prosopis* species has been widely used to cure basic ailments in the usual system of medicine. *Elaeocarpus ganitrus* have gallic, quercetin, and ellagic acids, (-) elaeocarpine, (-) isoelaecarpine and rudrakine <sup>[10, 11]</sup>.

#### Traditional Properties

An Unripe and ripped fruit of *Elaeocarpus sphaericus* shows different traditional uses:

- *Elaeocarpus sphaericus* imposes positive effect on Stress, Anxiety Depression, Palpitations and Lack of Concentration.
- It cools down the body temperature and brings calm to mind. Those who suffer from anxiety should keep big size five mukhi *Elaeocarpus sphaericus* with themselves and whenever they feel nervous they should hold them.

#### Ayurvedic Properties of Rudraksha

Rudraksha have many Ayurvedic properties that refer to this wonderful bead and gives details of rudraksha for increase body constitutions. The beads, bark and leaves of Rudraksha all are used to cure various ailments like mental disorders, headache, fever, skin diseases etc. Rudraksha may be worn either on arm, wrist or other parts of the body.

1. **For improving memory power:** Rudraksha can be used for improving memory power when taken with milk.
2. **For all brain diseases:** Rudraksha can be used for treating all brain diseases like brain fever etc.
3. **As a blood purifier:** Rudraksha shall be used for treating the blood impurities and strength in the body substance.
4. **As antibacterial:** Rudraksha can be used for treating the burns and marks. It can also be used for curing cough and breathing problems.
5. **For controlling epilepsy:** By using pulp of Rudraksha fruit or bark, can be used for controlling epilepsy.
6. **For curing liver related problems, jaundice, and stomachache:** Rudraksha can be used for treating stomach pain and liver problems.
7. **For blood pressure:** Rudraksha can be used to treat high blood pressure, heart diseases etc.

#### Test Methods for Analysis of Real Elaeocarpus

*Elaeocarpus ganitrus* is having various versions and the version of it increases the importance and price. It is made synthetically and the artificial *Elaeocarpus ganitrus* are also being sold in market. There are many methods of testing a genuine (or fake) *Elaeocarpus ganitrus*

1. **Cut Test:** When beads are cut horizontally then the number of sections be same as the number of lines present on the beads. If it is not then drawback will be that the beads get damaged. It is most reliable methods

2. **Properties test:** This test gives information that whether the beads show properties like inductance, capacitance, conduction of electric current etc.
3. **Copper Coin Test:** Generally it is believed that when the bead is placed between two copper coins then it will slightly rotate either clockwise or the anticlockwise direction. This phenomenon occurs due to physical and magnetic properties of the beads. Only expert people are good for it.
4. **Eye Test:** There is a natural partition on beads which is just like the closed lips and these deep linings (facets) can be seen with the help of magnifying glass (lenses). The artificial beads seem to be real but the facets cannot be made as real as those present on real one. Hence the real beads can easily be distinguished.
5. **Water Test:** Some of the rare beads like Gauri Shankar or Trijuti can be made by synthetically joining two or three beads with help of paste etc. If such beads are kept in boiling water for some time then a sharp streak will take place at the joint and the synthetic beads can be identified.
6. **Scientific Technique of Identification X-Ray:** This is a technique by which the internal structure is observed without damaging the beads. This digital X-ray test is done without complication for rudraksha beads up to nine mukhi but higher mukhi beads may not give 100% accurate results due to overlapping of the internal seeds. It gives much clear results for any beads than X-ray. CT scanning and X-ray [12-17]

### Expensive Method Experimental and Clinical Studies

All over the world scientific research is getting momentum to evaluate the pharmacological activities, side effects and medicinal uses of *E. ganitrus* against different diseases. On the basis of various *in vitro*, experimental and clinical researches, the following pharmacological activities or medicinal properties of *E. ganitrus* have been reported. To identify the beads but give

### Antimicrobial

*In vitro* antimicrobial activity of aqueous extract of *E. ganitrus* leaves was tested against clinical isolates of bacteria and fungi. The extract exhibited extensive antimicrobial action as it showed growth inhibition for *Bacillus cereus*, *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Aspergillus flavus*, *Penicillium sp*, *Candida albicans* and *C. tropicalis*. Agar well diffusion method is used for determining antibacterial activity of the crude extracts. Aqueous extract of *E. ganitrus* leaves was screened for antibacterial activity against three gram positive (*B. cereus*, *S. aureus*, and *M. luteus*) and three Gram negative bacteria (*P. aeruginosa*, *E. coli*, and *K. pneumoniae*), isolated from the clinical samples. The extract exhibited excellent antibacterial activity against all the bacterial cultures, except *M. luteus*. Antifungal activity of the crude extracts was examined through the agar well diffusion method. Antifungal activity of the extract was evaluated against three molds. The aqueous extract of *E. ganitrus* leaves exhibited maximum relative percentage inhibition against *B. cereus* clear and accurate results. *Penicillium sp.* (88.26 %) for bacteria and fungi respectively. Minimum inhibitory concentration values of the extract varied from 125-2000 µg/ml; however minimum value was reported against *B. cereus* and *A. flavus* (125 µg/ml). The result indicates the potential use of *E. ganitrus* leaves for the development of antimicrobial compounds, earlier experiments were performed with various extracts (Petroleum ether, benzene, chloroform, acetone and ethanol) of dried *E. sphaericus* fruit. The extracts have been recited to exhibit a broad spectrum of antimicrobial action against a variety of gram positive and gram negative bacteria. *E. ganitrus* is a less explored source of immensely useful antimicrobial constituents and it is worth for prospective experimental investigation.

### Antifungal Activity











Petroleum ether (PE), Chloroform (CE), Ethanol (EE) and Water (WE) extracts of *E. ganitrus* dried fruits were examined for *in vitro* antifungal activity by using the disk-diffusion assay and broth dilution test [38, 39]. Turbidimetry method was used for determining inhibitory concentration in terms of MIC (mg/ml) for different fungal strain of *Aspergillus niger*, *Candida geotrichum*, *Candida albicans*, *C. glabrata*. Ketoconazole was taken as the positive control. The CE showed maximum inhibitory potential (MIC 1.5 mg/ml) on *C. albicans*. The maximum inhibition was illustrated on *C. glabrata* and *G. candidum* by various extracts even at higher concentration. CE and EE were identified to be potential antifungal phytochemical investigation of extracts which confirms the presence of alkaloids, flavonoids, carbohydrates, protein, tannins, fats and fixed oils may be responsible for activity.

### Antioxidant Activity

*In vitro* antioxidant activity of ethanolic extract of *Elaeocarpus ganitrus* leaves was evaluated for their total antioxidant capacity, metal chelating, reducing power, hydroxyl radical scavenging and ABTS+ (2, 2-azino-bis-(3-ethylbenzothiazoline-6-sulphonate) radical scavenging activities. Maximum iron chelating activity (76.70%) was observed at 500 µg/ml extract concentration followed by the scavenging of the ABTS+ radical (55.77%) at the same concentration. However, the extract demonstrated only moderate hydroxyl radical scavenging activity (13.43%). Total antioxidant capacity was detected to be 24.18mg ascorbic acid equivalents at 500 µg/ml extract concentration. Recent studies have shown that various flavonoids and related polyphenols confer substantially to the total antioxidant activity of many plants.) Total phenolic content in *E. ganitrus* was detected to be 56.79±1.6mg gallic acid equivalents/g of dry material. Total flavonoids in *E. ganitrus* were detected to be 18.58±0.3mg rutin equivalents/g of dry material. These findings recommend 85% of the antioxidant capacity of

E.ganitrus is by virtue of phenolics And flavonoid components. Moreover, enzymatic and other non-enzymatic antioxidants may be contribute Antidepressant Effect. Pharmacological examinations with the water soluble portion of 90% ethanol extract of the *Elaeocarpus ganitrus* fruits showed the existence of an important central nervous system depressant effect, characterized by typical behavioral actions, potentiating of hexobarbitone hypnosis and morphine analgesia, anticonvulsant and anti-amphetamine effects. The pharmacological outline of action of the extract substantiates the use of the plant fruits in the management of mental diseases, epilepsy, hypertension, asthma and liver diseases in the tradition all Indian systems of medicines. Benzene, chloroform and acetone extracts decreased swim stress immobility in mice representative of ted to antioxidant potential. some degree of antidepressant activity.

**Table 1: Types of Rudraksha with It's Benefits and indication**

Indications		Benefit of rudraksha
	Chronic asthma heart problems, mental anxiety, T.B, Paralysis, stroke, eye problem bone pain and headache.	One mukhi rudraksha is the most promising rudraksha as it itself is manifestation of Lord Shiva One mukhi is extremely powerful and grants commitment and salvation to its wearer.
	Impotency, renal failure, stress, anxiety, lack of concentration, depression, mental chaos, hysteria and intestinal disorder.	Two mukhi rudraksha represents Ardhanarishwara, the combined form of Lord Shiva and Parvati. The ruler of this bead is Lord Ardhanarishwara and the ruling planet is moon.
	Depression, schizophrenia, weakness multifarious, directive of the menstrual cycle/ menstrual stress.	Three Mukhi rudraksha has a soothing effect on one's mind and body. It releases stress due to past sins and helps one to achieve success.
	Blood circulation, cough and brain linked illness, asthma, Memory lapse and respiratory problems.	The four Mukhi Rudraksha helps release the Vishuddha Chakra. It is also known for clearing Throat Chakra. This Rudraksha is expands memory power.
	Blood pressure, heart problems, stress, mental disability, fatness, diabetics, piles, neurotic and mal adjustment problems	The wearer of five Mukhi Rudraksha brings positive energy. This rudraksha improves the respiratory system in human beings. It brings good luck and has a calm effect on the mind.
	Epilepsy and gynecological problems	Six mukhi rudraksha This Mukhi saves the wearer from the emotional trauma of worldly sorrows and gives learning, wisdom, and knowledge.
	Asthma, pharyngitis, impotency, foot related disease, respiratory and confusion.	Seven Mukhi Rudraksha is known for giving prosperity in all zones of life like career, business and service thereby bringing all-around success and luxuries.
	Stomach ache, stress, skin diseases and anxiety.	Eight mukhi rudraksha is a highly lucky one for all people. This rudraksha symbolizes the eight directions and also eight types of siddhis or spiritual powers.
	Work as mysterious medicine for treating strange diseases	Nine Face Rudraksha gives good health, peace of mind, happiness and removes poverty. The wearer gets the capacity for making a right, positive and accurate decisions in their life.
	Hormonal inequality in the body, mental insecurity and whooping cough.	The ten mukhi rudraksha is a special one and is ruled by Lord Lakshmi Narayan. This rudraksha bestows mental peace and confidence to overcome the difficulties.

## Results and Discussion

Rudraksha (*Elaeocarpus ganitrus*) is very popular plant since historic times. The written evidences are found in various classical text as well as modern text e.g. Raj Nighantu, Bhavprakash Nighantu, Dravyagun avijnana, Indian materia medica, Indian medicinal plant etc. This plant has number of synonyms e.g. chattusampangi,

bhutnasan, rudraki, rudrakya, rudraksam etc. Various researches have been done and medicinally important constituent are isolated. It can be used internally as well as externally. Researchers have proved its antibacterial, antioxidant, antidiabetic antihypertensive, antianxiety etc. The distribution of rudraksha in Musi Banyuas in district comes from the farmers who come from the Pali district and only spread in the border area of Musi Banyuasin district [18-23].

### Conclusion

Rudraksha (*Elaeocarpus ganitrus*) is a beneficial plant. It is used astrologically as well as medicinally. It can cure various disorders like dahasaman (burning sensation), jwar (fever), prameha (diabetes), raktabharsamak (hypertension) etc. from future prospect research can be done to bring its formulations in the market. Rudraksha contain electric as well as magnetic field. Nowadays, extremely low frequency magnetic field is considered as therapeutic agent and so used in medicines. Extremely low frequency magnetic field can initiate a number of biochemical & physiological alteration in biological system which can be used to overcome the conditions of stress & maladjustment.

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