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## A Review on *Pyracantha crenulata* (Ghingharu)



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### ABSTRACT

*Pyracantha crenulata* it's commonly known as Ghingharu, Chota shaeb, Nepalese firethorn, Nepal firethorn and its English name is Himalayan firethorn and it is found in the Himalayas from Sutlaj to Bhutan and it is widely spread in the Nainital, Chamoli, Uttarkashi, Tehri, Almora, Pithoragarh district and the endemic of Himalayan hills ranging altitude is 900 to 2400m and it is dense bushy shrub grows widely in abundance in Barren, rocky and dry grassland. This drought and the frost tolerant species can withstand temperature fluctuations from subzero to 35 degree. These brushes are 5 to 15ft high profusely branched with dark red colored puppy barriers during the month of Aug-sept. This perennial, deciduous and thorny shrub is commonly known as Indian Hawthorn.



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## INTRODUCTION

*Pyracantha crenulata* (D.DON), M Roem, syn *crataegus, crenulata* (Roxb) cotoneaster *crenulata* (D, Don) K. Koch *Mespilus crenulata* D Don (Rosacea) is commonly known as Ghingharu, Chota Saeb, Indian Hawthorn, Himalayan firethorn, Nepalese firethorn, Nepal firethorn and it's English name is Himalayan firethorn. *Pyracantha crenulata* in the Kumaon region of Uttarakhand commonly known as Ghingharoo. [1, 2] In the Garhwal Himalaya it is also known for its rich bioresources and Ethnocultural. [3] *Pyracantha* flowers are hermaphrodite (bisexual) having one ovary with 20 stamens. This perennial deciduous and thorny shrub is typically called Indian Hawthorn or Ghingharu. [4] *Pyracantha* is used for a good soil binder for stabilizing degraded area that is a slope. That is prone to landslide. [5] The fruit of this plant has been used in Garhwal folk and traditional medicine in the treatment of serious health condition like blood pressure, diabetes, heart disorder, hypertension, circulation system especially in case of angina. [6]

The fruit is antispasmodic, appetizers, cardiogenic, diuretic, vasodilator, sedative used to treat burns, cardiac failure, myocardial debility and Buerger's disease. The fruit is consumed by aged people for rejuvenation and to reduce joint pain and body pain. The fruit powder combined with yoghurt is given to cure bloody dysentery. [1, 7, 8, 9, 10, 11]

The leaves possess antioxidant, immunomodulatory and anti-inflammatory activities that are used to prepare herbal teas, sunburn, creams and facial Cream. [12] The plant makes an excellent hedge and is grown as an ornamental plant. [13] Ghingharu fruit decreases blood pressure and does not increase cholesterol, also useful in diabetes. In Ghingharu vitamin C, vitamin A, vitamin B, vitamin B2, vitamin B12, vitamin E, protein, carbohydrates, fats, and fibers, calcium, potassium are found in Ghingharu. [14] The bioflavonoids in most *Pyracantha* species are quite useful in the treatment of malfunctioning of the heart and blood circulatory system. [15]

The antioxidant presents in the plant reduce damage from free radicals. The medicinal uses of this plant for the treatment of circulatory system ailment and respiration contamination already hooked up through the 18th century. In ayurvedic medication, it is taken into consideration to growth blood waft to coronary heart muscle and to repair ordinary coronary heartbeat. This impact consequences for the presence of bioflavonoids inside the fruit. The antioxidant property of fruit support the blood vessels. In other medicinal system, the flowers and fruit of plant considered acting as a mild heart tonic. [2] Also, in Ayurvedic medicine, it

is reported to be useful in the treatment of a number of ailments, including hepatic, stomach and skin diseases due to its diuretic, depurative, tonic, antirheumatic, cardiogenic, hypoglycemic, hypotensive, anti-inflammatory and lithontripic properties. [16, 17, 18]

## **GEOGRAPHICAL DISTRIBUTION**

*Pyracantha crenulata* is widely distributed in Himalayan form Sutlaj to Bhutan between 800-2500m and in China as a perennial shrub [7-11]. It grown in the range is between 1000-2600m in Uttarakhand. It is widely distributed in the Nainital, Chamoli, Uttarkashi, tehari, Almora, Bageshwar, Champawat, and Pithoragarh district. [3, 11] It is an important plant in the foothills of the Himalayas and is found in Uttarakhand in Himachal Pradesh and northern eastern state of India and Nepal at elevation off 1600- 2500m. [19]

## **PLANT DESCRIPTION**

Flowering season begins from March- May and it's fruit is grown in season June to September. Its habitat is shrubberies, open slopes, cultivated areas, slopes roadsides, streamside among shrubs and it's ripen fruits are eaten directly by the local communities in Uttarakhand. [20]

*Pyracantha crenulata* is a thorny, woody shrub of 2-5m in peak it's far determined with inside the foothills in the Himalayas. It is found along streams on the banks of tributaries and in pine and queues forests.



**Figure No. 1: Pyracantha tree**

### **Leaves**

The leaves are dark green in color with the smooth exterior, 2.5- 4.0cm in length and 1.0-2.2cm in width tapering end. The leaves are rich in antioxidants. Phenolics are one of the components used to make natural herbal tea by local people.

## Flowers

The white colored inflorescence is a compound corymb with many flowers in it. The flowers are hermaphrodite (bisexual) having 20 stamen and one ovary within the center. Every flower additionally incorporate five sepals and five petals.

## Fruit

The fruit is a pome type, consisting of pulpy berries. Fruiting happens at some point of the month of July to September in Uttarakhand condition. The berries are small and each berry weighs 250mg. The pome fruit is orange and red and it provides food for various birds. [21] The fruits are edible and rich in sugar and the leaves are used to make herbal tea. [22]

## Seeds

Each berry generally contains 5 triangular brown colored seeds, sometimes 3 or 4 seeds are observed and the seeds are covered with a hard seed coat. [23]



Figure No. 2: Leaves of *Pyracantha*



Figure No. 3: Flowers of *Pyracantha*



Figure No. 4: Fruits of *Pyracantha*

## CHEMICAL CONSTITUENTS

The fruits contained proteins, vitamins, sugars, flavonoids, oligomeric proanthocyanidins, tannins, polyphenols,  $\beta$ -sitosterol, esculetin and quercetin. [24, 25] The flowers yielded phenyl ethylamine, Omethoxyphenyl ethylamine and tyamine. The plant possessed 2-phenylchromones and chlorogenic acid. Pyracrenic acid was isolated from the bark. The major fatty acids of seed oil were linoleic, oleic and palmitic acids. [26, 27]

## TAXONOMIC CLASSIFICATION

**Biological source:** *Pyracantha crenulata*

**Kingdom:** Plantae

**Phylum:** Anthrophyta

**Class:** Magnoloipsida

**Order:** Rosales

**Family:** Rosacea

**Genus:** Pyracantha

**Species:** Crenulata [2]

## USES

Leaves used in the preparation of herbal tea, sunburn, creams. Wood is used for making walking sticks, low cost household items and agriculture tools. Bark is used in heavy bleeding during menstrual cycle. The stem bark is useful in fever exceptionally malaria. Antioxidant present in berries of Hawthorne reduced damage form free radicals. A root decoction is used in baths to alleviate body pain [28, 29, 30, 31] Extract of its bark applied topically protects skin from sunburn and all body organs from frostbite. The juice of hawthorn fruit has a hypoglycemic effect in the treatment of diabetes. [32]

## MEDICINAL IMPORTANCE

A tonic from Ghingharu culmination named 'Hridayamrit' actually meaning 'Nectar for heart' organized through DRDO. Fruits possess cardiogenic, coronary vasodilator and hypotensive properties use for cardiac failure, myocardial weakness, paroxysmal tachycardia, hypertension arteriosclerosis and burgers disease.

The antioxidant present in fruits are helpful in reducing the ill effects of free radicals in our body maintaining blood pressure and reduce cholesterol.

**1) Antihypertensive activity:** It is a properly set up truth in scientific technology that its culmination are powerful in curing hypertension. [33, 34] Its leaves also have antioxidant, immune-modulatory and anti-inflammatory properties. Undoubtedly it is quite effective in

curing various diseases. A study was conducted at the Indian Defence Institute of Bio-Energy Research (DIBER) a constituent Institute of the Defence Research and Development Organization (DRDO), to observe the effect of a *Pyracantha* herbal formulation on hypertensive rats. The results of the study confirmed the positive antihypertensive effect of this beverage. [35]

**2) Antioxidant property:** Antioxidants present in hawthorn berries are helpful in reducing the damage caused by free radicals. Western herbalists consider the berries as a potent heart tonic that is very useful in normalizing heart rhythm in hypertensive patients. [36, 37]

**3) Memory Enhancer:** A mixture of *Pyracantha* and Ginkgo (*Ginkgo biloba*) leaves was found to enhance brain cell activity and hence to enhance memory. [38]

**4) Antibacterial and antifungal activity:** *Pyracantha crenulata* ethanolic fruit extract has significant antibacterial activity against *Shingella flexneri*, *Escherichia coli* and *Streptococcus pyogenes* towards meals poisoning micro-organism. [11]

**5) Antiuro lithogenic activity:** A research has been done to determine the antiuro lithogenic property of the alcohol and juice extract of the fruit of *P. crenulata* against an ethylene glycol induced model in albino rats and to confirm the traditional medicinal use of the plant. [39]

## CONCLUSION

Popularity of natural products or their derivatives role in disease cure and prevention is increasing worldwide due to less side effect. *Pyracantha* is a plant with capability for the improvement of diverse nutraceutical and pharmaceutical products and also has immense potential for the formulation of nutraceutical products of general public importance to be used in various types of diseases like cardiovascular diseases, kidney problem, diabetes etc. Due to various phytoconstituents present in the plant it has anti-inflammatory, antioxidant, antibacterial, antifungal effect. The main aim of this review was to describe about the plant taxonomy, morphology, uses and its biological importance.

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