

## *Pistacia integririma* Stewart ex Brandis: A less known high value medicinal plant

Bharti Sharma<sup>1</sup>, Sheezan Rasool<sup>1</sup>, Shreekar Pant<sup>1\*</sup>

\*Corresponding author:

Shreekar Pant

<sup>1</sup>Centre for Biodiversity Studies, School of Biosciences and Biotechnology, BGSB University, Rajouri-185 234, J&K, India

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### Abstract

The family Anacardiaceae, best represented by the species *Pistacia integririma* Stewart ex Brandis, is known worldwide for its manifold uses. It is widely used to cure various diseases like cold, cough, asthma, fever, vomiting and diarrhea, etc., and widely used in modern medicine. Therefore, an attempt has been made to assess the medicinal potential of the species both in traditional as well as in modern medicine system. These properties are supposed to be cured by different active compounds present in the plant. This paper provides the relevant information about medicinal properties of this high value medicinal plant.

**Keywords:** *Pistacia integririma*, kakar singi, indigenous uses, medicinal potential.

### Introduction

*Pistacia integririma* Stewart ex Brandis belong to family Anacardiaceae. Plant is native to China. It is widely and narrowly distributed in eastern part of Indian Himalayan Region from Indus to Kumaon [1] at an altitude between 12000 to 8000 feet. Its distribution extends to China, Armenia, Afghanistan, Pakistan, and Nepal [2]. It is known as kakra in Hindi and chakra, chandraspada, shikari in Sanskrit [3]. In Uttarakhand and Himachal Pradesh it is commonly known as Kakar singi and as kangan in J&K. *P. integririma* is medium sized deciduous tree, upto 10-12 m in height [2]. Leaves are board, ovate and are present in pairs. Flowers are small and red in colour. Fruits are shiny and brown in colour when mature. The horn shaped, rugose, hollow galls like excrescences are used for medicinal purposes and they have a very sharp and bitter taste. The galls are aromatic, astringent and has high value in

Ayurvedic medicines as a remedy for asthma, phthisis and other disorders for the respiratory tract, dysentery, chronic bronchitis, in high cough, vomiting of children, skin diseases, psoriasis, modern medicine for the treatment of diseases which are fever, snake bite, scorpion sting. The use of leaf galls (Figure 1) of *P. integririma* as rejuvenator is well known and attributed to antioxidant property due to presence of phenolics and flavonoids. The galls and bark of the plant contains a number of secondary metabolites having analgesic, anti-microbial, anti-bacterial, anti-asthmatic and anti-inflammatory activities. It has been reported to have depressant [4] analgesic, analgesic, anti inflammatory activities [5-9] and hyperuricemic effect [10].

Chemically, it contains Monoterpenes [6, 11, 12] triterpenoids [6, 11, 13, 14, 15] sterol [15, 16] dihydromalvalic acid [17] and flavonoids [18-20].



Figure 1. Infected Galls of *P. integririma*

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## Traditional Uses

It is generally used as herbal remedy for common ailments such as cold, cough, asthma, fever, vomiting and diarrhea [21,1]. In Pakistan, galls of *P. integririma* are used for treatment of hepatitis and other liver disorders [22]. While in North India its galls are used as herbal drug for diarrhea, liver infections, diabetes, pain, inflammatory conditions and fever [9],[22]. Further, galls, leaves and bark are generally used as indigenous medicines in every household for the treatment of common fever, cough, asthma, diarrhea, jaundice, and snake bites [22].

Kakarsinghi also finds usage in the treatment of children's ear infections and suppress haemorrhage from gums and used to suppress bleeding from nose [21-25]. As per [26] "Hakims" (local vaidhays) consider galls useful in pulmonary infections, diarrhoea and vomiting. According to [4], *P. integririma* is generally used as anti-inflammatory, antidiabetic agent, as blood purifier, a remedy for gastrointestinal disorders and as an expectorant.

The galls are used in some of the ayurvedic formulations like 'Chvyanprash avaleha', 'Kumari Asava', 'Kumari Kalp' which is generally prescribed in weakness as rejuvenating agent and tonic (Gunakari Ayurvediy Aushadhe. Ayurveda Rasashala, Pune).

## Pharmacological activity

### Antibacterial activity

#### Bark

According to [27], the bark of *P. integririma* shows the antibacterial activity against *Staphylococcus aureus*.

### Leaf Galls

The ethanol and aqueous fractions of leaf galls of *Pistacia integririma* were evaluated for antibacterial activity using the agar-well diffusion method. All the strains showed concentration dependent susceptibility towards the extract of both ethanol and aqueous fractions (25, 50, 100, 250, 500 µg/100µL) and found that the antibacterial activity was more pronounced against *Gram positive* bacteria, while it showed moderate activity on *Gram negative* bacteria strains. The ethanol extract was found to show better activity profile than the aqueous extract. The inhibitory effect of the extracts was compared with standard antibiotic Ciprofloxacin. But as per [4], the chloroform, ethyl acetate and methanol extract of galls showed significant activity against two Gram negative and one gram positive bacterial strains and displayed highest inhibitory zone of (28:0 mm) at the tested concentration (22 mg/ml).

As per the study of [27], treatment with aqueous extract of galls showed a dose dependent effect on disruption rate of actively sensitized mesenteric mast cells of albino rats when challenged

with antigen (horse serum along with triple antigen vaccine). Aqueous extract of galls treatment for ten days resulted in significant protection against histamine aerosol-induced bronchospasm in guinea pigs and showed the spasmolytic activity against histamine induced contractions in isolated guinea pig tracheal chain preparation. Antiasthmatic activity extract galls may be due to the membrane stabilizing potential, suppression of antibody production and inhibition of antigen induced histamine release.

### Phytotoxic activity

Phytotoxicity of plants reduces the growth of weeds without any negative effect on the crop growth and overall yield under normal field condition. The phytotoxic activity was shown by ethyl acetate 90% growth inhibition followed by chloroform 70% growth inhibition and methanol 60% growth inhibition at a concentration of 500 ppm. This reflects that these fractions have active compounds which are responsible for their phytotoxic effect [27].

### Other services

*P. integririma* is generally lopped for fodder and fuel wood. A moderate quality charcoal is also obtained from this plant. Especially in rural areas, plant is also used for the construction purposes, wood carving, for making furniture, making agricultural implements, musical instruments and some times used for plywood. Insect galls, bark, and leaves are also used for obtaining dyestuff or tannin. This species is also used to check the soil erosion, help in reclamation, soil improvement, as an ornamental plant. According to [28], it is used in water purification.

### Conservation Status

Due to its high medicinal value and demand it could be categorized under threat list of threatened taxa. Due to this, species has great demand in national and international market [29]. Furthermore, extraction of the raw material from its wild population is the only source for meeting the market demand. This leads to over-exploitation of the species from wild. Local inhabitants collect this high value medicinal plant for either legal or illegal trading. The local inhabitants could collect Rs. 50 to 90 per kg [29] and Rs. 800-1000 per Kg (market survey) dried galls of *P. integririma*. For 1 kg of galls, approximately 90 to 100 plants need to be surveyed for the collection of galls. As a result, the population of this species is decaying day by day. This indicates that if the casual factors continue to operate, this species may become extinct within a few years. During the survey, it was also observed that local inhabitants carry looped tree as fodder for their livestock. This is another level of disturbance, because of lopping tree can't attain maturity and fails to develop seed. These levels of disturbances, like lopping pressure, over exploitation and unawareness of proper procedure

of collection and propagation, etc., are the other major factors for declining this species from its natural habitats.

## Conclusion

*P. integerrima* is widely used to cure cold, cough, asthma, fever, vomiting and diarrhea, hepatitis, other liver disorders, asthma, diarrhea, jaundice, snake bites and used as anti-inflammatory, antidiabetic agent, as blood purifier, a remedy for gastrointestinal disorders and as an expectorant. Recent research shows that bark of the plant promising antibacterial activity and anti-asthmatic activity. The main aim of this article is to focus on the medicinal potential of such dawdling high value less known medicinal plant and suggest that future research should be conducted in a manner to keep in mind the properties of such wonder tree, while analyzing/isolating/characterizing the active principle(s) compounds

present in it. At the same time, we should also try to identify the active compound responsible for each and every property, and identify if they act singly or in combination with other compounds present in it. Furthermore, keeping in view the demand and status of this species, it is necessary that further research is needed to overcome these problems and also to promote cultivation, propagation, awareness and conservation of this species through people participation and of course through various conservation methods like, *in-situ* and *ex-situ*.

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