



A Review on Medicinal Importance of *Allophylus cobbe* (L.) Raeusch and *Garuga pinnata* Roxburgh

S. D. Chavan^{1*}, R. J. Dias² and C. S. Magdum³

¹Tatyasaheb Kore college of Pharmacy, Warananagar; Tal: Panhala, Dist: Kolhapur
Pin: 416113 (M.S.) India.

²Department of Pharmacy, Government Polytechnic, Jalgaon

³Rajarambapu College of Pharmacy, Kasegaon

Received: 12 Jan 2019 / Accepted: 18 Mar 2019 / Published online: 1 Apr 2019

*Corresponding Author Email: sdchavan.tkcp@gmail.com

Abstract

Different parts of the plant such as leaf, root, flower and seed possess the medicinally/biologically active secondary metabolites which can be used as medicines. Now days the use of the medicinal plants, for the treatment of the different diseases in traditional and modern medicines is increasing because the herbal products represent the safety in distinction with the synthetics that are regarded as unsafe to both human and environment. Generally, in India, it is estimated that over 6000 plants are in use in traditional and herbal medicine. *Allophylus Cobbe* and *Garuga Pinnata* are medicinal plants, which have traditional uses against various diseases. The objective of this review is to compile medicinal values of *Allophylus Cobbe* and *Garuga Pinnata*.

Keywords

Allophylus Cobbe, *Garuga Pinnata*, medicinal plants, treatment, traditional.

INTRODUCTION:

A medicinal plant is any plant which, in one or more of its organs, contains substances that can be used for therapeutic purposes, or which are precursors for chemo-pharmaceutical semi-synthesis. Majority of world population is dependent on medicinal plants as source for remedies to cure and prevent all kinds of human disorders. When a plant is designated as 'medicinal', it is implied that the said plant is useful as a drug or therapeutic agent or an active ingredient of a medicinal preparation. Medicinal plants may therefore be defined as plants with one or more of its part containing properties that can be used for therapeutic purposes or which can be used as

precursors for the synthesis of various drugs. Medicinal plants have different biologically active compounds such as carbohydrates, proteins, enzymes, vitamins, minerals, fats and oils, tannins, quinones, terpenoids, flavonoids, sterols, carotenoids, simple phenolic glycosides, alkaloids, saponins, polyphenols etc. These bioactive substances which are very important as medicines and other activities from the plants mainly show the different pharmacological activities [1].

The current paper highlights the *Allophylus Cobbe* and *Garuga Pinnata* plants. Both these plants are the traditional herbal plants having the different bioactive components which are easily available in

the forests of Radhanagari, Katyayani and Jyotiba of Kolhapur district from Maharashtra state. So the present paper compiles the data on Botanical

Description, Ecology, Ethanobotany, Bioactive component and Pharmacological Properties of the *Allophylus Cobbe* and *Garuga Pinnata*.

Allophylus cobbe (L.) Raeusch

Scientific Classification

| | |
|---------------------|---|
| Kingdom | : Plantae |
| Class | : Magnoliopsida |
| Order | : Sapindales |
| Family | : Sapindaceae |
| Genus | : <i>Allophylus</i> |
| Species | : <i>Allophylus cobbe</i> |
| Species Name | : <i>Allophylus cobbe</i> (L.) Raeusch. |

Vernacular name

| | |
|-----------|---|
| Manipuri | Lichi manbi |
| Bengali | Rakhalphul |
| Assami | Chi-chehirum |
| Malayalam | Molago-maram, Mukkannanpezhu |
| Marathi | Theepani, Thivana |
| Kannada | Ervaala, Kasaballi, Sidisaale, Thogaratti |
| Tamil | Sirusalle, Perrakudikai |
| Telugu | Erra avalu, Guvva gutti, Salli kunkudu |



Fig. No. 01- *Allophylus cobbe* shrub

Botanical Description:

Allophylus cobbe (L.) Raeusch is a small shrub tree from the family Sapindaceae commonly known as Tippani in Marathi grows up to 5 m. The leaves of the *Allophylus cobbe* are alternate, compound, trifoliate, 7.5- 13.5 X 4.2-7.0 cm long, spirally arranged, crowded at the end of branchlets, drooping; petiole 5.0-6.5 cm long, pubescent; leaflets ovate or elliptic, acute or acuminate, sharply or distinctly serrate-dentate, hairy- pubescent on both surfaces, terminal leaflet acute at base; petiole of lateral leaflets 0.6-0.8 cm long, those of terminal leaflet up to 2.5 cm long. The stem is often climbing to considerable height, erect, cylindrical, has many branches and spreading.

Flowers are irregular polygamous- dioecious, small and shortly pedicillate. It contains 4 sepals, glabrous, in opposite pairs; polysepalous, membranous, outer sepals are smaller; 4 petals, polypetalous, cuneate, with fringed scale above the claw and the disc is unilateral lobed. It contains the 8 stamens which are free and shortly exerted. Ovary is 2 lobed and 2 celled, hairy, ovules one in each; simple style and stigma. Fruits are indehiscent, fleshy, globose, smooth, pea sized and red when ripen. It contains seeds with fleshy aril [2].

Ecology:

Allophylus (family Sapindaceae) having about 255 species found worldwide out of which nine species are found in India. Found to grow on upline edges of hills in Western Ghats as well as mangrove associate at West Coast of India. *A. cobbe* is extensively found in different parts of Maharashtra state from India. This plant is mainly found in forest areas of the Panhala and Radhanagari of Kolhapur district of Maharashtra State [3].

Ethanobotany:

Allophylus cobbe has strong ethnobotanical and ethanopharmacological background. The bark is bitter, sweet and astringent. It has vulnerary, digestive, carminative, constipating and anti-inflammatory properties. It is useful in ulcers, wounds, dyspepsia, anorexia, diarrhoea, stomachache, fever, bruises and inflammation. In Konkan region the bark is used in bone fractures and dislocation of joints. The leaf extract is taken against stomachache and leaf pest is applied on scabies. The root power is mixed with honey for diarrhoea. To cure the ulcers intake of leaf juice is effective. The fruits are cooling, sweet and tonic and are advised in general debility [4].

Bioactive component:

Allophylus cobbe contains different bioactive substances which are very important as medicines and other activities. Mature leaves, stem and roots exhibited higher concentrations of tannins and terpenoids than young leaves and stem. Phlobatannins were detected in all parts of *Allophylus*. Medium concentration of steroids and cardiac glycosides were observed in mature leaves. Flavonoids showed medium concentration in all plant parts [4].

Pharmacological Properties:**Antibacterial Activity:**

Allophylus cobbe is useful in traditional medical system and carry strong ethnopharmacological background of Antibacterial activity. R. B. Chavan and D. K. Gaikwad performed the Antibacterial assay as per the standard method described in Indian Pharmacopoeia for antimicrobial activity using agar well diffusion method using sterile cork borer of size 7 mm. It is observed that the young and mature leaves of *A. cobbe* exhibits greater zone of inhibition than the Cefotaxime against the gram-positive bacterium *Bacillus subtilis*. Activity of aqueous and ethanolic extracts of young and mature leaves of *A. cobbe* against *Staphylococcus aureus* showed the maximum zone of inhibition in the range of 20-23 mm which is comparatively less than standard antibiotic cefotaxime [5].

Analgesic Activity:

Preeti Jain *et. al.*, studied the Analgesic Activity by the different methods such as Hot Plate Test & Acetic Acid Induced Writhing Test. For Hot Plate Test ethanolic extract of the plant showed the activity by significantly increasing the reaction time of heat sensation in mice at the doses of 250 and 500 mg/kg. At 3 hr of study, the extract increased the reaction time of heat sensation, and for Acetic Acid Induced Writhing Test it showed inhibition of licking response in mice due to the administration of the drug. The oral administration of the drug significantly attenuated the acetic acid induced abdominal writhes in mice [6].

Anti-inflammatory activity:

Preeti Jain *et. al.* studied the anti-inflammatory activity by carrageenan induced rat paw edema test, it showed that the ethanolic extract of *A. Cobbe* leaves possess significant anti-inflammatory activity. The most prominent inhibition of inflammation 58.88% at 250 mg/kg was observed at the 3rd h of study, while the standard diclofenac sodium (10 mg/kg) showed 41.62% inhibition in comparison with the control [6].

Antioxidant Activity:

Preeti Jain *et. al.*, studied the Antioxidant activity of the *Allophylus cobbe* extracts using one of the most effective methods for evaluating radical-scavengers i.e. DPPH method. At a concentration of 200µg/mL, the scavenging activity of the ethanol extract (91.53% inhibition) was comparable to that of the standard ascorbic acid (99.3% inhibition) [6].

Insecticidal Activity:

Jayasinghe U.L.B. *et. al.* studied the twenty-nine solvent extracts from twenty Sri Lankan plants for antifeedant activity against the fourth instar larvae of Mexican bean beetle, *Epilachna varivestis* Muls., Coccinellidae. *Allophylus cobbe* (Sapindaceae) had shown strong antifeedant activity. So, these extracts could be potential for the isolation of antifeedant compounds [7].

Wound Healing:

Sanjeevani *et. al.* developed the topical formulation for the wound healing by using the *A. Cobbe*. To evaluate the wound healing activity the excision and incision wound models were used. To evaluate the wound healing ability of the prepared formulation, they measured parameter such as rate of wound contraction, Epithelization time both by Excision wound model, Histological evaluation of healed tissue and determination wound breaking strength by Incision wound model. Topical application of methanol extract of *Allophylus cobbe* L. leaves confirmed the wound healing activity in rats [8].

ovicidal activity:

Priya, M N *et. al.* studied the anthelmintic activity of methanolic, aqueous and hydroalcoholic extracts of *A. Cobbe* using egg hatch assay method. For the experimentation fresh ova were collected from Goat infested with *Haemonchus contortus* and were concentrated by centrifugation. Almost all the extracts contain same phytochemical constituents,

the methanolic extract shows more ovicidal activity at 6.25 mg/ml whereas the hydroalcoholic extract did not produce the same effect. The control drug albendazole showed ovicidal activity at the doses tested and almost all the ova were found disintegrated. Study confirmed the presence of phenolics, tannins and flavonoids contributing the anthelmintic activity [9].

***Garuga pinnata* Roxb.**
Scientific Classification

| | |
|------------------------|-------------------------------|
| Kingdom | : Plantae |
| Order | : Sapindales |
| Family | : Burseraceae |
| Genus | : <i>Garuga</i> |
| Species | : <i>Pinnata</i> |
| Species Name | : <i>Garuga pinnata</i> Roxb. |
| Common name | : Grey Downy Balsam Tree |
| Vernacular name | : |

| | |
|-----------|--|
| Assam | Gendelipoma |
| Bengal | Dabdabe, Jum, Nil Bhadi, Tum kaphat |
| Burma | Chinyok, Chinyop |
| Gujerati | Kancodd, Kusimb |
| Malayalam | Karuvempu, Kareyam, Kattukalinjan |
| Marathi | Kakad, Kudak, Kuruk |
| Melghat | Kekda |
| Nepal | Auledabdabe, Dabdabbi |
| Tamil | Arunelli, KaruvembuKaruvilangam, Malaiyudi |
| Telugu | Garuga, Kondavepa |
| Tulu | Kadambate |



Fig. No. 02- *Garuga Pinnata* tree

Botanical Description:

Garuga pinnata is a deciduous tree species from the family Burseraceae commonly known as kakad in Marathi. A tree sometimes reaching 15 m. in height; bark furrowed, the outer layer peeling off in flakes. Leaves 15- 45 cm long, deciduous in the cold season; leaves alternate, crowded towards the ends of

branches, compound imparipinnate, 15-32 cm long; leaflets 6-10 pairs, and an odd one, opposite or nearly so, subsessile, sometimes 15 cm long, ovate or ovate lanceolate, pubescent on lower side; apex acuminate, base oblique. Flowers yellow, regular polygamous, hypogynous 0.4 cm across, in much branched, axillary, tomentose panicles, several

together at the ends of the branches; bracts deciduous. Calyx 6 mm. long, gamosepalous, campanulate, cleft a little less than halfway down, densely tomentose outside; lobes ovate- oblong, subotuse. Petals 5 mm long, inserted on the calyx tube, free, linear oblong, tomentose outside, sparsely pubescent within, tip thickened, inflexed. Disc is thin, lining the calyx - tube crenate. Stamens 10, equal, free, inserted on calyx – tube, filaments slightly hairy. Carpels 5, syncarpous, ovary superior, ovoid, sessile, 4-5 celled; Style long, stout, hairy; stigma capitate, 5- lobed. Fruits are drupes 1-2 cm across, greenish yellow, black when dry, irregularly globular. Seed is with membranous wing [2].

Ecology:

Garuga pinnata is found in Asia, namely the Indian sub-continent, Southeast Asia and the parts of China. In India it is extensively found in Maharashtra state's forest areas of the Kolhapur district like Radhanagari and Katayani. In Bangladesh it is found in forests of Chittagong, Chittagong hill tracts, Habiganj, Moulvi bazaar, Dhaka and Tangail [10].

Ethanobotany:

Garuga pinnata has strong ethnobotanical and ethanopharmacological background. It has properties of diuretic, aphrodisiac, tonic, astringent, alterative, cooling; promote growth of hairs. It is useful in the treatment of anaemia, leprosy, ulcers and vaginal discharge. Externally the paste of the leaves is applied on the forehead to alleviate the headache, especially in fever. To mitigate the burning sensation of the body, fresh juice the leaves is massaged [10].

The leaves juice, milk and sugar are recommended in inflammatory conditions of urinary bladder and dysuria. The bark is advised in eye diseases. It is advised with *Adhatoda vasica* and *Vitex negundo* in asthma. The fruits are recommended in blood disease, excessive thirst, dysuria, sexual debility in males and habitual abortion in females. The fruits are beneficial as anabolic in tuberculosis to hasten the healing of cavitation in the lungs. The ripped fruit is valuable in heart diseases. The cold infusion of tea prepared from fruits is mixed with honey and sugar in fever. The fruit alleviates the thirst and burning sensation in fever. The roots are helpful in ascites [2].

Bioactive component:

Garuga pinnata contains different bioactive substances which are very important as medicines and other activities. Leaves contain amentoflavone. Stem bark extract gave positive tests for steroids, terpenes, alkaloids, flavonoids and saponins. An euphane triterpene alcohol has been isolated from this plant. The leaves of this plant are found to have

noticeable amount of phenolic compounds, which may involve in controlling various oxidative and reductive processes. Two diarylheptanoids, 6'-Hydroxygaruganin and Garuganin were isolated from *G. pinnata* [10].

Pharmacological Properties:**Bone Fracture:**

Suneetha *et. al.* (2011) in their work on indigenous phytotherapy for bone fracture from Western Ghats, stated that the plastering of crude stem bark paste over the bone fractured areas for 2 months for healing of bone fracture by *Garuga pinnata* [11].

Antimicrobial Activity:

Sonia Zaman (2016) studied the Antimicrobial Activity of the chloroform extract of *Garuga pinnata* against Gram positive bacteria, Gram negative bacteria and Fungus. In case of gram-positive bacteria, the extract showed good antibacterial activity against *B. subtilis* and *S. aureus*. In case of gram-negative bacteria, the extract showed good activity against *S. paratyphi* and *E. coli*. Activity of *G. pinnata* was carried out by the standard disc diffusion method. The antibacterial activity was expressed in terms of millimeter by measuring the diameter of the zone of inhibition. The presence of different biologically active compound like flavonoids, alkaloids and tannins confirm its activity as antimicrobials [12].

Antioxidant Activity:

Sonia Zaman (2016) studied the Antioxidant Activity i.e. free radical scavenging activity of the leaves extract on the stable radical 1,1-diphenyl-2-picrylhydrazyl (DPPH). Activity was determined spectrophotometrically using ascorbic acid as standard. Result was calculated in the form of percentage of inhibition using the formula. The extract showed significant antioxidant activity compared to ascorbic acid. It was concluded that the high concentration of the phenolic compounds may account for the Antioxidant Activity [12].

Cytotoxic Activity:

Sonia Zaman (2016) studied the Cytotoxic Activity by brine shrimp lethality bioassay. It is an assay procedure of bioactive compounds, which indicates cytotoxicity and different pharmacological activities (e.g. anticancer, antiviral, insecticidal, pesticidal, AIDS, etc.). Cytotoxicity was determined using vincristine sulfate as standard. The extract showed very good cytotoxic activity as compared to the activity of standard. It indicates that biologically active compounds are present in extract. In high doses bioactive compounds shows toxic action [12].

Antidiabetic Activity:

Thupurani *et. al.* (2013) screened the antidiabetic efficacy of methanol and aqueous extract *Garuga pinnata* stem bark in streptozotocin induced diabetic rats. Methanol extract exhibited significant inhibition percentage of α -amylase and α -glucosidase enzyme activities. The percentage inhibition recorded for methanol and aqueous extracts are considerably compared with reference standard acarbose [13].

Antiulcer Activity:

Chitra *et. al.* (2013) studied the Antiulcer Activity of *Garuga pinnata* by using the ethanolic extract of the *G. Pinnata* leaves in albino wistar rats. Pharmacological Screening for the ulcer was done by the different methods such as Pylorus ligation; Indomethacin induced ulcers in rats and Cold-restraint stress-induced ulcers. Measurement for the ulcer scoring was considered same for all the induction models and it was made as 0.5-hemorrhage, 1- streaks, 2- spot ulcers, 3- severe ulcer, 4- erosions and 5 perforations. Alcoholic extract of *Garuga pinnata* was effective in reducing the ulcer area and the ulcer score by modulation of defensive factors through an improvement of gastric cytoprotection and acid inhibition. The action may be shown by the presence of the Tannins and Flavanoids in the extract [14].

Anticancer Activity:

Thupurani *et. al.* (2013) studied the Anticancer activities of the extracts were evaluated using MCF-7 and MDA-MB-231 human breast cancer cell lines. It has been reported that phenolics are very much potent to reduce the amount of cellular protein and mitotic index, cell proliferation and colony formation of cancer cells. Thus, the presence of phenolic compounds in the extract of *G. pinnata* is the major source to show the anticancer activity it is also revealed that the stem bark extract possesses saponins which exhibits the anticancer properties [15].

CONCLUSION:

Allophylus Cobbe and *Garuga Pinnata* are the traditional medicinal plants with enormous medicinal value. Leaves, barks, stems, fruits, flower etc. of this plant have been used traditionally for different human ailments. This review mainly discussed the different properties of these plants which possesses the therapeutic importance. These species mainly contain the different phytochemicals such as phenols, phytosterols, saponin and flavanoid glycosides which mainly show the different pharmacological activities and these constituents are responsible for their use in different disorders

traditionally. These are the traditional herbs and to make the herbal therapy more effective, it is very necessary to isolate the chemical entity responsible for the action and to identify the structure and the function relationship for the purpose of improved usefulness and pharmacokinetic profile and for the development of new herbal medicine. Treatment of disorders with minimum of possible side effects is our interference and the successful completion of these proven strategies by the complete knowledge of the traditional medicinal plants is the focus of our efforts. These efforts will lead to the safer and the cost-effective drugs for the people suffering from the different diseases, the number of which is increasing day by day.

Acknowledgement:

Authors are grateful to the University and head of Institute Dr. J. I. Disouza for giving library facility and the support to write this review article.

REFERENCES:

1. Roshan Adhikari, Naveen Kumar HN, Shruthi SD: A Review on Medicinal Importance of *Basella Alba* L. International Journal of Pharmaceutical Sciences and Drug Research. 4(2):110-114, (2012).
2. Ashok Wali and Madhukar Bachulkar. Traditional Herbal Drugs. Ankur Publications, Kolhapur. 2016.
3. Chavan Reshama Bharat and Gaikwad Dattatraya Krishna. GC-MS Analysis of Young Leaves of *Allophylus cobbe* (L.) Raeusch. and *Allophylus serratus* (Roxb.) Kurz. Indian Journal of Pharmaceutical Education and Research. 51(3): 472-479, (2017).
4. R.B. Chavan and D.K. Gaikwad. The Ethnobotany, Phytochemistry and Biological Properties of *Allophylus* Species Used in Traditional Medicine: A Review. World Journal of Pharmacy and Pharmaceutical Sciences. 5(11): 664-682, (2016).
5. R.B. Chavan and D.K. Gaikwad. Antibacterial Activity of Medicinally Important Two Species of *Allophylus-Allophylus cobbe* (L.) Raeusch. and *Allophylus serratus* (Roxb.) Kurz. Journal of Pharmacognosy and Phytochemistry. 2(1): 1-7, (2013).
6. Preeti Jain *et. al.* Anti-Inflammatory, Analgesic and Antioxidant Activities of *Allophylus Cobbe* Leaves. American Journal of Pharmacology and Toxicology. 9(4): 223-231, (2014).
7. U.L.B. Jayasinghe *et. al.* Antifeedant Activity of Some Sri Lankan Plants. Natural Product Research. 17(1): 5-8, (2002).
8. Sanjeevani Desai, Pravin Sathe and John Disouza. Development of Topical Formulation Containing *Allophylus Cobbe* L. For Wound Healing Activity. World Journal of Pharmaceutical Research. 5(9): 833-848, (2016).

9. Priya, M N *et. al.* Invitro ovidal activity of *Allophyllus cobbe* leaf extracts against *Haemonchus contort.* International Journal of Applied and Pure Science and Agriculture. 1(3): 24-28 (2015).
10. B. Lavanya and S. Thangamalathi. *Garuga Pinnata* Roxburgh –An Update International Journal of Institutional Pharmacy and Life Sciences. 6(2): 6-11(2016).
11. Suneetha J., Prasanthi S., Ramarao Naido and Seetharami reddy. Indigenous Phytotherapy for Bone Fractures from Eastern Ghats. Indian Journal of Traditional Knowledge. 10(3):550-553, (2011).
12. Sonia Zaman. In Vitro Evaluation of Antimicrobial, Antioxidant and Cytotoxic Activities of *Garuga Pinnata* Leaves. Indo American Journal of Pharmaceutical Sciences. 3(3): 294-299, (2016).
13. Murali Krishna Thupurani, Reddy P Nishanth, Singara Charya MA. In Vitro and In Vivo Antidiabetic Potentialities of *Garuga Pinnata* Roxb Stem Bark. International Journal of Pharmacy & Therapeutics. 2013; 4(4): 255-260.
14. V. Chitra, Sourabh Das M. Madhuri, V. Rajalakshmi. Evaluation of Antiulcer Activity of Alcoholic Extract of *Garuga pinnata* Roxb. Leaves in Experimental Animal Models. International Journal of PharmTech Research 2013; 5(3): 991-1000.
15. Murali Krishna Thupurani, Reddy P Nishanth, Pardhasaradhi Mathi, Ventka Raman, Singara Charya M.A. Studies on Anticancer and Antibacterial Potentialities of *Garuga pinnata* roxb. Int. J. Pharm. Sci. Rev. Res.2013; 21(2): 163-167.