

An Overview

Ormocarpum Cochinchinese (Elumbotti)

A.Hariya Dharshini¹, Dr. J. Karthi²

^{1,2}Dept of pharmacy

²Principal, Dept of Pharmacognosy

^{1,2}Pallavan Pharmacy college , Kanchipuram.

Abstract- The plant *Ormocarpum cochinchinense*, also known as “elumbotti” is a tropical plant indigenous to Southeast Asia. It is a member of the Fabaceae family and is distinguished by its compound leaves and unusual pod-like fruits. It is notable for its traditional applications in several locations, even if it is treasured for its ornamental properties. This herb was traditionally used to treat bone healing. Aside from bone healing, pharmacological properties such as anti-inflammatory, antiarthritic, antioxidant, mosquitocidal, antifungal and antibacterial activities have been identified. Secondary metabolites found in this plant such as alkaloids, tannins, flavonoids, phenol, saponins, terpenoids, coumarins, have a variety of therapeutic activity.

Keywords- Ormocarpum cochinchinese, elumbotti, pharmacology.

I. INTRODUCTION

Plants are rich in phyto chemicals, which have a broad range of health benefits. Phytochemicals derived from medicinal plants protect against many different kinds of chronic progressive diseases¹. This is why plants have been highly explored across the years for their different therapeutic potentials, such as antimutagenic, antibacterial, antioxidant, anticancer, and so on². Phytochemicals act as precursors for the manufacture of many medications, and nearly eighty percent of the modern medicines are produced directly or indirectly from plants³.

The plant *Ormocarpum cochinchinense* (Elumbotti in Tamil), a member of the Fabaceae family, has long been employed by traditional healers. The Irula tribe utilizes the bark and leaves for healing bone fractures¹¹. *Ormocarpum cochinchinense* is a shrub that is exceptionally effective in repairing bone fractures, but its use is currently unknown to all but a few villages in the tropical dry evergreen forest parts of Tamil Nadu⁴. To treat chest pain, the leaves are ingested raw or made into a medicinal confection called lehiyam. For rheumatic fever, the root decoction is a useful treatment¹². The leaves are applied to alleviate anxiety. Lumbago is treated with the roots, which are said to have tonic and stimulating

properties To cure paralysis, an application preparation that involves rubbing oil over the root bark is utilized. ¹³ Certain pharmacological characteristics, such the ability to mend bone fractures and its antioxidant activity ¹⁵ and anti bacterial activity ¹⁶ are reported.

From ancient times to the present, people have used this herb as therapeutic medication. Plant-based metabolites were used to create the majority of medicines in use⁷. Historic Indians recognized traditional knowledge about therapeutic herbs and their efficacy against illnesses⁸. However, clinical evidence became unclear because it was kept hidden by village vaidyas⁹. There is, however, no clinical evidence to support the traditional usage of *O.cochinchinense* leaves in the treatment of “bone healing”.





TAXONOMICAL CLASSIFICATION:

- KINGDOM: Plantae
- CLASS: Equisetopsida C. Agardh
- DIVISION: Angiosperms (Flowering Seed Plants) (Dicotyledon)
- FAMIL: Fabaceae (Leguminosae)
- GENUS: Ormocarpum
- ORDER: Fabales
- SYNONYM: Ormocarpum cochinchinense, Dalbergia diphca Pers. Hedysarum sennoides Willdenow, Parkinsonia orientalis Spreng , Ormocarpum orientale (spreng) Merr., Ormocarpum glabrum Tejism, & bin., ormocarpum sen-noides (Willdenow) Candolle.

VERNACULAR NAMES OF ORMOCARPUM COCHINCHINESE:

- Tamil: Kattumurungai, Elumbotti
- Kannada: Kaadu nugga
- Malayalam: Kattumurunga, punamurinna
- Sanskrit: Kanashekarā
- Telungul: Advimunaga, Nalla kaasana

MORPHOLOGY:

- Erect subshrubs. Leaves pinnately 10-13-foliolate; leaflets alternate, obovate-oblong, obtuse; petiole slender; stipule ovate. Flowers in slender axillary, 6-10 long, racemes.
- Plant growth form: Tree (Small (6m-15m)), Shrub
- Mode of nutrition: Autotropic
- Plant shape: Irregular
- Height range: 7.5 m

PHYTOCHEMISTRY:

Phthalic acid (RT:68.418, PA%:15.32), di(2-propylpentyl) ester-phthalic acid- 2-hydroxy-1, terpenoid hydroxymethylethyl ester of hexadecanoic acid (PA%: 10.93, RT: 67.789) Trimethyl-1a-2,2,5a-[3-oxo-1-butenyl]Benzazirene-1- 1.methyl ester of carboxylic acid (RT: 78.842, PA%: 6.82)- No movement Hexadecanoic acid and palmitic acid (RT: 58.352) . PA%: 6.63). Fatty acid tetradecanoic acid (RT: 54.291, PA%: 4.09). 3-ethyl-5,8-dimethyl-amide, N-methyls-Triazolo[4,3-a] pyrazine (RT: 68.090, PA%: 3.94) 1,1,1,3,5,5,5-Heptamethyltrisiloxane (RT:78.085) (PA%: 3.59). Octadecatrienoic 9, 12, 15, acid: linolenic acid (PA%: 3.74, RT: 61.643), Acid methyl ester is (RT:57.659, PA%: 2.30). Tentadecano` fatty acid and acid (PA%: 1.42, RT: 62.060 were reported³².

The leaf extract of o.cochinchinese contains alkaloids, flavonoids, saponins, tannins, cardiac glycosides, steroids, gums, resins, carbohydrates, terpenoids, coumarins, betacyanin, phytosterols, phenols, were reported^{10,26}.



MEDICINAL PROPERTIES:

- Ormocarpum cochinchinense has been traditionally used for curing bone fracture.
- Used as an anti - inflammatory agent.
- Elumbotti is used for anti-arthritis activity
- A useful treatment for rheumatic fever is the root decoction ²⁷.
- The leaves are applied to relieve anxiety.
- The roots are used to cure lumbago and are said to be tonic and stimulating.
- Paralysis is treated with an application preparation that involves rubbing oil into the root bark²⁸.

PHARMACOLOGICAL ACTIVITY:

1. Anti inflammatory activity:

Redness, swelling, heat, and pain are the four cardinal indicators of inflammation, which is a clinical condition. In rheumatoid arthritis (RA), an autoimmune disease, autoantigens accumulate in the synovial joints, leading joint inflammation²¹. To treat inflammatory diseases, steroidal and non-steroidal anti-inflammatory medications are available. Regrettably, these medications have serious adverse effects, including GI tract damage^{23,24}, renal failure, heart failure, and stomach lesions²².

Herbal remedies have long been used to cure a variety of illnesses, because of their low side effects and affordability, it is now vital to do scientific research on these herbs. Many herbs are used to cure inflammation and rheumatism. *Ormocarpum senoides*, a new herb, is introduced in this order to demonstrate its anti-inflammatory properties^{25,26}.

Better anti-inflammatory activity was demonstrated by *Ormocarpum cochinchense* when the plant was extracted using ethanol as a solvent¹⁷. In general, the presence of various phytochemicals was indicated by the various solvent extracts of *O. cochinchinense* leaves. Ethyl acetate, ethanol, methanol, and water all contained alkaloids. It is essential for the anti-inflammatory action.

2. Bone healing:

One of the main plant that Tamil Nadu, India, villagers used to treat bone fractures was *O. cochinchinense*. For this reason, the plant is known as “elumbotti”, from the Elumbu, which means bone, and the otti, which means joined. Research on this plant effects was necessary before it could be developed as a bone fracture healing supplement⁵.

3. Anti Oxidant activity:

Multiple inflammatory processes mediate periodontitis, a chronic inflammatory disease with a microbial etiology. Oxidative stress is now widely acknowledged as a component of periodontal pathogenesis. Reactive oxygen species and antioxidants need to be in balance to preserve periodontal health. Rich sources of antioxidants and anti-inflammatory compounds can be found in medicinal herbs containing bioactive phytochemicals. Antioxidants and phytoconstituents are found in the medicinal herb *Ormocarpum cochinchinense*¹⁷.

4. Anti bacterial activity:

The acetone extracts exhibited the strongest antibacterial activity, with the ethyl acetate extract following suit. There was moderate activity in the ethanol and methanol extracts. The most significant zone of inhibition against *Shigella flexneri* was demonstrated by acetone extract; other targets included *Enterobacter aerogenes*, *Bacillus subtilis*, *Micrococcus luteus*, and *Pseudomonas aerogenosa*. The greatest activity against *Proteus vulgaris* and *Enterococcus durans* was demonstrated by ethyl acetate¹⁰.

5. Antifungal activity:

The most effective extract, ethyl acetate, demonstrated the highest activity and highest effect against *Aspergillus flavus*, *Candida tropicalis*, *Candida albicans*, and *Trichophyton menta* agrophytes. The acetone extract exhibited anti-*Malassezia pachydermatus* properties¹⁰.

6. Anti-arthritic activity:

A condition that's referred to as an autoimmune disorder is characterized by an excess of autoantigens produced as a result of tissue protein denaturation. Highly inflammatory polyarthritis, rheumatoid arthritis is caused by autoantigens that destroy, distort, and impair joints^{18,19}. When compared to the standard drug diclofenac sodium the *ormocarpum cochinchinense* showed better activity.²⁰

7. Mosquitocidal Activity:

Controlling mosquitoes is vitally important everywhere in the world, but especially in tropical and subtropical regions. The use of insect repellents, wearing light-colored clothing that covers as much of the body as possible, and sleeping beneath mosquito nets are the current methods of prevention. In addition to reducing or eliminating *Culicidae* breeding places, people who live in areas where mosquito-borne diseases are endemic should combine these methods with mosquitocidal treatments that include chemical or microbiological ovicides, larvicides, and pupicides. However, synthetic mosquitocides cause harm to both the environment and human health, as well as fostering the emergence of pesticide resistance. In recent years, botanical-based insecticides and repellents have been created to address these critical issues^{30,31}. *O. cochinchinense*-synthesized Ag NPs are easy to produce, are stable over time, and can be employed at low dosages to strongly reduce populations of malaria, dengue and filariasis vectors²⁹.

CONCLUSION

This article provides an overview of the pharmacological characteristics, ethnomedical applications, and phytoconstituents of the plant *Ormocarpum*. Therefore, more research needs to be done in order to validate the pharmacological properties, isolate chemicals, and record the ethnomedical uses.

REFERENCES

- [1] Jimaima Lako V, Craige Trenerry, Mark Wahlqvist, Naiyana Wattanapenpaiboon, Subramaniam Sotheeswaran, Robert Premier. Phytochemical flavonols, carotenoids and the antioxidant properties of a wide selection of Fijian fruit, vegetables and other readily available foods. *Food Chem* 2007;100:1727–41.
- [2] Chukwujekwu JC, Amoo SO, Van Staden J. Antimicrobial, antioxidant, mutagenic and antimutagenic activities of *Distephanus angulifolius* and *Ormocarpum trichocarpum*. *J Ethnopharmacol* 2013;148:975–9.
- [3] Myers. *Phytochemical methods (a guide to modern techniques to plant analysis)*, Chapman and Hall; 1982.
- [4] Dinesh Kumar, M., Maria John, K.M. and Karthik, S. 2013 The bone fracture-healing potential of *Ormocarpum cochinchinense*, methanolic extract on albino wistar rats. *J. Herb Spices Med. Plants.* 19(1): 1-10, Maria John, K.M., Venkatesan, D., Sandhiya, S., Karthik, S. and Natarajan, S. 2011. In vitro synthesis of calcite crystals from *Ormocarpum cochinchinense* (L.) a traditional bone healing aid of Southern India. *Amer. J. Plant Physiol.* 6(6): 312-317.
- [5] Schmidmaier, G., and B. Wildemann. 2004. Development and characterization of a standard closed tibial fracture model in the rat. *Eur. J. Trauma.* 30:35–42
- [6] M. Pazhanisamy¹ * and G.A.I. Ebenezer Phytochemical screening of *Ormocarpum cochinchinense* Leaf extracts Oct 5 2013.
- [7] Samy RP, Pushparaj PN, Gopalakrishnakone P. A compilation of bioactive compounds from ayurveda. *Bioinformation* 2008;3:100-10.
- [8] Bisht C, Badoni A. Distribution and indigenous uses of some medicinal plants in district Uttarkashi, Uttarakhand. *Indian J Res* 2009;1:38-40.
- [9] Vedavathy S. Sustainability of traditional herbal medicine practiced in Anthrapradesh, India. *Proceedings of the Workshop Sharing Local and National Experience in South Asia*, 21-23 January. Pokhara, Nepal; 2001. p. 220-5.
- [10] 10.A. Hannah Hepsibah, G. Jeya jothi, A comparative study on the effect of solvents on the phytochemical profile and biological potential of *ormocarpum cochinchinense* auct.non (Lour) Merrill Nov.5.2016.
- [11] Rathakrishnan T. *Traditional agricultural practices: Applications and technical implementations*, New India Publishing; 2009.
- [12] Subodh Kapoor. *The Indian Encyclopedia*, Genesis Publishing Pvt. Ltd; 2002
- [13] Markham CR. *Travels in Peru and India: While superintending the collection of Chinchona plants and seeds in South America, and their introduction into India*; 2012.
- [14] Dinesh Kumar M, Maria John KM, Karthik S. The bone fracture healing potential of *Ormocarpum cochinchinense* methanolic extract on albino Wistar rats. *J Herbs Spices Med Plants* 2013;19:1–10.
- [15] Sivakumar T, Gajalakshmi D. In vitro antioxidant and chemical constituents from the leaves of *Ormocarpum cochinchinense* Elumbotti. *Am J Plant Physiol* 2013;8:114-22.
- [16] Hannah Hepsibah A, Jeya Jothi G. In vitro antibacterial activity and phytochemical analysis of *Ormocarpum cochinchinense* extracts on nosocomial infection causing bacteria. *Asian J Pharm Clin Res* 2014;8:113–6.
- [17] Somashekar, Gayathri¹; Sudhakar, Uma² et al. In vitro Anti oxidant and Anti inflammatory activity of ethanolic leaves extract of *Ormocarpum Cochinchinense* Nov 15, 2022,
- [18] Opie EL. On the relation of necrosis and inflammation to denaturation of proteins. *J Exp Med* 1962;115:597-608.
- [19] Umopathy E, Ndebia EJ, Meeme A, Adam B, Menziwa P, Nkeh-Chungag BN, et al. An experimental evaluation of *Albica setosa* aqueous extract on membrane stabilization, protein denaturation and white blood cell migration during acute inflammation. *J Med Plants Res* 2010;4:789-95.
- [20] S.Srividhya, G.Sridevi., Anti – arthritic activity and Anti inflammatory activity of ethanolic leaf extract of *ormocarpum sennoides*, 15 March – 2016.
- [21] Grover S, Tandon R, Misra R, Aggrawal A. Interleukin-1 receptor antagonist gene polymorphism in patients with rheumatoid arthritis in India. *Indian J Med Res* 2006;123:815-20.
- [22] Huerta C, Castellsague J, Varas-Lorenzo C, García Rodríguez LA. Non-steroidal anti-inflammatory drugs and risk of ARF in the general population. *Am J Kidney Dis* 2002;45:531-9.
- [23] Wallace JL. Pathogenesis of NSAID-induced gastroduodenal mucosal injury. *Best Pract Res Clin Gastroenterol* 2001;15:691-703.
- [24] Shih SC, Chang CW. Nonsteroidal anti-inflammatory drug-related gastrointestinal bleeding in the elderly. *Int J Gerontol* 2007;1:40-5.

- [25] Thamacin AM, Soosairaj S. Medicinal plants of villupuram district, Tamilnadu. *J Phytol* 2010;23:77-82.
- [26] Pazhanisamy M, Ebenezer GAI. Phytochemical screening of *Ormocarpum cochinchinense* leaf extracts. *J Acad Ind Res* 2013;2:275-8.
- [27] Subodh Kapoor. *The Indian Encyclopedia*, Genesis Publishing Pvt. Ltd; 2002.
- [28] Markham CR. *Travels in Peru and India: While superintending the collection of Chinchona plants and seeds in South America, and their introduction into India*; 2012.
- [29] Marimuthu Govindarajan, Giovanni Benelli, One-pot fabrication of silver nanocrystals using *Ormocarpum cochinchinense*: Biophysical characterization of a potent mosquitocidal and toxicity on non-target mosquito predators., Jun 2016, pg – 377 – 385.
- [30] benelli et al., *Declining malaria, rising dengue and Zika virus: insights for mosquito vector control.*, 2016
- [31] Benelli., *Plant-borne ovicides in the fight against mosquito vectors of medical and veterinary importance: a systematic review.*,2015., Benelli et. al.,*Declining malaria, rising dengue and Zika virus: insights for mosquito vector control.* 2016.
- [32] Gayathri Somashekar, Uma Sudhakar , Seshadri Srividya, Snophia Suresh ., *Phytochemical Analysis and in vitro Cell Viability Effects of Ethanolic Extract of Ormocarpum cochinchinense on Mouse Embryonic Fibroblasts.* 11.10.2022.