

TRADITIONAL USES, MEDICINAL AND PHYTOPHARMACOLOGICAL PROPERTIES OF *ERYTHRINA INDICA* LAM: AN OVERVIEW

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Email: hemant.surya@gmail.com**ABSTRACT**

Medicinal plants are the nature's gift to human society to make disease free healthy life. It plays a vital role to buildup and preserve our health. In our country more than thousands medicinal plants are recognized. The present review is therefore, an effort to give a detailed survey of the literature on its Phytopharmacological properties.

Erythrina indica belonging to the family Leguminosae is a compact shrub with knobby stems, growing wild throughout the costal forest of India. It is popular in indigenous system of medicine like Ayurveda, Siddha, Unani and Homoeopathy. In the traditional system of medicine various plant parts such as bark, root, leaves and fruits are used in fever, liver ailment, rheumatism, relieve joint pain, and to kill tapeworm, roundworm and threadworm.

Key words: *Erythrina indica*, Leguminosae, Phytopharmacological, collyrium, rheumatism.

INTRODUCTION

Medicinal plants continue to be an important therapeutic aid for alleviating the ailments of human kind. The search for eternal health and for remedies to relieve pain and discomfort drove early man to explore his immediate natural surroundings and led to the use of many plants, animal products, and minerals, etc. and the development of a variety of therapeutic agents. Today, there is a renewed interest in traditional medicine and an increasing demand for more drugs from plant sources. This revival of interest in plant-derived drugs is mainly due to the current widespread and strong belief that "green medicine" is safe and more dependable than the costly synthetic drugs, many of which have adverse side effects.

Description

Erythrina indica belonging to the family Leguminosae also known as Indian coral tree or Tropical coral tree or Tiger's clow or Moochy wood tree or Variegated coral tree, Sunshine tree, Coral bean, Pangara (Marathi). *Erythrina indica* is a compact shrub with knobby stems. It posses dense clusters of deep crimson flowers, that spread broadly open. *E. indica* is a medium-sized, spiny, deciduous tree normally growing to 6-9 m tall. Young stems and branches are thickly armed with stout conical spines up to 8 mm long, which fall off after 2-4 years rarely; a few spines persist and are retained with the corky bark. Bark is smooth and green when young, exfoliating in papery flakes, becoming thick, corky and deeply fissured with age. Leaves are trifoliate, alternate, bright emerald-green, petioles are long about 6-15 cm, rachis 5-30 cm long, prickly; leaflets smooth, shiny, broader than long, 8-20 by 5-15 cm, ovate to acuminate with an obtusely pointed end. Leaf petiole and rachis are spiny.

Flowers are bright red to scarlet, erect terminal racemes 15-20 cm long. Stamens are slightly protruding from the flower. Fruit is a cylindrical torulose pod, green, turning black and wrinkly as they ripen and thin-walled and constricted around the seeds. There are 1-8 smooth, oblong, dark red to almost black seeds per pod. *Erythrina* comes from the Greek word 'eruthros' meaning red, shows red flowers of the *Erythrina* species.¹⁻⁴

Synonyms

Erythrina variegata orientalis, *Erythrina variegata* parcelli, *Erythrina variegata* picta

Vernacular Names

English name: Indian coral tree, Tiger's clow, Moochy wood tree, Sunshine tree.

Hindi: Dadap, Pharad, Ferrud.

Marathi: Pangara.

Sanskrit: Paribhadra.

Gujarati: Panarawas, Pararoo.

Bengali: Palidhar Palitu-Mudar.

Kannada: Varjipe, Harivana.

Tamil: Kalyan - Morangai.

Telugu: Bodita, Bodisa.

Malyali: Murukku, Mulmurukku.¹

Table 1. MORPHOLOGICAL AND GENERAL CHARACTERS

Plant Type	Shrub, Small to medium-sized thorny tree
Roots	Deep roots, Tap roots
Type of stem	Hard, strong, rigid, wooded
Leaf Type	Trifoliate, Pinnate venation, Entire margin, Oval shaped
Leaf Arrangement	Alternate, heart shaped,
Leaf Colour	Green
Leaf Surface	Smooth, shiny.
Bark	Corky, Streaked with vertical lines of green, buff, grey and white.
Flower	Deep red in color, Looks like a tiger's claw
Seeds	Dry pod, kidney shaped, dark purple to red
Odour	Characteristic
Taste	Bitter
Plant Height	Medium (6 – 10 m)
Pollinators	Birds
Propagation/Cultivation	By seeds
Plant feature	Costal side plant, Forest plant, hill side plant.
Plant Utilities	Medicinal, Industrial, Commercial plant.

Taxonomy

Erythrina indica falls under the scientific classification as follows

Scientific classification

Kingdom: Plantae

Division: Magnoliophyta

Class: Magnoliopsida

Order: Fabales

Family: Leguminosae

Genus: *Erythrina*

Species: *Erythrina indica*^{1,5}



Fig.1. Leaves of E. Indica



Fig.2. Flower of E. Indica

Habit and habitat

Erythrina indica is well adapted to the humid and semi-arid and tropics and subtropics, found in zones with annual rainfall of 800 to 1500 mm. The species is most commonly found in warm coastal areas up to an elevation of 1500 m. The plant grows all over India in many forests and hills. It is frequently found around the Marshy Land, Plain Land. The Plant is a prickly shrub or woody vine reaching a length of 10 m.in height.

Phytoconstituents Present

The preliminary phytochemical investigation showed the presence of alkaloids, carbohydrates, amino acids, tannins, steroids, flavonoids.

Traditional/Ayurvedic Utilities

An Indian preparation is used to destroy pathogenic parasites and relieve joint pain. Juice from the leaves is mixed with honey and ingested to kill tapeworm, roundworm and threadworm. Women take this juice to stimulate lactation and menstruation. A warm poultice of the leaves is applied externally to relieve rheumatic joint pains. The bark is used as a laxative, diuretic and expectorant. Different parts of plant are used in traditional medicine as nervine sedative, collyrium, in ophthalmia, anti-asthmatics, antiepileptic, antiseptic and as an astringent. Bark is used in fever, liver ailment and rheumatism. The leaf juice used to heal wounds and sores. Leaf paste applied for muscular pain in cattle. Leaf extract possess nematicidal property. The root extract possess antimicrobial activity. Bark is astringent and used as febrifuge and anthelmintic. It is also used as an antidote to strychnine. Its leaves are aperient; they also encourage the start of menstruation and of milk secretion. The bark is helpful in gallstone, liverishness, an expectorant, febrifuge, and vermifuge.⁶⁻⁹

Phytochemical Properties

Erythrina indica contain several phenolic metabolites, such as pterocarpan, isoflavones, flavanones and chalcones, some of which displayed antiplasmodial activity, antimycobacterial activity and cytotoxic activity against various cancer cell lines. It also contain alkaloids like N-norprotosinomenine (1), protosinomenine (2), erysodienone (3), 3-erythroidine, erysopine, erythraline, erythramine, erysodine, erysotrine, erythratine, N,N-dimethyltryptophan, hyparphorine and it also contains sterols like campesterol, β -sitosterol, β -amyrin. The isoflavones named as indicanines D and E together with 11 known compounds including 6 isoflavones like genistein, wighteone, alpinum isoflavones, dimethyl alpinum isoflavone, 8- prenyl erythrinin 'C' and erysenegalensein E and one Erythrinassinate B. Flavonoids include apigenin, genkwanin, iso-vitexin, swertisin, saponarin, 5-Oglucosylswertisin and 5-O-glucosylisowertisin. Glucoside swertiamarin, a triterpene betulin have also been isolated. The alcohol insoluble portion of the unsaponifiable matter has yielded n-hexosamol, heptacosine, nonacosane and non saponifiable matter of the petroleum ether extract has yielded myristic, stearic and oleic acids.¹⁰⁻¹⁵

Pharmacological Properties

Anti-Osteoporotic Effect

Study showed that *Erythrina indica* could suppress the high rate of bone turnover induced by estrogen deficiency and improve the biomechanical properties of bone in the lab rats.¹⁶

Cytotoxic

Study showed that isolated five compounds from the methanol extract of stem bark of *Erythrina Variegata*: epilupeol, 6-hydroxygenistein, 3 β , 28- dihydroxyolean-12-ene, epilupeol, and stigmasterol. Different compound showed varying degrees of Cytotoxicity.¹⁷

Anthelmintic Activity

The method described by Dash et al. was employed for evaluating anthelmintic activity. *Pheritima posthuma* was divided into seven groups. Each group consists of six earth worms of same type and treated with any of the following. 50 milliliter of test solution containing 50 and 100 mg /ml of test extracts. Ethanol, Chloroform and Ethyl acetate extract of leaves of *Erythrina indica* and Piperazine citrate (10mg/kg). The Mean time of paralysis and death was recorded in minutes. The paralysis time was recorded when no movement of any sort could be observed except when the worms were shaken vigorously. Times for death of worms were recorded when worms were neither moved while shaken vigorously or when dipped in warm water (50°C).¹⁸

Antiulcer Activity

Sakat Sachin et.al studied Antiulcer activity of methanol extract of *Erythrina indica* leaves in pylorus ligated and indomethacin induced ulceration in the albino rats. The methanol extract of E. indica leaves possess significant antiulcer properties in a dose dependent manner.¹⁹

Diuretic Activity

The method of Lipschitz et al was employed for the evaluation of diuretic activity. The animals were divided in to five groups (six in each) deprived of food and water for 18hrs. prior to the experiment. On the day of experiment, the Group I animals received normal saline (20 ml/kg. p.o.), the Group II animals received furosemide (20 mg/kg. i.p.), the Group III, IV and V animals received Ethanol, Chloroform and Ethyl acetate extracts (250 mg/kg) respectively. The total volume of urine was collected at the end of 5hr. The total volume of urine and the urine concentration of Na⁺, K⁺ and Cl⁻ the Na⁺ and K⁺ were measured by β ame photometry.²⁰

Analgesic Activity

Haque et.al were studied, the peripheral analgesic activity of methanolic extract of leaf of E. indica was determined by the acetic acid induced writhing inhibition method. The inhibition of writhing in mice by the plant extract was compared against inhibition of writhing by a standard analgesic agent, aminopyrine given orally at a dose of 50 mg/kg body weight. The number of writhing was calculated for 10 min 5 minutes after the acetic acid injection. The analgesic activity was determined by radiant heat tail-flick model in mice. Tail-flick latency was assessed by the Analgesiometer. The methanolic extract of leaf of *Erythrina indica* possesses significant analgesic activity.²¹

Cardiovascular Effects

G.K. Chatterjee et.al were studied, The intravenous administration of the aqueous extract at a dose, varying from 0.1-0.4mg/kg produced a sharp and short lived fall in B.P., both in cats and rats in acute experiments. The cats were sensitive as regards the hypotensive action than rats, since a moderate fall was noted with 0.12 mg/kg while in rats the hypotensive response noted only after 0.4 mg/kg. On the isolated frog hearts the extract has no action in smaller dose but at a dose of 5 mg resulted a complete but reversible block of the heart.²²

Effect on Smooth Muscle

G.K. Chatterjee et.al were studied, The aqueous extract produced a contraction of intestinal smooth muscle in isolated guinea pig-ileum preparations at a dose of 1.3 x 10⁻⁵ g/ml; it is abolished by retreating the ileum with dephenhydramine but not abolished by pretreatment with atropine.²²

Respiratory Effects

G.K. Chatterjee et.al were studied, In smaller doses, the extract did not affect the respiration in urethane treated guinea-pigs but at higher doses the rate of respiration increased but there was no change in its amplitude. The effect generally persisted for 15-20 minutes. At a very high dose (4.6 mg/kg, iv.) the respiration become shallow and in some cases even there was a short, lasting apnoea.²²

CNS Effects

G.K. Chatterjee et.al was reported to the extract was relatively non-toxic and the mice can tolerate a dose more than 500 mg/kg, ip. of the extract. For CNS activity the extract was administered at a dose of 80 mg/kg im. Pretreatment of mouse with the extract neither potentiated nor reduced the pentobarbitone dose induced sleeping time. Similarly the extract failed to protect the mouse significantly from pentylenetetrazol induced convulsions.²²

Antioxidant Activity

Saraswathy A., et.al were investigated the ethanolic extract of the stem bark of *Erythrina indica* was screened for its *in vitro* antioxidant activity by Ferric thiocyanate and thiobarbituric acid methods were employed and it was found that the ethanolic extract of the stem bark of *Erythrina indica* possess significant antioxidant activity.²³

CONCLUSION

There are thousands of different tribal and other ethnic groups in India. A part from the tribal groups many other rural people also possess important knowledge about the plants. In recent years, ethnomedicinal studies received much attention as this brings to light the numerous little known and unknown medicinal virtues especially of plant origin. They obviously deserve evaluation on modern scientific lines such as phytochemical analysis, Pharmacological screenings and clinical trials. In the present article, we have reviewed the literatures to collect the botanical, Ethnobotanical, phytochemical and pharmacological information on *Erythrina indica*. The leaves, bark and root are used in India for the treatment of various diseases. The different extract of *Erythrina indica* and species shows anthelmintic activity, anti-osteoporotic effect, cytotoxic, antiulcer activity, analgesic, antioxidant activity, diuretic activity.

A critical analysis of the literatures of *Erythrina indica* finds use as a medicine is fairly large, yet its therapeutic efficacy has been assessed only in few cases. In view of the wide range of medicinal

uses of *Erythrina indica* as mentioned in Ethno botanical surveys, Ayurveda, Unani system.

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