



# A REVIEW ON PONGAMIA PINNATA (L) PIERRE: A GREAT VERSATILE FABALES PLANT

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**Abstract:** *Pongamia Pinnata* (L) Pierre [family: -Fabaceae] found all over world. It is commonly known as 'Karanja' in Marathi and Hindi and the presence of various constituents in different solvents. It contains Alkaloids, Flavonoids, Carbohydrates, Tannins and Saponins. The methanolic extract of contained told flavonoid content. This plant has various Pharmacological activity and Phytochemical constituent's present. The method involves separation of components by TLC and also involves traditional uses.

**Index Terms - *Pongamia Pinnata*, Phytochemical qualitative analysis, Traditional uses, TLC, pharmacology.**

## 1. Introduction: -

The *Pongamia pinnata* tree is richest and brightest trees of India, the name *Pongamia* has conclude from the Tamil name, *pinnata* that indicate to the pinnata leaves.<sup>1</sup>

The tree is scientifically called *Pongamia pinnata* and in Marathi and Hindi it is called *Karanja*, *Pongamia pinnata* L. belongs to family Fabaceae.

*Pongamia pinnata* is a medium sized evergreen tree with a spreading crown and short stems. It is a shade plant. It is an indo-malaysian species from sea level to 1200m from India to Fiji, is common in alluvial and coastal conditions. Now found in Philippines, Seychelles, Florida, Hawaii, India, Malaysia, Oceania, Australia.<sup>2</sup>

March and April "Pongam Tree" is purple in color. for about a week, until the buds wither, new leaves and soon after the leaves start to grow When ripe, the tree takes on a beautiful and radiant lime green. A "Pongam tree" grew in a large number of gardens and long countless roads in India and becomes one of the most revered trees in town.<sup>3</sup>

It grows wild in coastal forests all over India and along streams and rivers. The Pongam tree is a medium sized tree that grows fast. If has a rough and gray- brown bark. New leaves grow and large number of the flowers bloom at same time. They remain half hidden in the center of the leaf. The blossom is 1.3cm long and mass up to the tip of the long stems. These stems grow from the upper corners of the leaves. The flowers have a minute stem. They are loose and brown in color and also hold a calyx in the shape of a cup. There are five white petals as well as those discovered in pink or dark purple.<sup>4</sup>

The fruit of the Pongam tree is a few pods like wood that grow. They are dark gray in color and mature before the next new leaves appears. Each seeds of this plant are covered with a strong raft. The raft looks like a rubber ship. The ground under the trees is always covered with cracked carpet. The Pongam tree has five, seven or nine oval-shaped sheets with tips.<sup>5</sup>

The leaves have a diameter of between 15 and 30 cm. length and each leaf on a short petiole. The stems of the leaves and the stems of the flowers are usually swollen at the base. It is one of the few nitrogen Fixing tree seed containing 30-40% Oil. This overview might help you a bridge between traditional and modern claims *Pongamia Pinnata* therapy.<sup>6</sup>

**Taxonomical Classification<sup>7</sup>**

- Kingdom - Plantae
- Subkingdom – Tracheobionta
- Super division – Spermatophyta
- Division - Magnoliophyta
- Class - Magnoliopsida
- Subclass - Rosidae
- Order - Fabales
- Family - Fabaceae
- Genus - Pongamia
- Species – pinnata

**Vernacular Names of Pongamia Pinnata Linn.**

- Hindi, Marathi and Gujarati - Karanj, Karanja
- Sanskrit - Ghrtakarauja, Karanjaka, Naktahva, Naktamala
- English - Indian beech
- Telugu - Pungu, Gaanuga
- Tamil - Ponga, Pongam
- Malayalam - Pungu, Punnu
- Oriya - Koranjo
- Punjabi - Sukhehein, Karanj, Paphri
- Assam - Karchuw
- Bengali - Dahara karanja, Karanja, Natakaranja
- Kannada - Honge, Hulagilu

**Properties and Action (Ayurvedic).<sup>8</sup>**

- Rasa: Katu, Tikta, Kasaya
- Guna: Tiksna
- Virya: Usna
- Vipaka: Katu
- Karma: Kaphahara, Pittahara, Vatahara

**Synonyms.<sup>9</sup>**

- *Pongamia pinnata Merr.*
- *Millettia novo-guineensis Kane.*
- *Derris indica (Lam.) Bennett*
- *Pongamia glabra Vent.*
- *Pongamia pinnata Merr.*

**Traditional use: -**

The fruits, bark, seeds, seed oil, leaves, flowers and roots have been used medicinally.

In the 16th century, the fruits of karandzhi, kimsuki and arishta has been used for parasitic infections, urinary tract disease, and diabetes. Fruits and sprouts are used in folk remedies for abdominal tumors in India.

Seeds for the treatment of keloid tumors in Sri Lanka and powder of plant origin for the treatment of tumors, in Vietnam.

In Ayurvedic medicine, the bark is described as an anthelmintic, useful for abdominal ailments.

Increase, ascites, acrimony, diseases of the eyes, skin and vagina, itch, haemorrhoids, tumour's, ulcers and injuries. The bark is used internally for bleeding haemorrhoids and vitamin deficiencies.

In the Unani system, the seeds of ash are used to strengthen the teeth. The seeds are carminative and purifying and are used for chest pain, chronic fever, earache, hydrocele and low back pain. In India the seeds are used for skin diseases; keratitis; haemorrhoids; urine discharge; and diseases of the brain, eyes, head and skin. Plant sap, like oil, has antiseptic properties. It is an excellent remedy for itching and cold sores. The seeds are hematinous, bitter and pungent.

The leaves are used for their anthelmintic, digestive and laxative effects, as well as for inflammation, haemorrhoids and wounds. They are active against *Macrocooccus*; their juice is used for colds, coughs, diarrhoea, dyspepsia, gas, gonorrhoea and leprosy. The leaves have it digestive, laxative, anti-diarrheal, anti-gonorrhoea and anti-leprosy properties.

The flowers are used for diabetes and jaundice. Traditional doctors of the Ayurvedic and Indian Siddha systems of medicine boil the flowers of the plant in water, cool the water, and use the decoction, including the marc, to treat diabetes. Karanja root is an ingredient in Dhanvantaram Ghrutam, available in the South, pre-scribed for rheumatic disease and diabetes. The Roots are used for cleaning gums, teeth, and ulcers. Root juice is used for cleansing foul ulcers and closing fistulous sores. Young shoots have been recommended for rheumatism.<sup>10</sup>

**Phytochemistry.<sup>11</sup>**

**Seed-** Demethoxy-kanugin, Gamatay, Glabrin, Glabrosaponin, kaempferol, kankone, kanugin, karangin, neoglabrin, pinnatin, pongamol, pongapin, quercetin, saponin,  $\beta$ -sitosterol and tannin. Lanceolatin B, o-pongachromene and pongaglabrone.

**Bark-** 3-methoxy-(3,4-dihydro-3-hydroxy-4-acetoxy)-2, 2- dimethylpyrano-(7,8:5,6)- flavone and 3-methoxy- (3,4-dihydro-4-hydroxy-3- acetoxy)-2, 2- dimethylpyrano-(7,8:5,6)-flavone.

**Leaves-** Isoflavonoid diglycosides, 4-O-methyl-genistein 7- O-beta-D-rutinoside, retinoid, 12a-hydroxy-alpha-toxicarol, vecinin-2, kaempferol 3- O-beta-D-rutinoside, rutin, vitexin, isoquercitrin, kaempferol 3-O-beta-D-glucopyranoside, 11,12a-dihydroxy-munduserone, kaempferol, and quercetin.

**Flowers-** Hydroxyl furanoflavones, chemnoflavanone, triterpenes, beta sitosterol glucoside and aurantiamide, phenyl alanine dipeptide.

**Roots-** Paclitaxel, Fluorophenylalanine, Vinblastine, Vincristine (Sulphate), Teniposide, Fluoxetine, Oetoposide.

**2. Phytochemical qualitative analysis.<sup>12-13</sup>**

Different phytochemical were present in the plant and scrutinized for preliminary tests to be qualitative analysed standard method. Plant extracts Successive solvent extraction method.

**Thin Layer Chromatography.**<sup>14-15</sup>

This method helps to the separation of chemical compounds between two phases: A Mobile phase and stationary phase by using solvent i.e. Toluene: Ethyl acetate in volume ratio 7:1. Thin-layer chromatography can be used identify compounds present in a given mixture, and determine the purity of a substance.

**Total Flavonoid content.**<sup>16-17</sup>

This method used to the determination of flavonoid content plant part of *Pongamia Pinnata* L. by Aluminium chloride method using quercetin as a standard.

**3. Pharmacological Activity: -****Anti-Oxidant Activity.**<sup>18</sup>

Oral administration of ethanolic extract from the leaves 300 mg/kg body weight significantly reduced the level of Thiobarbituric acid reactive substances (TBARS), Hydroperoxide (HP) and conjugated diene (CD) and increased the level of Superoxide dismutase (SOD), glutathione peroxidase (GPx), and Reduced glutathione (GSH) in liver and kidney of NH<sub>4</sub>Cl-induced hyperammonemic rats.

**Anti-inflammatory Activity.**<sup>19</sup>

The administration of 70% ethanolic extract 300 or 1000 mg/kg was reported to exhibit significant anti-inflammatory activity in acute subacute and chronic models of inflammation on rats without ulcerogenic activity.

**Anti-Convulsant Activity.**<sup>20</sup>

Treatment of pentylenetetrazol-induced convulsion (PTZ) in wistar albino rats (80 mg/kg, i.p.) with the ethanolic extract (250 mg/kg i.p.) exhibited significant anticonvulsant activity by lowering the duration of extension phase (3.7270.65) when compared to control group (8.9470.42). The control used was 1% normal saline (1 ml/100 gm, orally).

**Anti-Viral Activity.**<sup>21</sup>

Oral administration of ethanolic extract of leaves 200 or 300 g increased the survival rate for the White Spot Syndrome Virus infected shrimp to 40% and 80%, respectively.

**Immune modulatory Activity.**<sup>22</sup>

The aqueous extract showed maximum stimulation on Nitric Oxide activity by the RAW 246.7 cells. The extract also induced remarkable production of IL-10.

**Anthelmintic Activity.**<sup>23</sup>

The anthelmintic activity of the methanolic extract of the seeds which needed less time to cause the paralysis and death of Indian adult earthworm, *Pherentima posthuman*, than the extracts of leaf, wood, bark, and pericarp of the fruit did was further studied.

**Antihyperammonemic Activity.**<sup>24</sup>

The levels of blood ammonia, circulatory urea, uric acid, non-protein nitrogen and creatinine increased significantly in rats treated with ammonium chloride and decreased significantly in rats treated with the extract and ammonium chloride.

**Anti-Diabetic Activity.**<sup>25</sup>

The orally administered aqueous extract 300 mg to diabetic rats showed a significant anti-hyperglycaemic activity as well as significantly increased the plasma insulin level.

**Conclusion: -** The extensive literature survey revealed that *Pongamia Pinnata* L. Plant shows the presence of many chemical constituents which are responsible for varied pharmacological and medicinal properties. The Preliminary Phytochemical Analysis of *Pongamia Pinnata* extract shows Presence of Alkaloids, Flavonoids, Carbohydrates, Tannins and Saponins. The Methanolic extract found in flavonoid content. Some traditional uses.

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