

Jungle Jalebi (*Pithecellobium dulce* (Roxb.) Benth.): A Useful Medicinal Plant

Dr. Nirbhay Singh Solanki

Assistant Professor Botany, Pradhanmantri College of Excellence Maharaj, Bhoj Government P. G.
College Dhar M.P. India

Abstract

This plant holds significant medicinal value. Known as 'Jungle Jalebi,' it is also referred to by some as 'English' or 'Vilayati' (foreign) tamarind. Various scientific studies have established its medicinal importance, demonstrating properties such as anti-venom, antibacterial, spermicidal, anti-obesity, anti-inflammatory, cardioprotective, antifungal, larvicidal, antidiarrheal, antidiabetic, and anti-tubercular activity. It also plays a crucial role in atmospheric nitrogen fixation. Additionally, tribal communities utilize it for various medicinal purposes.

Keyword : *Pithecellobium dulce* ,Anti-venom effect, Spermicidal activity, Anti-obesity activity, Antibacterial Activities

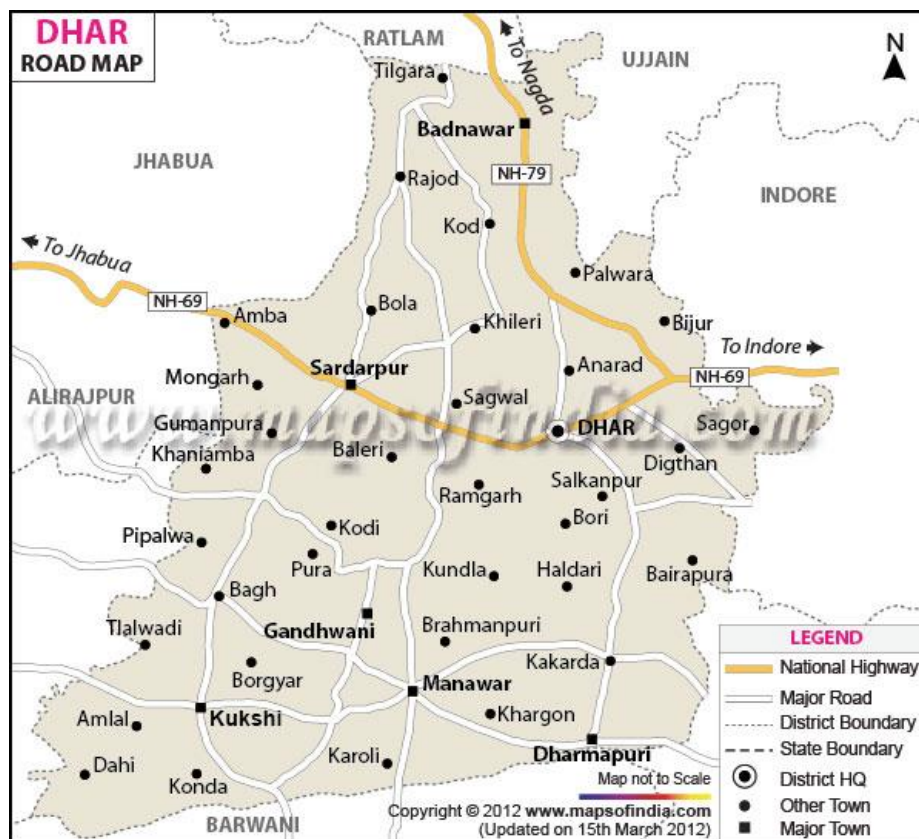
1. Introduction

Jungle Jalebi is a very important plant. It has many medicinal properties. We also know it as Vilayati Tamarind or Sweet Tamarind. It is a very useful plant of the Leguminosae family. It is native to the Pacific coast of Mexico and is found growing in many countries in many parts of the world.

Since ancient times, plants have been a beneficial source of natural products for maintaining human health and the environment. Approximately 80% of the global population uses traditional medicines derived from plants. In developed countries alone, about 33% of medicines are plant-based, and 60% of modern medicines are naturally derived from plants used since ancient times.

It exhibits anti-venom, antibacterial, spermicidal activities, anti-obesity activities, antioxidant activities, anti-inflammatory, cardio-protective, antioxidant, antifungal activities, larvicidal, anti-diarrheal activities, anti-diabetic activities, wound healing activities, and anti-tumor activities

Studyarea



Research Methodology

I took photographs with my mobile phone camera and thoroughly examined the plant I visited the forest several times and gathered information about this plant from local residents. From time to time, I visited the forest and surrounding areas to conduct detailed studies, paying particular attention to the plant's flowering and fruiting seasons, as well as its economic importance. I read numerous relevant research papers available on platforms like the National Library of Medicine, PubMed, Semantic Scholar, and Google Scholar. Research papers published in various research journals were also studied.

Scientific classification

Kingdom: Plantae

Clade: Tracheophytes

Clade: Angiosperms

Clade: Eudicots

Clade: Rosids

Order: Fabales

Family: Fabaceae

Subfamily: Caesalpinioideae

Clade: Mimosoid clade

Genus: Pithecellobium

Species: P. dulce

Binomial name- *Pithecellobium dulce* (Roxb.) Benth.

Synonyms

Acacia obliquifolia M. Martens & Galeotti

Albizia dulcis (Roxb.) F. Muell.

Feuilleea dulcis (Roxb.) Kuntze

Inga camatchili Perr.

Inga dulcis (Roxb.) Willd.

Inga javana DC.

Inga javanica DC.

Inga lanceolata sensu Blanco

Inga lanceolata Willd. is *Pithecellobium lanceolatum*

Inga leucantha C. Presl

Inga pungens Willd.

Mimosa dulcis Roxb.

Mimosa edulis Gagnep.

Mimosa pungens (Willd.) Poir.

Mimosa unguis-cati Blanco

Mimosa unguis-cati L. is *Pithecellobium unguis-cati*

Pithecellobium littorale Record

Pithecellobium dulce (Roxb.) Benth. (lapsus)

Vernacular names

Telugu- Seema chintakaya

English- Quamachil, Madras thorn, Manila tamarind

Hindi -Vilayati babul, Vilayati imli, Jangle jalebi

Malayalam -Korukkapuli

Tamil- Kodukkaapuli

Kannada -Seeme hunase

Sanskrit -Kodukkaapuli

Marathi- Ingraji chinch

Bengali -Jilapi

Gujarati- Bakhai Ambli, Goras ambli

Odia- Seema Kaiyan

Chinese- Niu ti dou

French- Campeche (New Caledonia), Cassie de

Manille

German- Camambilarinde

Greek- Pithekos ellobion

Japanese -Huamuche, Guamuche

Philippines- Camachile

Spanish- Guamuchil, Guama americano, Quamachil

Vietnamese- Me Keo, Keo Tay, Me nuoc, Gang Tay

Thai-Makham-khong, Makham-tha

Arabic- Showkat Madras

Geographical distribution

The *Pithecellobium dulce* tree is a tree native to the Pacific coast of México. It is distributed throughout the states of Guerrero, Morelos and Chiapas. It is widely distributed on the American continent, for example, Brazil, Argentina, Bolivia and Colombia. The tree can also be seen in India, tropical Africa

and Southeast Asia. In addition, it is usually found on tropical islands such as Cuba, Jamaica, Puerto Rico and Hawaii (USA)

Plant Descriptions

Leaves : Bipinnate 4-8 cm long; pinnae a single pair, each pinna bearing a single pair of pale green, coriaceous, unequal-sided oblique, ovate-oblong, obtuse, 1-4 cm long leaflets, often with a pair of sharp spines at the base of the leaf which ranges from 2 to 15 mm in length

Leaflets : 25-56 mm long and 9-32 mm wide, obliquely elliptic or oblong-elliptic with 4-7 pairs of pinnate veins, deep olive green above, paler grey-green below, with small glands, 0.3-0.8 mm high and 0.4-0.7 mm in diameter, at the tip of the petiole and the tip of the pinnular rachi

Flowers: white to yellow, fragrant in small globose, sessile, or short pedunculate heads about 1 cm in diameter, arranged in raceme-like or spiciform panicles 10-20 cm in length and 1.0-1.5 cm in diameter, often in the terminal compound.

Corolla & Calyx : 5 Pubescent corollas (3.0-4.5 mm long) and 5 calyces (1.5 mm long) surrounding about 50 thin stamens, which are united in a tube at the base

Ovary : Sessile or stalked; many ovules

Style : Filiform

Stigma : Minute capitate

Fruits : Linear, curved legume pods. Pod turgid, twisted, often spiral, 10-18 cm long, about 1 cm wide, dehiscent along the lower suture, the valves turn pinkish-red when ripe, and open to reveal the seeds; pink or white edible pulp.

Seed : 6-8 shiny seeds reddish brown to black, elliptical, beanlike, and about 1 cm in length.

Bark : Smooth, grey with yellowish lenticels, becoming rough, furrowed, and eventually starting to peel when it matures.

Phytochemical review

Various lucrative phytoconstituents have been isolated from the various parts of plant owing to the medicinal effects. Bioactive fractions of plants and their medicinal importance are mentioned below.

Leaves

Pithecellobium dulce extract from leaves mainly contain the following like cyclitol, dulcitol, octacosanol, α -spinasterol, kaempferol-3-rhamnoside, quercetin and afzelin (Zapesochaya et al., 1980).

Fruit

Pithecellobium dulce fruits have nutritional and medicinal value which have been found to contain 2, 5, 6-trimethyl 1, 3-oxathiane, trans-3-methyl-2-N-propylthiophane, 2-carboxaldehyde-5-hydroxymethyl, methyl-2-hydroxyicosanoate, D-pinitol, heptacosanoic acid, hexadecanoic acid, tetracosanol, 22-tricosenoic acid and stigmasterol. Fruits also contain ellagic acid, gallic acid, mandelic acid, ferulic acid, vanillic acid, coumaric acid, rutin, naringin and daidzein (Preethi and Saral Mary, 2014).

Seeds

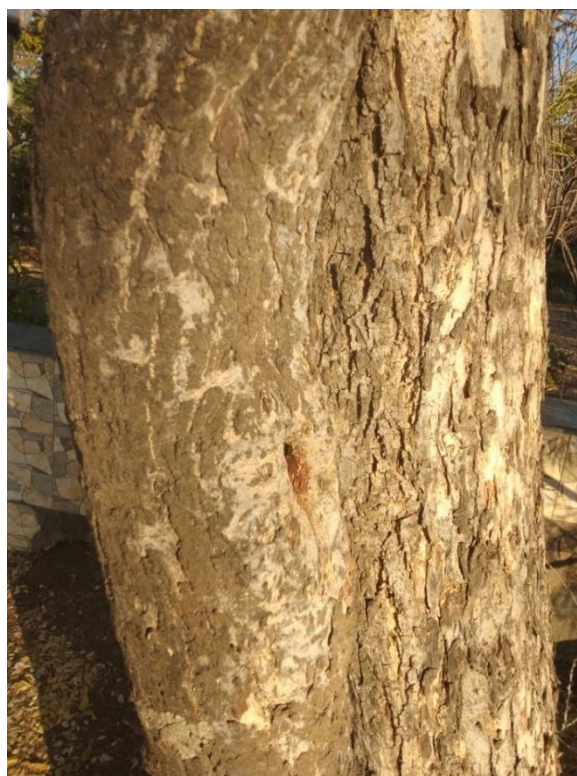
Pithedulosides, dulcin, hederagenin, oleanolic acid and echinocystic acid were identified. Some pithedulosides were saponins while others were found to be triterpenoidal glycosides (Rao et al., 2018).

Peel

It contains stigmasterol, sitosterol, quercetin and pinitol (Preethi and Saral Mary, 2014).



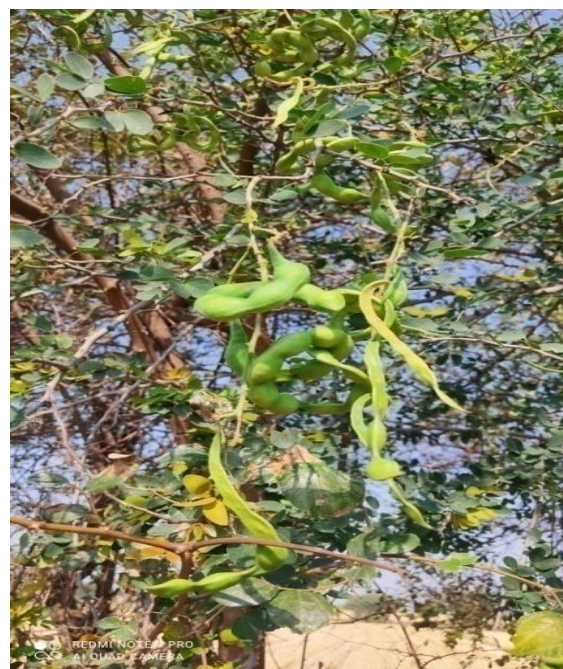
Pithecellobium dulce (Roxb.) Benth.



Pithecellobium dulce (Roxb.) Benth. stem



Pithecellobium dulce (Roxb.) Benth. Inflorescence



Immature fruit



Pithecellobium dulce (Roxb.) Benth **fruit**



Aril(fleshy seed coat)



Pithecellobium dulce (Roxb.) Benth seed

Anti-venom effect

The tannin was extracted from *Pithecellobium dulce* barks using aqueous extraction. The venom lethality was inhibited and the necrotizing activity of the venom was minimized by this crude extract. The extract also inhibited 90% of acetylcholine esterase activity as it contains higher tannin concentration or combined hydrolyzable tannin concentration. α -cobra toxin protein was docked with four different tannin compounds using Autodock 3 and tannic acid, Digallic acid has -14.7 kcal/mol, -10.38 kcal/mol binding energies were studied. The plant extract selectively blocks nicotinic acetylcholine receptor and non-selectively precipitate the venom protein (Pithayanukul et al., 2005).

Antibacterial Activities

Ethanol extract from the pulp of *Pithecellobium dulce* pods has the potential to inhibit Gram-positive bacteria (*Bacillus subtilis*) and Gram-negative bacteria (*Klebsiella pneumonia*). The secondary metabolites (such as flavonoid, saponin, etc.) are responsible to inhibit the growth of bacteria. The ethyl acetate of *Pithecellobium dulce* fruit peel was found to be effective against *S. epidermis*, *E. coli*, *K. pneumonia*, *S. aureus*, *E. faecalis*, *P. aeruginosa* and *P. putida*, while the methanol extract was effective against *K. pneumoniae*, *S. aureus* and *P. putida*. The aqueous extract was found to be effective only against *K. pneumonia* and *S. aureus*, while the petroleum ether extract was only effective against *P. Putida*. The crude methanolic extract is more effective as compare to others. *Pithecellobium dulce* pulp extract revealed effective inhibitory activity against Gram-positive bacteria, *Bacillus subtilis* and Gram-negative bacteria, *Klebsiella pneumonia*. *B. subtilis* showed a greater mean clearance than other Gram-positive bacteria. Similarly, the extract showed a maximum zone of clearance for gram-negative bacteria, *K. pneumoniae*, than other gram-negative bacteria. *Pithecellobium dulce* fruit peel metabolites could also be used as an antimicrobial and wound healing agent. The ethanolic extract of its leaves has also been reported to have potent antibacterial activity. (Sukantha et al 2011)

Spermicidal activity

Given the significance of saponins as potential spermicidal agents, tests for spermicidal properties were conducted on the saponins of *Pithecellobium dulce*. Sapogenin demonstrated activity against human semen in a dilution of 0.03% (Shweta, 2013).

Anti-obesity activity

Pithecellobium dulce fruit peel different organic solvent extracts at two different doses (100 and 200 mg kg⁻¹) were used for the assessment of anti-obesity compared to orlistat. The findings indicated that the petroleum ether, ethyl acetate, and methanolic extracts had potential anti-obesity activity (Jagadeeshwar et al., 2021).

Antioxidant activities

The fruit extract of *P. dulce* has phenolic contents which are used as anti-oxidantal components. Fruit pericarp has phytochemicals like anthocyanin, and flavanoids which are a major source of polyphenol antioxidant properties. The phenolic components function as good donors of hydrogen, making them potent antioxidants (Rice-Evans et.al.,1995). The aqueous extract of *Pithecellobium dulce* leaves revealed the phenolic components, including flavonoids, which show a potent free radical scavenging activity (Kulkarni et.al.,2018). A strong source of antioxidants is acetone and the methanolic extract of *Pithecellobium dulce* leaf powder (Katekhaye et. al,2012). Kumari has investigated that bark, leaf, fruit, and seed extract of *Pithecellobium dulce* effectively scavenge free radicals and reduce oxidative stress through various mechanisms, like hydrogen atom donation, electron transfer, and inhibition of lipid peroxidation. The ethanolic and methanolic extracts generally exhibit stronger antioxidant activity than aqueous extracts due to the presence of higher concentrations of phenolic compounds (Nagmoti et. al,2012). The oxidative stress is implicated in the development of chronic diseases such as cardiovascular disorders, diabetes, cancer, and neurodegenerative diseases. The antioxidant properties of *Pithecellobium dulce* suggest its potential as a source of natural therapeutic agents (Patil et.al.,2026).

Anti-Inflammatory

Anti-inflammatory effect of a substance may be defined as it has property to reduce inflammatory symptoms such as pain, heat, redness, swelling, and loss of function. Several drugs have been utilized against the inflammation and specific to this the drug aspirin has been utilized by the predominant people all over the world. Long-term use of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) can cause gastric erosions, which can become stomach ulcers and in extreme cases can cause severe hemorrhage, resulting in death. The methanol extract of leaves of *Pithecellobium dulce* Benth was screened for analgesic and antiinflammatory activity at the doses of 200 and 400mg/kg body weight. The maximum anti-inflammatory response was produced at 3 hours with extract doses of 200 and 400 mg/kg

Cardioprotective

Study evaluated the effect of *Pithecellobium dulce* peel in isoproterenol (ISO) induced myocardial infarction in adult male Wistar rats. ISO induced MI in rats showed increase in marker enzymes. Pretreatment PD fruit peel extracts positively altered the activities of marker enzymes and biochemical parameters in ISO-induced rats

Anti-fungal activity

Fungistatic and fungicidal activities of *Pithecellobium dulce* seeds on plant pathogens such as *Penicillium digitatum*, *Botrytis cinerea*, *Rhizopus stolonifer*, and *Fusarium oxysporum*. The anti-fungal activity of the aqueous extract against *P. digitatum*, *B. cinerea*, and *R. stolonifera* is mostly due to the presence of kaempferol and a few other compounds (Bautista-Baños et al., 2003). In addition, the triterpenoidal saponins Pithedulosides A, B, E, F, and I inhibited the growth of *Colletotrichum gloeosporioides* mycelium and *R. stolonifer* in vitro (Shweta, 2013).

Larvicidal & Ovicidal against Mosquito Vectors

Study evaluated various extracts of *Pithecellobium dulce* for larvicidal and ovicidal potential against mosquito vectors, *Anopheles stephensi* and *Aedes aegypti*. All leaf and seed extracts showed moderate larvicidal and ovicidal effects; however, the methanol extract of leaf showed the highest larval activity. Results suggest the seed and leaf extracts have potential as an eco-friendly option for mosquito vector control



A village man and woman selling Jungle Jalebi

Anti-diarrheal activity

Castor oil-induced diarrhea in rats was used to test the aqueous and ethanolic extracts of the leaves. The aqueous extract was more powerful. Diphenoxylate HCl was utilized as a control medication (Sugumaran et al., 2008). Another study only employed the ethanolic extract of the leaf and loperamide as a control medication. The results demonstrated considerable antidiarrheal activity by prolonging the latent period and decreasing defecation frequency (Venu et al., 2016).

Antidiabetic Activity

Diabetes mellitus results from insulin-related issues, resulting in elevated blood sugar levels. Common diabetes medications may have side effects, including potential damage to the liver or kidneys. Natural plant-based treatments present a safer alternative. One such plant is *Pithecellobium dulce* (*P. dulce*). Research on its seed extract in diabetic rats showed it could protect insulin-producing cells. Rats that received the extract exhibited improved blood sugar regulation and increased liver glycogen levels. Additionally, the fruit contains pinitol, a natural substance known for its anti-diabetic properties. (Murugesan et al., 2019)

Wound healing activities

Pithecellobium dulce has wound-healing activity due to the presence of bioactive components like tannins, flavonoids, phenolic acid, and other metabolites. In an in vitro scratch assay using human skin fibroblast cells, the methanolic leaf extract of *Pithecellobium dulce* markedly enhanced cell migration and promoted wound closure, achieving approximately 78.8% wound closure within 72 hours (Elhewehy et al., 2026). *P. dulce* is traditionally used for the management of skin injuries and emphasized the need for further pharmacological and clinical studies to validate its therapeutic applications (Dhanish et al., 2022).

Antitubercular Activity

The hexane, chloroform and alcoholic extracts of the leaves were studied for their antimycobacterial activity by BACTEC460TB- Radiospirometric system. The alcoholic extract at the concentration 20mg/ml showed highest activity when comparable with standard drugs like, streptomycin, isoniazid, rifampicin, ethambutol and pyrazinamide

Nitrogen Fixation

Pithecellobium dulce is well known for its tolerance of heat, drought, salinity, and impoverished soils. *Pithecellobium dulce* forms nodules with rhizobia. Mostly nodulation is common in all types of soils. The indigenous woody legumes and their root nodule bacteria play an important role in the overall nitrogen fixation in soil. These bacteria convert atmospheric free nitrogen into nitrate form and plant use nitrate in their metabolic processes (Qadir et al., 2019)

Folklor

1. Frequent bowel movements: Decoction of bark taken as tea.
2. The leaves, when applied as plasters, used for pain, venereal sores.
3. Salted decoction of leaves, for indigestion; also used as abortifacient.
4. Bark used in dysentery, dermatitis and eye inflammation.
5. In Brazil, used as a cancer elixir.
6. In Mexico, decoction of leaves for earaches, leprosy, toothaches and larvicide.
7. In India, bark of the plant used as astringent in dysentery, febrifuge. Also used for dermatitis and eye inflammations. Leaves used as abortifacient.
8. In Guiana, root bark used for dysentery and as febrifuge.
9. In India, bark used as astringent for dysentery. The Huastec people of northern Vera Cruz and San Luis Potosi in Mexico use different parts of the plant to treat gum ailments, toothache, and cancer. Leaves used as poultice with alcohol to treat bile. Pulp from fruits used as astringent and hemostatic, and used for hemoptysis. Ground seed used to clean ulcers.

Conclusion

It exhibits various properties. Jungle Jalebi is a very important plant. It has many medicinal properties. It exhibits anti-venom, antibacterial, spermicidal activities, anti-obesity activities, antioxidant activities, anti-inflammatory, cardio-protective, antifungal activities, larvicidal, anti-diarrheal activities, anti-diabetic activities, wound healing activities and anti-tumor activities. It also performs the important function of fixing atmospheric nitrogen through *Rhizobium*. It is also used in rural areas by various tribes to cure various diseases. It provides food for birds. It grows easily even in areas with less water.

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Web sites link

1. https://en.wikipedia.org/wiki/Pithecellobium_dulce
2. <https://www.stuartxchange.org/Kamatsile.html>
3. https://en.wikipedia.org/wiki/Pithecellobium_dulce#cite_note-18