Novelty Journals

ISSN 2394-9716

International Journal of Novel Research in Interdisciplinary Studies
Vol. 10, Issue 4, pp: (1-5), Month: July – August 2023, Available at: www.noveltyjournals.com

MOLECULAR STUDIES AND PHARMACOLOGICAL ROLE OF PITHECELLOBIUM DULCES

[1] E. RAJITHA, [2] SRIHARI LAKSHMAN M.V, [3] REBBANIBONI NANDINI

DOI: https://doi.org/10.5281/zenodo.8124250

Acceptance Date: 09-May-2023, Published Date: 07-July-2023

Abstract: **Pithecellobium dulce is a medium-sized, evergreen tree with tremendous nutritional value; each portion of the plant is packed with important vitamins, amino acids, and minerals. P. dulce's fruits have long been employed in Ayurvedic medicine and folk cures. The plant also contains biologically active mixtures like tannin, olein, and glycosides. From the plant's different necks, 38 functional phytocompounds such as quercetin, kaempferol, and dulcitol were linked. The bark of this plant contains catechol tannins. Polyphenols are phytocompounds that have their own factory and have a lot of catholicon activity. Their fruits are high in phenols, flavonoids, and saponins, which have been linked to the treatment of diabetes, oxidative stress, and gastrointestinal problems, as well as anticonvulsant and cardioprotective properties, anti-ulcerogenic, anti-proliferative the antibacterial, antifungal, and adulticidal properties of the plant flake and seed are all present. As a result, the current study focuses on exploiting medicinal parcels of P. dulce as well as its biological operations in remedial development.**

Keywords: Pithecellobium dulce, **anti-diabetic, anti-inflammatory, antioxidant, anti-fungal, anti-bacterial, anti-ulcerogenic.**

1. INTRODUCTION

Pithecellobium dulce benth, a member of the Leguminosae family, is an evergreen tree native to the southern parts of India and Southeast Asia. P. dulce, sometimes known as manila tamarind, is one of the most well-known species among them. The species name, 'dulce,' is derived from the Greek term 'Pithekos. It is endemic to the Pacific Coast and conterminous mounds of Mexico, Central America, and Northern South America, and is farmed across the downs of India and the Andaman Islands. It is a delicate to medium-sized, evergreen, unpleasant tree that grows to a height of 18 meters. The business is well-known for its edible fruits, which have traditionally been devoured for colorful emotions. The fruits are twisted, straight legumes (capsules) with a length of 10 to 13 cm. A single cover usually contains 10 seeds, and the capsules are irregularly shaped and smoothed. strangled between the seeds in gyrations of 1 to 3 spirals (lomentaceous). Seeds are black and candescent, with a 1cm perimeter and a crimson funicle dangling from the capsules. Both sides of the cover are dehiscent (Murugesan, Lakshmanan et al. 2019).

Taxonomical Classification of *Pithecellobium dulce* (Rao, Samyuktha et al. 2018)

Kingdom : Plantae
Sub Kingdom : Viridiplantae
Infra Kingdom : Streptophyta
Division : Tracheophyta
Order : Fabales
Family : Leguminosae
Genus : *Pithecellobium*
Species : dulce

Novelty Journals

ISSN 2394-9716

International Journal of Novel Research in Interdisciplinary Studies
Vol. 10, Issue 4, pp: (1-5), Month: July – August 2023, Available at: www.noveltyjournals.com

Vernacular Names (Rao, Samyuktha et al. 2018)

English : Sweet Tamarind

Telugu : Seema Chinta

Hindi : Jangle jalebi

Bengali : Dekhani babul

Tamil : Kodukkaapuli

Kannada : Kottampuli

Malayalam : Korukkapuli

Japanese : Huamuche, Guamuche

Javanese : Asem londo, Asam belanda

Philippines : Camachile

Sanskrit : Kodukkaapuli

Spanish : Guamuchil, Guama americano, Quamachil

Tamil : Kodukkaapuli

Thai : Makham-khong, makham-tha

FRUITS

SEEDS

Table 1: Number of Pithecellobium Species (Rao, Samyuktha et al. 2018)

S No.	Name of the plant	Isolated Phyto-constituents
1.	*Pithecellobium albicans*	Gallic acid Afzelin Kaempferol Quercetin Quercitrin Spinasterol
2.	*Pithecellobium arboretum*	Oleonolic acid α Spinasterol
3.	*Pithecellobium clypearia*	1-Octacosanol -O-galloylplumbo catechin Penta-hydroxyflavan-7-gallate Tetrahydroxyflavan-7-gallate
4.	*Pithecellobium cauliflorum*	Glucosylsterol
5.	*Pithecellobium cubense*	Oleonolic acid α –Spinasterol

6.	*Pithecellobium jiringa*	Djenkolic acid Gallocatechin Procyanidinds
7.	*Pithecellobium lucidum*	Julibroside Galloyl acid Ethyl gallate Gallocatechin gallate
8.	*Pithecellobium monodelphum*	Biodiesel contains: Methyl palmitate Methyl stearate Methyl arachidate Methyl lineolate
9.	*Pithecellobium multiflorum*	Lupeol α- Spinasterol
10.	*Pithecellobium saman*	Epilupeol Lupenone α- Spinasterol α- Spinasterone

Table 2: Pharmacological Activity of *Pithecellobium dulce*

Species	Part of the plant	Extract	Activity	Method & Animal used
Pithecellobium dulce	----------	Ethanolic and Aqueous	Anti-Inflammatory (Srinivas, Geeta et al. 2018)	Rats When compared to Aspirin, secondary metabolites showed a higher reaction percent of inhibition of protein denaturation and HRBC membrane stability (Standard Drug). By lowering paw quantity at the sampled cure place, both excerpts demonstrated eloquent anti-inflammatory exertion. The ethanol excerpt, which was identical to diclofenac sodium, a common anti-inflammatory drug, exhibited more exertion than the waterless snippet.
	Fruit peel	Petroleum ether extract Peel methanolic ethyl acetate aqueous pulp	Anti-bacterial (Srinivas, Geeta et al. 2018)	The capacity of all extracts to quench the DPPH radical suggests that they are excellent antioxidants. Both gram-positive and gram-negative bacteria are effectively inhibited by pulp extract. In the gram-negative, the extract revealed a maximum clearance zone. Pneumocystis pneumoniae
	----------	Metonic leaf extract Acetone extract Water	Antioxidant (Katekhaye and Kale 2012, Nagmoti, Khatri et al. 2012)	It was discovered that the aqueous and methanolic extracts had respective total phenolic contents of 1.31 0.006 and 1.74 0.003 mg gallic acid equivalents/g of extract powder [3,] As the extract concentration increased, so did the reducing power. The phenolic content of the MB, AB, ML, and AL extracts (5 mg/ml) was 0.129 0.11, 0.190 0.14, 0.084 0.24, and 0.115 0.25 g/ml, while the flavonoid content was 0.43 0.01, 0.23 0.01, 0.90 0.01, and 0.25 0.01 g/ml, respectively[4].

	----------	Alcoholic fruit	Anti-Diabetic (Srinivas, Geeta et al. 2018)	Rats For 30 days, diabetic rats were given P. dulce fruit extract (300 mg/kg b.w /day) orally, which dramatically lowered blood glucose, glycosylated haemoglobin, urea, and creatinine levels. In treated diabetic rats, oral treatment of PDM (125, 250, and 500 mg/kg) for 21 days led to a significantly lower fasting blood glucose and HbA1C as well as a significantly higher body weight, serum insulin, total protein, and liver glycogen levels. PDM successfully brought diabetes brought on by streptozotocin's dyslipidemia back to normal. In treated diabetic rats, levels of lipid peroxides were controlled while antioxidant enzyme activity and reduced glutathione concentration were found to be dramatically increased in the pancreas, kidney, and liver.
	----------	Leaf aqueous solvent	Anti-Microbial (Pradeepa, Subramanian et al. 2014)	Agar well prolixity method was used to asses the anti-microbial exertion of splint excerpts against gram-positive Bacillus subtilis, E. faecalis, M. luteus, S. aureus and S. epidermidis), seven Gram-negative (Aeromonas hydrophila, A. faecalis, E. aerogenes, E. coli, K. pneumoniae, P. aeruginosa and S. typhimurium) bacteria and eight fungi A. flavus, A. niger, A. oryzae, A. terreus, A. alternata, Alternaria brasicola, A. solani and A. vitis). The excerpts showed variable inhibition zone (ranging between 7 to 27mm) against utmost of the tested microbes. Solvent excerpts were plant to be more effective than the waterless excerpt. The most susceptible microorganism was E. faecalis flaunting a zone of inhibition of 27mm. The smallest MIC values were attained against E. faecalis, indicating the vulnerability of the strain for all the excerpts. The excerpts revealed a varied inhibitory zone (ranging from 7 to 27mm) against most of the microorganisms tested. Waterless excerpts were found to be less effective than solvent extracts. E. faecalis was the most vulnerable bacterium, with a 27mm inhibition zone. The MIC values for E. faecalis were the least, showing that the strain was vulnerable to all of the antibiotics.
	----------	Ethanol aqueous	Anti-diarrheal (Rashid, Biswas et al. 2015)	Wister albino rats were used to create a diarrhea model. The anti-diarrheal activity of P. dulce ethanol extract using castor oil produced diarrhea in rats, and the loperamides were found to be anti-diarrheal (standard drug). When compared to the control group, the extract dramatically reduced the amount of wet faeces and the total number of faeces.
	----------	Fruit Extract	Anti-Ulcerogenic (Megala and Geetha 2012)	**Model**- Rats pretreated with HAEPD (200 mg/kg b wt for 30 days) were given alcohol, acetylsalicylic acid, or hypothermic restraint stress to generate gastric ulcers. stomach tissues were examined for the amount of stomach fluid,

				pH, acidity, pepsin activity, H+, K+-ATPase, myeloperoxidase activity, mucin content, nucleic acids, glycoproteins, and prostaglandin E2 (PGE2) levels.
	Leaves	Leaves Extract	Anti-Fungal (Arif, Bhosale et al. 2009)	Solvent-solvent fractionation, chromatography methods, and mass spectroscopy are all part of the model.

2. CONCLUSION

P. dulce is a plant that has a long history of use in traditional medicine. In the plant P. dulce, a wide range of chemical components can be found. Although Pithecellobium dulce contains a number of medicinal characteristics that aid in disease resistance or prevention, some of its mechanisms of action are yet unknown. However, more research and bioassays are needed to fully comprehend the plant Pithecellobium dulce's potential. It has significant economic and theoretical worth, and it has to be examined more thoroughly and methodically on the basis of existing research in order to help conventional medicine modernize.

REFERENCES

[1] Arif, T., et al. (2009). "Natural products–antifungal agents derived from plants." Journal of Asian natural products research 11(7): 621-638.

[2] Katekhaye, S. D. and M. S. Kale (2012). "Antioxidant and free radical scavenging activity of Pithecellobium dulce (Roxb.) Benth wood bark and leaves." Free Radicals and Antioxidants 2(3): 47-57.

[3] Megala, J. and A. Geetha (2012). "Antiulcerogenic activity of hydroalcoholic fruit extract of Pithecellobium dulce in different experimental ulcer models in rats." Journal of Ethnopharmacology 142(2): 415-421.

[4] Murugesan, S., et al. (2019). "Nutritional and therapeutic benefits of medicinal plant Pithecellobium dulce (Fabaceae): A review." Journal of Applied Pharmaceutical Science 9(7): 130-139.

[5] Nagmoti, D. M., et al. (2012). "Antioxidant activity free radical-scavenging potential of Pithecellobium dulce Benth seed extracts." Free Radicals and Antioxidants 2(2): 37-43.

[6] Pradeepa, S., et al. (2014). "Evaluation of antimicrobial activity of Pithecellobium dulce pod pulp extract." Asian Journal of Pharmaceutical and Clinical Research 7(1): 32-37.

[7] Rao, B., et al. (2018). "Review of literature: phyto pharmacological studies on pithecellobium dulce." J Glob Trends Pharm Sci 9: 4797-4807.

[8] Rashid, M., et al. (2015). "Phytochemical screening and analgesic, anti-bacterial and cytotoxic activity evaluation of ethanol extract of Pithcellobium dulce (Roxb.) benth leaf." Asian Journal of Pharmaceutical and Clinical Research 8(2): 451-457.

[9] Srinivas, G., et al. (2018). "A review on Pithecellobium dulce: A potential medicinal tree." IJCS 6(2): 540-544.