



## *Diplocyclos Palmatus*: A Hidden Gem in Traditional Medicine and Modern Pharmacology-A Review

S. Ruppana<sup>1\*</sup>, Sneha G<sup>2</sup>, Sowmiya P<sup>2</sup>, Sagunthala B<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Pharmacology, Sathyabama Institute of Science and Technology Chennai-600119

<sup>2</sup>Assistant Professor, Department of Pharmacy Practice, Sathyabama Institute of Science and Technology Chennai-600119

<sup>2</sup>Assistant Professor, Department of Pharmaceutics Sathyabama Institute of Science and Technology Chennai-600119

<sup>2</sup>Assistant Professor, Department of Pharmacology, Sathyabama Institute of Science and Technology Chennai-600119

Corresponding author:

S.Ruppana, Assistant Professor, Department of Pharmacology, Sathyabama Institute of Science and Technology

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### KEYWORDS

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### ABSTRACT:

*Diplocyclos palmatus* (L.) C. Jeffrey is a climber that is a member of the Cucurbitaceae family and is also referred to as Shivlingi or lollipop plant. Because of its many pharmacological qualities, it has been extensively utilized in ancient medical systems such as Ayurveda, Unani, and Siddha. Male infertility, female sterility, and menstruation abnormalities are among the reproductive health conditions that the plant is mainly used to treat. Antimicrobial, antioxidant, analgesic, anti-inflammatory, antidiabetic, antifungal, and anti-arthritis qualities are also present in its seeds, leaves, fruits, and roots. The existence of bioactive substances such as flavonoids, alkaloids, phenols, terpenoids, and glycosides is shown by phytochemical research, which enhances the plant's therapeutic effectiveness. Recent pharmacological investigations support its potential in managing conditions like diabetes, Alzheimer's disease, cancer, and arthritis. This review highlights the botanical description, ethnomedicinal uses, phytochemical composition, and pharmacological significance of *D. palmatus*, underlining its importance in traditional and modern medicine.

### INTRODUCTION:

India is home to some of the world's most abundant biodiversity and has long depended on its natural resources. Due to their lack of access to modern healthcare, many communities rely on the efficacy and safety of traditional remedies, which often have no unfavorable side effects<sup>1</sup>.

More than 25,000 herbal remedies, including those used in Ayurveda, Unani, Siddha, Sowa Rigpa, and homeopathy, are used in traditional Indian medicine. These are practiced by over 1.5 million people. In order to meet the massive demand for herbal products, more than 7,800 manufacturing facilities produce natural health products, and each year about 2,000 tons of raw

medicinal plants are consumed. Many of these plants contain phytochemicals with antioxidant properties, such as phenols, flavonoids, carotenoids, vitamins, terpenoids, and nitrogenous substances<sup>2</sup>.

*Diplocyclos palmatus*, belongs to the family of Cucurbitaceae also known as shivalingi or lollipop plant, is one such plant that is commonly overlooked despite having significant medicinal benefits. Seed is similar to 'shivling' icon of lord shiva. Hence it is known as shivlingi. It is an annual climber of rainy season. This plant cannot tolerate heat and frost. Numerous ailments are treated with the plant in traditional medicine. Fruits and leaves part are consumed as vegetable in Kenya and Southeast Asia



The fruit is especially well-known for its use in reproductive medicine, where it treats impotence, female infertility, and vaginal discharge. Additionally, it has expectorant and laxative properties. Known for its aphrodisiac, antipyretic, and anti-inflammatory qualities, the seeds are utilized to help with conception. Skin disorders, rheumatic pains, asthma, coughs, flatulence, and even snake bites can all be treated with the herb. They are well known for their gynecological, detoxifying, antispasmodic, antibacterial, analgesic, and anti-arthritis properties.

Infertility has been a prevalent problem throughout history and still affects a large number of couples globally. The plant's leaves are utilized as an element in a specific nutritional preparation of the tribal people of Chhattisgarh as a tonic, together with Bengal gram flour.<sup>(3-6)</sup>

#### Taxonomic Positionss

**TABLE 1: TAXONOMIC DESCRIPTION OF *DIPLOCYCLOS PALMATUS (L.) C. JEFFRE*<sup>7</sup>**

Taxonomical Rank	Taxon
Kingdom	Plantae
Subkingdom	Tracheobionta
Superdivision	Spermatophyta
Class	Magnoliopsida
Subclass	Dilleniidae
Order	Violales
Family	Cucurbitaceae
Genus	Diplocyclos
Species	<i>Diplocyclospalmatus (L.) C. Jeffrey</i>

#### VERNACULAR NAMES<sup>7</sup>

**Table No : 2 Vernacular names**

LANGUAGE	VERNACULAR NAMES
Gujarati	Shivalingi
Kannada	Lingatonde balli,

	Angathondeballi, Lingakonde Balli Mahaalinganaballi
Konkani	Karta
Marathi	Shivalingi, Mahadevi
Nepali	Seva
Tamil	Aivirali, Aiviralkkovai, Iyveli, Iyviri, Sivalingakkay, Shivalingakkay
Telugu	Lingadonda
Tulu	Lingatonde
Sanskrit	Chitrphala, Lingaja, Lingini, Apashtambhini
Hindi	Bankakra, Bonkakra, Isvaralingi, Putloguli
Malayalam	Aiviralikkova, Iyiviralikkova, Kakkakothi, Naiunnikkai, Namakai, Nehoemeka, Neysatti, Neyyuni, Neyyuruni, Pambukodi, Sivalingakkaya, Sivavalli
Garhaawal	Put-loguli

#### Synonyms<sup>7</sup>

##### *Shivalingi*

- *Native bryony*
- *Diplocyclos palmatus (L.) Jeffrey*
- *Bryonia palmata Linn.*
- *Bryonopsis laciniosa Auct.*
- *Bryonopsis laciniosa var walkeri Chakrav*
- *Ilocania pedata Merr.*



**GEOGRAPHICAL DISTRIBUTION<sup>(7,8)</sup>:**

Tropical regions such as Australia, Bhutan, China, India, Indonesia, Nepal, Pakistan, South Korea, Sri Lanka, Tropical Africa, Thailand, and the Philippine Islands were home to the Shivlingi. The states of Andhra Pradesh, Bihar, Chhattisgarh, Goa, Gujarat, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Rajasthan, Tamil Nadu, Tripura, and Uttar Pradesh are among those that have it.

**MORPHOLOGY<sup>(9,10)</sup> :**

**LEAVES:** The alternating, broadly ovate, palmately 3–7 lobed leaves measure 3.5–14 x 4–14.5 cm, with glabrous, linear-lanceolate to elliptic lobes. Petioles are 1.5–9.0 cm long and frequently have irregular teething. There are two branches on tendrils.

**STEM :** The stem is thin, densely branched, with slender, striate, and smooth rings. It is an annual climbing herb with a spreading stem.

**FLOWERS :** The blooms are grouped in tiny fascicles of three to six, and each peduncle is filiform, glabrous, and 5 to 20 mm long. The calyx is subulate, glabrous,

and has longer teeth that measure between 2 and 5 mm. The corolla is segmented, oblong, vivid, hairy, and 3–5 mm long. Female flowers have stalks, are shorter than male flowers, and can be solitary or clustered.

**FRUITS :** Pepo is a unique kind of berry that can grow alone or in clusters, globos, and has a diameter of 2.5 to 3.5 cm. When fully grown, it has red and white stripes and 5-7 compacted seeds.

**SEEDS:** The seeds are about 5-6 mm long and have a yellowish cocoa-like appearance. The upper surface of the seeds resembles a "Shivling" and is 5-6 mm in length.

**ROOTS:** Tap root system with many root hairs and secondary roots. Rarely do fibrous roots emerge from vine nodes.

**ANDROECIUM:** Stamens appear to be three, with two having ditheous anthers and one having monotheous anthers. They dehisce via longitudinal slits in the extrose.

Flowering period of plant is generally in the month of August and September and fruits in August and October.



Leaves of *D.Palmatus*



Fruit of *D.Palmatus*



Seed of *D.Palmatus*

Figure no : 1 Image of *Diplocyclos palmatus*



**PLANTS PARTS USED** : Many parts of this plant, including the leaves, fruits, seeds, and roots, are used medicinally. As a laxative and galactagogue, the entire plant is effective. Additionally, venereal illnesses are treated using it. A member of the Bitter Gourd (*Cucurbitaceae*) family, the plant's leaves are frequently used to help diabetics manage their blood sugar levels. Infertility in women is specifically treated using the seeds, sometimes referred to as Shivlingi Beej. The seeds have antifungal, antihyperlipidemic, antibacterial, anti-inflammatory, spermatogenic, analgesic, and antipyretic qualities, among other advantageous qualities.

#### PHYTOCHEMICAL CONSTITUENTS OF SLIVLINGI (*DIPLOCYCLOS PALMATUS* (L.)

*C. JEFFRE*)<sup>(11-14)</sup>:

*Diplocyclos palmatus* (L.) *C. Jeffrey* contains Bryonin and fatty acids throughout the plant. The fruits have chlorogenic acid, gallic acid, and protocatechuic acid.

The seed oil contains several compounds, including punicic acid, goniothalamine, glucomannan, anthraquinone, anthocyanins, coumarins, emodins, serpentine, oleic acid, hexanoic acid, 2-ethyl cyclohexanon, 1,2- benzenedicarboxylic acid, octadecanoic acid, sulphurous acid, n-nonaldehyde, 3-octanoic acid, 9- octadecenoic acid, 2H-pyran-2-one, 2(3H)-furanone, acetic acid, 2,4-decadienal, cyclohexanone, and octanoic acid. The plant contains important phytoconstituents like alkaloids, Flavonoids, Terpenoids, saponins, Sugar, Carbohydrates, Tannins, Cardiac Glycosides.

Phytochemical analysis was conducted on ethanol and aqueous extracts from various parts of *Diplocyclos palmatus* fruit using standard methods to detect secondary metabolites like alkaloids, tannins, flavonoids, and triterpenoids. Thin-layer chromatography (TLC) was also used with a mobile phase to identify active components<sup>(13,14)</sup>.

**Table no : 3 DIFFERENT SOLVENT USED FOR EXTRACTION<sup>(15)</sup>:**

Phytochemicals	Petroleum Ether		Ethyl Acetate		Chloroform extract		Methanol Extract		Aqueous Extract	
	Leaf	Seed	Leaf	Seed	Leaf	Seed	Leaf	Seed	Leaf	Seed
Alkaloids	-ve	-ve	-ve	-ve	-ve	+ve	+ve	+ve	+ve	+ve
Flavonoids	-ve	-ve	-ve	-ve	-ve	+ve	-ve	+ve	+ve	+ve
Tannins	-ve	+ve	+ve	+ve	+ve	+ve	-ve	+ve	-ve	-ve
Saponins	-ve	-ve	-ve	-ve	-ve	-ve	-ve	+ve	-ve	+ve
Phenols	-ve	-ve	-ve	-ve	-ve	-ve	+ve	+ve	-ve	-ve
Protein	-ve	-ve	-ve	-ve	-ve	-ve	-ve	+ve	-ve	-ve
Steroids	-ve	-ve	+ve	-ve	+ve	+ve	+ve	+ve	+ve	+ve
Cardiac Glycoside	-ve	+ve	-ve	+ve	+ve	+ve	+ve	+ve	+ve	+ve
Diterpenoids	-ve	-ve	+ve	-ve	+ve	+ve	-ve	+ve	-ve	-ve
Triterpenoids	-ve	-ve	-ve	-ve	+ve	+ve	+ve	+ve	-ve	-ve

**Table No : 4 Phytoconstituents Present in Stem<sup>(13,15)</sup>**

Phytoconstituents	Aqueous extract	Ethanol Extract
Alkaloids	+ve	+ve
Triterpenoids	-ve	+ve
Flavonoids	+ve	-ve
Tannis	-ve	-ve
Saponins	+ve	+ve
Sugars	-ve	-ve
Starch	-ve	-ve
Steroids	+ve	+ve
Proteins	+ve	+ve
Resins	-ve	-ve

**ETHNOBOTANY<sup>(16,17,18)</sup>:**

This plant has several uses and is significant to tribal culture and customs. The vivid red fruits of this annual climber, which is also known as "Shivlingi" or "Gargumaru" in India, are highly valued for their medicinal qualities. This shrub is revered to the Gond and Bharia tribes of the Pathalkot valley. They consider the seeds to be an aphrodisiac that improves sperm quality and sexual desire, making it advantageous for childless couples. It is also regarded as a tonic that supports mental and physical well-being and reduces the aging process.

Bhumkas, or traditional healers, make certain concoctions of the herb and suggest them to those who are ill. Remarkably, Bhumkas in Pathalkot's Harra-Ka-Chhar hamlet recommend this plant's seeds to couples hoping to conceive male offspring. Shivlingi seeds, Tulsi (*Ocimum sanctum*) leaves, and jaggery (an Indian traditional unrefined sugar) are combined by traditional healers in Gaildubba and given to women who are infertile for a variety of reasons.

**ACTIONS AND PROPERTIES<sup>(19,20)</sup>:**

1. Kaphashamak: It dissolves clogs in the body's pathways brought on by an excess of Kapha by assisting in the reduction of excess Kapha dosha.

2. Pittavardhak: It raises the body's Pitta dosha.

3. Vranshodhan: This plant has a reputation for accelerating the healing of wounds.

Shothahara: It has anti-inflammatory properties.

5. Madhumehnashak: It acts as an antidiabetic and is used to treat diabetes.

6. Medahar: It is known to have anti-obesity qualities.

7. Swaskashara: It helps with asthma treatment.

8. Garbhdharan: This plant's seeds are used to promote conception and increase fertility.

9. Jwarghna: Its qualities aid in lowering fever.

10. Alpaartab: It cures oligomenorrhea, or irregular periods, and helps regulate the menstrual cycle.

11. Kashtaartab: It eases the discomfort of unpleasant periods, or dysmenorrhea.

12. Vajjikanan: It promotes sexual wellness by acting as an aphrodisiac.

13. Garbhashya-shothahara: This remedy is used to treat decreased sperm count, or oligospermia.

**Table no : 5 Different parts of *Diplocyclos palmatus* used to treat various disorders**

S.N	NAME OF DISORDERS	OF <i>DIPLOCYCLOS PALMATUS</i>
1.	Adenitis	Adenitis can be treated using plants. <sup>(21)</sup>
2.	Ague	Ague is treated using plants. <sup>(21,22)</sup>
3.	Animal Bite	The sting of a scorpion is treated with leaf juice. Additionally, it is used to treat snake bites <sup>(23)</sup> .
4.	Cephalagia	Plants can help people with cephalagia <sup>(24)</sup>
5.	Constipation	During conception, one seed is combined with a teaspoon of animal ghee. It helps women with milk sterility, strengthens their vaginal



		muscles, and treats leucorrhoea. <sup>(25)</sup>
6.	Diabetes	To treat diabetes, seeds are administered. <sup>(26)</sup>
7.	Earache	To relieve ear pain, fruit juice is put into the ear. <sup>(24)</sup>
8.	Gastro-intestinal disarray	Flatulence, constipation, colic, stomach disorders, intestinal worms, and dysentery are all treated with plants <sup>(27)</sup> .
9.	General debility	Plants are used to treat general debility. <sup>(24)</sup>
10.	Inflammation	Utilizing plants can help reduce inflammation <sup>(28)</sup> .
11.	Male Fertility	Impotence can be treated with fruit <sup>(29)</sup>
12.	Ophthalmic disorder	Leaves are indicated to treat eye infection <sup>(30)</sup>
13.	Oral disorder	Plants are used to treat tongue paralysis and mouth foaming. <sup>(24)</sup>
14.	Pain	A bodily soreness can be relieved by eating fruits <sup>(31)</sup> .
15.	Splenomegaly	Plants are used to treat enlarged spleens <sup>(24)</sup>
16.	Tuberculosis	Plants are used to cure scrofulous colli and phthisis. <sup>(32)</sup>
17.	Tumour	Plant is used to alleviate stomach swelling or tumour <sup>(33)</sup>
18.	Venereal disorder	Plant is recommended in the treatment of syphilis <sup>(34)</sup>
21.	Skin disorder	Plant is recommended to treat abscess, sores, carbuncle and various skin

		disorders. Leaves paste is applied topically on boils. <sup>(35)</sup>
22.	Pyrexia	Plant is recommended to treat bilious fever, yellow fever and in fever with flatulence <sup>(21)</sup>
23.	Hepatic Disorder	Plant is used to treat hepatic disorders and jaundice <sup>(36)</sup>
24.	Asthma	Plant is used to treat asthma <sup>(37)</sup>

#### PHARMACOLOGICAL PROPERTIES:

**Antioxidant<sup>(38,39)</sup>:** The phytochemicals, antioxidant capacity, and phenolic profile of leaf and fruit extracts from *Diplocyclos palmatus* were examined in this study. Hexane, chloroform, methanol, and water were used to extract the plant's leaves and fruits. Following that, the extracts underwent biochemical analyses using tests for phenols, tannins, flavonoids, terpenoids, and antioxidants.

Compared to the chloroform extracts, the methanol fruit extract had noticeably more phenolics, flavonoids, and terpenoids. But there were more tannins in the methanol extract. Several in vitro systems were used to evaluate the extracts' antioxidant activity. The highest levels of phospho- molybdenum, metal chelating, and DPPH radical scavenging activities were found in the methanol fruit extract. In the ABTS radical scavenging test, the aqueous leaf extract performed the best. Effective ferric reduction antioxidant properties were shown by the fruit extract in water. The most effective solvents for removing antioxidant components from the fruit and leaf were discovered to be methanol and water. The leaf contained the majority of the bioactive phenolic compounds, with chlorogenic acid (CA) and CA being the main components in the fruit and leaf, respectively. However, gallic acid, HBA, CLA, and vanillic acid were common in both the leaf and fruit.

#### HPLC QUANTIFICATION OF AERIAL PARTS<sup>(40)</sup>

Hplc quantification of phenolic acids in aerial parts of *diplocyclos palmatus* through antioxidant assay. A C18



column with a gradient solvent system was used for the elution. Four assays were used to measure antioxidant potential and identify total phenolic and flavonoid contents: the 2- deoxy ribose test, ferric reducing power assay, total antioxidant capacity, and DPPH radical scavenging assay. Gallic acid is the most prevalent of the three phenolic acids found in the species, according to the data. The total antioxidant capacity (TAC) was 0.137 mg/g ASE, and the total phenolic content was greater than the flavonoid amount. The extract from *D. palmatus* had an IC<sub>50</sub> of 125.61 ± 0.834 (µg/ml) and 353.71 ± 0.663 (µg/ml) for scavenging hydroxyl radicals. They were found to have 146.31 ± 0.415 µg/ml and 286.23 ± 0.671 µg/ml of in vitro antidiabetic potential, respectively.

**Antimicrobial**<sup>(41,42,43)</sup>: The ethanolic extract of the leaves, stems, seeds, and fruits of *Diplocyclos palmatus* demonstrated antimicrobial activity against various pathogenic microorganisms. The extracts from the leaves and stems showed significant growth inhibition against bacterial strains such as *Staphylococcus aureus*, *Micrococcus luteus*, and *Bacillus cereus*. The stem extract exhibited the lowest inhibitory effect against both gram-positive and gram-negative bacteria, confirming the plant's antimicrobial properties.

Antimicrobial activity was performed by using agar diffusion method against gram negative and gram positive bacteria its effects are compared with standard ciprofloxacin, streptomycin. The maximum zone of inhibition was exhibited in Gram negative bacteria.

**Antibacterial**<sup>(43)</sup>: The aqueous extract of the *D. palmatus* leaf was tested for antibacterial activity and was found to be effective against *Staphylococcus aureus*, *S. pyogenes*, *E. coli*, and *K. aerogenes*. The extract exhibited varying antibacterial effects on *E. coli* at different dosages.

**Analgesic**<sup>(44)</sup>: The alcoholic extract of the dried aerial parts of *D. palmatus* was evaluated for its analgesic activity in a mice model using Eddy's hot plate analgesia meter. After administering the standard drug and the plant extract to the mice, the animals were placed on an electrically heated plate at 55°C ± 0.5°C, and their response times to pain were recorded. The results showed significant analgesic activity after 30 to 60 minutes, with the *D. palmatus*-treated group displaying an increased response time to pain stimuli.

The response time improved from 5.83 to 8.50 seconds at 30 minutes, and from 5.67 to 10.5 seconds after one hour, compared to the control group.

#### **Gynaecological activity**<sup>(12,36)</sup>

Powder is prepared from the seeds of Shivlingi, Sonth, Kalimirch, Putrajivi, and Vat root bark. 2– 5 grams. Powder is eaten with water or milk at once per night for 21 days, following the end of the menstrual cycle or its onset.

**Androgenic Activity**<sup>(44,45)</sup>: Ethanolic extract of *Diplocyclos palmatus* seeds were examined for androgenic effect using a male albino rat model. The plant extract was administered orally to the rats for 28 days at doses of 50, 100, and 150 mg/kg body weight daily. The weight of the testes, prostate, seminal vesicles, and epididymis all increased, according to the results. The plant's androgenic action was further demonstrated by a notable increase in sperm count, fructose levels, serum testosterone, luteinizing hormone levels, and spermatogenesis.

**Antivenom and Antidote Activity**<sup>(47,48)</sup>: Fruits of *Diplocyclos palmatus* are mashed, and their juice is administered twice daily for snake bite. 50g of *Diplocyclos palmatus* leaves are ground into a paste, along with betel leaves one to two tablespoons which is administered three times a day right away after a snake bite. During their recuperation, the patient is recommended not to sleep or wash their hair. In lab experiments, a Soxhlet extractor was used to extract the dried plant material with chloroform, producing a semisolid substance (14.25% yield).

Triterpenoids, lipids, and steroids were all detected in the extract with positive results. The extract was subsequently utilized to assess its efficacy as an antidote in experiments after being suspended in several concentrations (50, 100, and 200 mg/kg) in an aqueous solution of Tween 80 (2%) and indomethacin (10 mg/kg).

**Anti-inflammatory Activity**<sup>(28,49)</sup>: Chloroform extracts of *Diplocyclos palmatus* leaves in various inflammatory models, including rat paw edema, granuloma, and chronic inflammation were evaluated. The results showed that the extract had significant anti-inflammatory effects at doses of 50, 100, and 200 mg/kg. The maximum inhibitory activity was seen at



200 mg/kg, compared to the normal drug's 62.1% inhibition. The extract significantly inhibited dextran-induced paw edema in dose-dependent ways, reduced inflammation in histamine-induced paw edema models, and reduced granuloma tissue formation in the cotton pellet-induced granuloma model. Additionally, the extract reduced peritoneal leukocyte migration at doses of 50, 100, and 200 mg/kg. According to these results, chloroform extracts might be useful as a natural anti-inflammatory.

Similarly hydro-alcoholic extract of *Diplocyclos palmatus* (L.) Jeffrey's roots were investigated against carrageenan-induced paw oedema as an acute inflammatory model to assess the anti-inflammatory efficacy. The extract demonstrated considerable and dose-dependent anti-inflammatory action when administered orally at doses of 100 and 200 mg/kg b.w. ( $p < 0.01$ ).

**Alzheimers Disease<sup>(50)</sup>:** Chloroform and methanolic extract of *Diplocyclospalmatus* seed was examined on mice with experimental Alzheimer's disease caused by amyloid beta. In this study For 21 days, mice were given two doses of DPM and DPC daily along with normal donepezil as part of an acute toxicity investigation.

An intracerebroventricular injection of A $\beta$  was administered. Avoidance tests, mazes, and Y-mazes were used to evaluate cognitive ability. Following 22 days, biochemical measures such as decreased GSH, malondialdehyde, nitrite, and AChE levels were estimated using brain homogenate. The findings demonstrated that, in a dose-dependent way, DPM and DPC extracts successfully decreased behavioral and biochemical abnormalities. As a result, *Diplocyclos palmatus* seeds' antioxidant and AChE activities demonstrated a neuroprotective impact on A $\beta$ -induced AD in rats.

**Antifungal<sup>(51)</sup>:** Chloroform, methanol, ethanol, and water were among the solvents used in the extraction process, which was carried out utilizing cold maceration procedures for antifungal activity of *Diplocyclos palmatus* leaves both in vitro and in vivo. The extracts were compared for their practical yields after the phytochemical examination was completed. Pyrex software was used for in-silico analysis, and *Diplocyclos palmatus*' active ingredients were docked to the Orotidine 5'-phosphate decarboxylase binding

site. The Well Diffusion Assay was used to conduct the in-vitro antifungal investigation.

Isoquercetin had the best docking score, and the ethanolic extract of the leaves had the maximum output. When compared to the chloroform extract, the ethanolic extract showed significant antifungal effectiveness. When compared to the common medications Terbinafine and Luliconazole, the data showed that the ethanolic extracts had significant antifungal activity.

#### **Antiarthritic activity<sup>(52)</sup>:**

Ethanolic extract of *Diplocyclos palmatus* (L.) C. Jeffrey (EEDP) seed was examined to shield rats from Fred's complete adjuvant-induced arthritis. EEDP was administered at doses of 100, 200, and 400 mg/kg body weight. The findings showed a potent anti-inflammatory impact by reducing the increased paw volume and joint diameter in arthritic rats. EEDP also made rats' paw mechanical and thermal hyperalgesia worse. Furthermore, it enhanced biochemical and changed hematological indicators. Histopathological study showed decreased cell infiltration and joint cartilage degradation in rats with arthritis treated with EEDP. According to this study, EEDP can be used in ethnomedicine to alleviate pain, inflammation, and arthritis.

#### **Antiulcer activity<sup>(53)</sup>:**

Ethyle extract of *Diplocyclos palmatus* fruit was examined for antiulcer activity. Phytochemicals like tannins, alkaloids, glycosides, steroids, polysaccharides, and flavonoids are found in plants like *Diplocyclos palmatus*. Flavonoid and phenolic components make up secondary metabolites. These compounds, which have antioxidant properties, can be identified using a variety of methods. The active components were isolated using methods including column chromatography and column elution. Three compounds with Rf values of 0.78, 0.69, 0.59, and were recovered from the Ethyle extract of *Diplocyclos palmatus* (EEDP).

The study evaluated the antiulcer efficacy of drugs using the Aspirin plus pylorus ligation ulcer model. At 20 mg/kg, DP-3 had the most antiulcer effects. By increasing stomach pH, decreasing volume, and lowering ulcer index, kaempferol and rhamnocitrin have demonstrated strong in vivo antiulcer action.



## AntiDiabetic activity<sup>(26)</sup> :

Methanolic extract of *Diplocyclos palmatus* Linn seed was evaluated in mice against streptozotocin, induced diabetic effect. Extract was administered orally to male Swiss albino mice, of dose (150 mg/kg body weight). Antidiabetic activity was evaluated through the measurement of oral glucose tolerance, fasting blood glucose, urine glucose, liver glycogen content, serum lipid profile, change in body weight, and histopathology. Following 15 days of extract administration, diabetic mice given 150 mg/kg of methanolic extract showed the greatest decrease in fasting blood glucose (53.87%). When compared to the diabetic control, the treated mice's body weight loss was controlled and their serum lipid levels returned to almost normal. Additionally, the extract administration demonstrated a gradual drop in urine sugar levels and a notable increase in liver glycogen content. Mice given 150 mg/kg methanolic extract had normal pancreatic architecture when the pancreas segment was inspected under a microscope.

## Anticancer Activity<sup>(54)</sup>:

Ethanollic extract of *Diplocyclos palmatus* fruit was examined for anticancer study. MTT assay and apoptosis study was tested against HCT116 cell line at various concentrations at three varied period, viz., 24, 48, and 72 h. The outcomes exhibited that ethanolic solvent extract of the fruit of *Diplocyclos palmatus* constrained the growth of HCT116 cells of 69.58 µg/ml at IC<sub>50</sub> concentration, respectively. Alternation in the cell morphology also revealed that *Diplocyclos palmatus* comprises a few valuable chemical elements extracted using ethanol that can be used further in the management of cancer treatment.

## Antipyretic activity<sup>(55)</sup>:

Methanolic extract of *Diplocyclos palmatus* was evaluated for antipyretic activity in swiss albino rats at doses of 125, 250, and 500 mg/kg body weight. According to the study, a dose of 125 mg/kg significantly reduced body temperature for up to four hours. Yeast suspension subcutaneous injections significantly raise the rectal temperature for up to 19 hours. When compared to paracetamol, methanol extract demonstrated an antipyretic action and considerably decreased the yeast-induced elevation of

body temperature.

## Antiassthmatic activity<sup>(56)</sup>:

70% Alcoholic extract of *Diplocyclos palmatus* was evaluated for antiasthma activity using the Atopic allergy approach in albino rats. When compared to prednisolone, oral treatment of the extract 300 mg/kg body weight, for 7 days resulted in a 56.27% increase in the percentage of granulation and 43.88% cell protection in the treated rat.

## Anticonvulsant Activity<sup>(57)</sup>:

Different solvents like aqueous, chloroform and alcoholic extract of dried leaves of *Diplocyclos palmatus* were used to test anticonvulsant efficacy against MES and PTZ convulsions in Wistar Albino Rats. After alcoholic and aqueous extracts, the chloroform extract had the highest chemical concentration. Following an oral dosage of 3000 mg/kg, the study observed no discernible changes in the average body weight of the animals. The anticonvulsant properties of alcoholic and chloroform extracts were demonstrated in the in vivo investigation; the chloroform extract was found to be more effective than the alcoholic and aqueous extracts.

**Antifertility<sup>(58)</sup>:** Methanolic seed extract of *Diplocyclos palmatus* was examined for antifertility activity in Albino mice. Thin-layer chromatography (TLC) and high-performance liquid chromatography (HPLC) were used to characterize seed methanol extracts. For 42 days, the mice were given methanol extract (ME) dissolved in regular saline, while the controls were given regular saline. Five ME fractions were found by TLC analysis, and three phytochemicals— quercetin, tannic acid, and rutin— were found by HPLC analysis. While testis histology revealed increased Sertoli cells, spermatozoa, and Leydig cells, as well as vascularization and sperm count, the liver did not exhibit any damage at the dose given. More follicles in the secondary antral follicle stage, which is maturing towards the Graafian follicle, were visible in the ovarian histology.

**Anthelmintic<sup>(59)</sup>:** Ethanolic Extract of *Diplocyclos palmatus* leaves was evaluated for anthelmintic activity. Indian Adult earthworms like *Pheretima posthuma* Annelida; Megascolecidae was used in this study. The effectiveness of plant is compared to



commercial medication nitazoxanide. The ethanol extracts of the plant, at doses of 10, 20, and 50 mg/ml, exhibited a dose-dependent anthelmintic effect against adult Indian earthworms. The extracts induced paralysis and death at the following times (mean  $\pm$  SEM): 10 mg/ml (paralysis:  $1.2421 \pm 0.0963$  min, death:  $3.7 \pm 0.4159$  min), 20 mg/ml (paralysis:  $1.438 \pm 0.0687$  min, death:  $3.424 \pm$

$0.0346$  min), and **50 mg/ml** (paralysis:  $0.904 \pm 0.1928$  min, death:  $2.102 \pm 0.1743$  min).

### CONCLUSION

*Diplocyclos palmatus* is a highly valuable medicinal plant with diverse therapeutic applications, deeply rooted in traditional medicine. Its rich phytochemical profile, including alkaloids, flavonoids, and essential fatty acids, contributes to its wide range of health benefits. Traditionally used to enhance fertility, it also exhibits strong anti-inflammatory, antioxidant, antimicrobial, and antifungal properties. Scientific studies further highlight its potential in managing diabetes, arthritis, neurodegenerative diseases like Alzheimer's, and even cancer. Additionally, its cultural and ethnobotanical significance among indigenous communities underscores its importance in natural healing systems. However, despite its promising medicinal properties, further pharmacological research and clinical trials are necessary to establish standardized formulations, dosage recommendations, and safety profiles. Integrating traditional wisdom with modern scientific advancements will help unlock the full therapeutic potential of *Diplocyclos palmatus*, ensuring its sustainable use in contemporary medicine.

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