



Review Article

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A COMPREHENSIVE REVIEW ON ETHNOMEDICAL STUDY AND PHARMACOLOGICAL ACTIVITY OF RAJAPATA (*CYCLEA PELTATA*)

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ABSTRACT

Dravya (Drug) is one among the chikitsa chatushpada (4 important treatment protocols). It is equally important for a physician to choose the right drug depending on the disease condition. In Ayurveda there is reference of n number of drugs, our Acharyas have given detailed description about it in various Ayurvedic classics, and there are millions of drugs yet to be discovered. Among the drugs which are presently available there is a need for discovery of its pharmacological action. Many researchers are being conducted and proved the effect, chemical constituents, mode of action, pharmacological actions and many other properties of a drug. Rajapata is one such drug on which many research works have been conducted and proved its action on various diseases. Reference about this is found in Ayurvedic classics. Here is an attempt made to put all the available information from Ayurvedic classics, research works conducted on Raja pata (*Cyclea peltata*) in a nutshell and to analyze the data and to draw the conclusion.

Keywords: Raja pata, Ethnobotany, pharmacological action

INTRODUCTION

The plant *Cyclea peltata*, belonging to the Menispermaceae family, is a climbing shrub with tuberous roots, peltate leaves, greenish-yellow flowers, and drupaceous fruits. It is commonly found in south and east India.¹ *Cyclea peltata* contains various phytoconstituents such as alkaloids like cycleapeltine, cycleadrine, cycleacurine, tetrandrine (TET), cycleanorine, among others, which contribute to its pharmacological activities. Fangchinoline, an alkaloid present in *Cyclea peltata*, can inhibit calcium transmembrane movement and receptor release.² This plant is traditionally used for treating conditions like cough, fever, kidney disorders, urinary disorders, and snake poisoning.³

Literary review on Rajapata (*Cyclea peltata*)

All the available information is collected from various samhita's, textbooks and research work from different sources and systematic documentation is done in this communication.

Habitat

Cyclea peltata is mostly found in regions like Andaman and Nicobar Islands, Arunachal Pradesh, Assam, Maharashtra, Kerala, and other tropical regions of Asia, especially in evergreen and semi-evergreen forests. Among 28 species of *Cyclea peltata* identified globally, around seven are located in India.⁴

Distribution

It is found across Sri Lanka and India⁵
In India it is found in following regions:

Maharashtra: Nasik, Pune, Raigad, Ahmednagar, Sindhudurg, Kolhapur.⁴

Karnataka: Hassan, Shimoga, Chikmagalur, Coorg, Mysore.⁴

Kerala: In all most all district.⁴

Tamilnadu: Salem, Coimbatore, Theni, Kanyakumari, Tirunelveli.⁴

Botanical Description

Cyclea species are dioecious, meaning they have separate male and female plants. They are scandent or climbing shrubs with simple, alternating leaves that are veined palmately and can be peltate or non-peltate. The petiole of the leaves is typically long. The inflorescences of *Cyclea* plants can be cauliflorous, paniculated, racemose, or thyrsoid, and they can occur in various positions such as axillary, extra-axillary, terminal, or on old stems. The flowers of *Cyclea* species are monosexual, meaning they are either male or female.



Figure 1: *Cyclea peltata*

Leaves

- Simple, alternate, heart-shaped.
- Measuring: 2.5–10 cm long, 2.5–3.75 cm broad, with stipules 5–10 cm long and nerves 7–11⁶.
- The leaves of *Cyclea* species are intense, short, or slightly sinuate at the base. They are mucronate and have a bristly texture on the nerves and veins.

Flower

- Male flowers are spiky, subsessile, or grouped into heads. They are pale yellow colour.
- Female flowers are rectangular, glabrous sepals of flowers are racemose. They bloom during the windy season and they are orbicular, and shorter than the sepal ovary. Organic products of *Cyclea peltate* are ovoid and are wrapped with shady brown or red seeds.

Root: The root is tuberous and has a spherical and a white starchy cortex, empty, bent form, and the surface is coloured greyish-earthly.

Fruit: Reniform, drupe.⁷

Local Names

English – Pata root⁸, Indian moon seed⁹
 Hindi- Path,⁸ Pathi⁸, Raj patha.⁹
 Kannada- Padvali⁸, Visapoddi⁸, Visahaddi⁸, Padubala balli⁹, Phalani⁹
 Malayalam- Patavali⁸, Patakkilannu⁸, Padathali⁹, Padakizhangu⁹
 Sanskrit- Patha⁸, Ambasthaki⁹, Bhruhat patha⁹
 Tamil- Patakkilanku⁸, Sirupathavalli⁹
 Telugu- Patha⁸, Patatig
 Gujarati- Kalepat, Kanipet⁹
 Konkani- Padavel⁹
 Marathi- Thorali Padavel⁹

Properties and Action

Rasa Panchaka

Rasa- Tikta (Bitter)
 Guna- Laghu (lightness), Tikshna (sharp)
 Vipaka- Katu (spicy)
 Virya- Usna (warm)¹⁰

Dosakarma- Vatakapha samaka (Vatahara because of Usna virya-hot potency, Katu vipaka -pungent and Tikta rasa -bitter taste)¹⁰

Karma- Jwaratisara (fever and diarrhea), Stanyasodhana (cures disorders related to breast), Sulahara (analgesic action), Kusthaghna (skin disorders), Kandughna (reduces itching), Visaghna (antitoxic), Vranahara (wound healing), Hridrogahara (cures cardiac disorders), Krimighana (anti helminthic action).¹⁰

Pharmacological actions - Hypoglycemic, Muscle relaxant, antibacterial, CNS depressant, Fungitoxic, Antitumor activity¹⁰

Rogagnata (therapeutic indications)

Classical- Jwara (fever), Stanyadusti (disorders related to breast), Sula (pain), Chardi (vomiting), Atisara (diarrhea), Kusta (skin disorders), Kandu (itching), Visavikara (poisonous effects), Krimi (worm infestations), Daha (burning sensation), Hridroga (cardiac disorders), Vrana (wound).¹⁰

Action- roots used in smallpox, bone fracture, malaria fever, jaundice, stomachache¹¹

Ethnobotanical

Table 1: Parts used and their specific indications

Part used	Indication
Root	Eaten raw for stomach ache ¹²
Root tuber	Powdered root tuber mixed in half glass of diluted curd is taken for 8 consecutively to cure piles ¹³
Rhizome	Used for preparation of oil for toothache ¹⁴
Leaf	Leaf Paste is used for dandruff ¹⁴ One teaspoonful of leaf juice is taken twice for 1-2 days in dysentery ¹⁵ Leaves crushed into paste half, or one teaspoon of paste is taken orally, daily twice for 2days in Intestinal worms ¹⁵

Matra (Dose)

Kwata (decoction) – 50 – 100ml
 Choorna (powder) – 1-3 gm¹⁰

Chemical Constituents

Roots – contains alkaloids like Hayatine and Hyatinine, Hayatidine. Also contains quercitol, sterol, and saponins.
 Leaves – contains cycleanine, 1-berberine, Hyatidin, Hyatinin, Hayatin, d-quercitol¹⁰
 Root has tetrandrine as the major alkaloid. Tetrandrine (0.1g/day) is found effective in the treatment of chloroquine resistant malaria¹¹. Tetrandrine possess cytotoxic and immunomodulatory properties. It is indicated in the treatment of chronic inflammatory diseases. It also possesses antihypertensive, cardiac depressant, vasodilator effect and antiallergic activity.¹¹

Controversy

In the classics two varieties of Pata have been mentioned they are Brihat patha (Rajpatha) and Laghu patha. Both the varieties almost has similar properties¹⁶. Laghu patha has been identified as *Cissampelos pareira* Linn. In Kaiyadeva Nighantu, Brihat patha has been mentioned as Kuchelika¹⁷. In Shakavarga, Charaka has described Patha and Kuchela as separate drugs^{18, 19}.

In classics, *Cyclea peltate* Lam. and *Stephania hernandifolia* (Willd) Walp. are taken as brihat patha. *Cissampelos pareira*, *C. peltata* and *S. hernandifolia* are members of same family i.e., Menispermaceae²⁰.

Brihat patha is bitter, astringent and indicated in blood related diseases and polyuria.²¹ *C.peltata* is used as a substitute for *C.pareira*²².

The roots of *C.pareira* can be distinguished by the concentration of alkaloid berberine. In *C.pareira* alkaloid berberine is in high concentration where as in *Stephania japonica* it is in low concentration and absent in *Cyclea peltate* roots. Saponins are found in high concentration in the roots of *Cyclea peltate* and in *Cissampelos pareira* it is found in low concentration and it is absent in *Stephania japonica* roots.²²

Table 2: Research works on *Cyclea peltata*

Activity	Conclusion
Diuretic activity	The study on the petroleum ether and ethanolic extracts of <i>Cyclea peltata</i> revealed diuretic activity, with the ethanolic extract being more effective. Further research about phytoconstituents responsible for this effect is needed. The excretion pattern of water, Na ⁺ , and K ⁺ suggests a Furosemide-like action. Plants with strong diuretic effects often contain benzyl isoquinoline alkaloids, and some flavonoids may enhance diuretic activity by interacting with the Adenosine A1 Receptor. The diuretic properties of <i>Cyclea peltata</i> likely involve these mechanisms, but the specific site and cellular mechanisms require further investigation. This study supports the

	traditional use of <i>Cyclea peltata</i> for diuretic effects, emphasizing the need for detailed phytochemical studies and isolation of active compounds. ²³
Antifibrotic effect	The ethanolic extract of <i>Cyclea peltata</i> seems to have promising antifibrotic properties, especially in reversing fibrous tissue formation in liver cells caused by repeated injury with CCL4. The presence of alkaloids in this plant suggests further research through isolation, fractionation, and structural elucidation of these compounds. ²⁴
Immunomodulatory, Antimicrobial, antioxidant property	<i>Cyclea peltata</i> has antimicrobial and antioxidant properties due to its phytochemicals, but its aqueous extract may have toxic effects on physiological or immunological systems. At low concentrations, it might boost the immune system, while high concentrations could cause adverse effects. Currently, there is no literature on other health benefits or immunomodulatory activities of this plant. The research involves immunomodulatory studies on albino rats with varying concentrations of the aqueous extract to provide baseline data and establish scientific evidence for the plant's immunological properties. ²⁵
Anti-lithiasis, neuropharmacological properties, larvicidal, anti-fertility, anti-bacterial	<i>Cyclea peltata</i> has exhibited various activities such as anti-lithiasis, neuropharmacological properties, larvicidal, anti-fertility, and antibacterial effects. These activities are attributed to the presence of alkaloids like tetrandrine, bisbenzylisoquinoline, tropoloinquinoline, among others. The survey has revealed the superior pharmacological actions of <i>C.peltata</i> . The current knowledge about this herb serves as a foundation for further exploration of its potential activities and the discovery of new compounds. ²⁶
Antitoxin effect	The study in India revealed that snakebites cause many deaths annually, with traditional medicine being prevalent in rural areas. Research showed that plant extracts can inhibit harmful activities from snake venom, confirmed by ex vivo studies. This provides scientific evidence for using <i>Cyclea peltata</i> root as an antivenom, likely due to its bioactive compounds, supporting herbal medicine as a potential anti-snake venom remedy. ²⁷
Anthelmintic	The study results show that the paralysis time for the standard drug and the methanolic extract of <i>Cyclea peltata</i> Lam leaves is statistically significant. At higher concentrations (100mg/5ml), the extract induces paralysis similar to or greater than the standard drug. However, at lower concentrations (25, 50mg/5ml), the death time for the plant extract is significantly longer than that of the standard drug albendazole, indicating lower anthelmintic activity. At higher concentrations, the death time for both the standard drug and the plant extract becomes statistically nonsignificant, suggesting similar or greater anthelmintic activity for the extract. Thus, the methanolic extract of <i>Cyclea peltata</i> Lam leaves shows significant anthelmintic activity against adult <i>Pheretima posthuma</i> worms compared to albendazole. ²⁸
Effect on reproductive system of female rat	The study shows that <i>Cyclea peltata</i> root extract in pet. ether (CPPE) and ethyl acetate (CPEA) significantly affect the estrus cycle of treated rats by prolonging the diestrus and metestrus phases. The extract's plant steroids, alkaloids, and long-chain fatty acids can disrupt the estrogen-progesterone balance, altering the reproductive tract's morphology and making it less conducive to fertilization and implantation. Thus, <i>Cyclea peltata</i> root extract can modify reproductive physiology in rats and serve as an antifertility agent. ²⁹
Antidiabetic effect	The study reveals that <i>Cyclea peltata</i> roots have significant anti-diabetic effects. In-silico molecular docking studies identified the anti-diabetic activity of phytoconstituents found in these roots. Notably, the molecule <i>Cyclea</i> curing showed similar effects on human pancreatic alpha-amylase as the drug Acarbose. These results indicate that plant phytoconstituents could be valuable in diabetes treatment. Further research enhances therapeutic options against alpha-amylase. ³⁰
Hepatoprotective	The study findings reveal the strong hepatoprotective effect of <i>Cyclea peltata</i> in the treatment of liver disorders. This shows the importance of this plants as per traditional claim. ³¹
Phytochemical and neuropharmacological evaluation	The study findings suggest that <i>Cyclea peltata</i> plant extracts have demonstrated dose-dependent neuroprotective activity against fluoride-induced brain damage. The extracts showed positive results in tests like forced swim test and locomotor activity assessment. The evaluation of biochemical parameters indicates the involvement of alternative neuroprotection pathways. The neuroprotective function of the extract is attributed to its antioxidant activity, which helps prevent lipid peroxidation in brain tissue. This research opens up new opportunities for further investigate. ³²
Gastric antisecretory and antiulcer activity	The study results show that the ethanolic extract of <i>Cyclea peltata</i> exhibits strong antisecretory and antiulcer effects. These findings support the traditional use of this herb in treating peptic ulcers and associated stomach pain. ³³

CONCLUSION

By the above-mentioned data, it is clear that Raja pata is one such drug which can be used in various diseases. Chemical constituents present in this play different role in curing different diseases which has been proved by animal and cell studies. The diseases which are mentioned in classics such as Kusta (skin diseases), Visavikara (diseases due to poisoning), Krimi (worm infection) has been proved with studies like antimicrobial, antifungal, antitoxic, anthelmintic. It is proved to have other actions like antifibrotic, antiulcer, hepatoprotective, antidiabetic, antioxidant property. From the data available it demonstrates that Raja pata is utilized in various forms and in various diseases like Kusta (skin diseases), Visavikara (disease due to poisoning), Atisara (diarrhea), Chardi (vomiting), Hridroga (cardiac disorder) etc. The plant exhibits antifibrotic, antiulcer, hepatoprotective, antidiabetic, antitoxin, antibacterial, antimicrobial, diuretic actions with good convincing findings. Other pharmacological action can be assessed through detailed research.

REFERENCES

- Chellappan David Raj. Pharmacognostical, antioxidant and antiulcer screening of *Cyclea peltate* roots. Revista Brasileira de Farmacognosia Brazilian Journal of Pharmacognosy 2011; 21(6): 1096-1103 DOI:https://doi.org/10.1590/S0102-695X2011005000168.
- Shine VJ, Latha PG, Suja SR, Anuja GI, Sabulal B, Vilash V, Rajasekharan S. Anti-hepatotoxic Effect of Root Ethanol Extract of *Cyclea peltata* against Acetaminophen Induced Oxidative Stress in Wistar Rats and *in vitro* Primary Hepatocyte Culture. American Journal of Experimental Biology 2014; 1(1): 1-5.
- Patel SS, Goyal RK, Shah RS. Antihyperglycemic, antihyperlipidemic and antioxidant effects of Dihar, a polyherbal ayurvedic formulation in streptozotocin induced diabetic rats. Indian J Exp Biol 2009; 47(7): 564-70.
- Sreelakshmi KP, Abhina M, Adithya K, Angela Gabrial, Neethu P, Sushitha VS. A Review on *Cyclea peltata* (Menispermaceae). International Journal of Creative Research Thoughts. 2024; 12: b906-b909
- Cyclea peltate* Hook. f. & Thoms. India Biodiversity Portal. Retrieved 2021-06-03.

6. George M, Joseph L, Jose CK. Phytochemical Screening and *In-Vitro* Anti-Microbial Activity of Various Extracts of *Cyclea peltata* Lam. International Journal of Innovative Science and Research Technology. 2017; 2: 55-61
7. Uthirapathi M, Manohar K, Nalliah N.. Comparative investigation on antimicrobial and phytochemical profiling of *Cyclea peltata* and *Tiliocora acuminata*. Journal of Applied Biology & Biotechnology. 2020; 8(03): 57-63.
8. Indian medicinal plants, Vol 2, *Cyclea peltate* (Lam.) Hook.f.& Thoms. Reprinted, Universities Press (India) Private Limited, 2007; 277.
9. *Cyclea arnotii* Miers, Ann. Mag. Nat. Hist. ser. 3, 18:19.1866; Gamble, Fl. Pres. Madras 31(22).1915; Ramach. & VJ Nair, Fl. Cannanore Dist. 42. 1988; Sasidh. www.keralaplants.In
10. Hedge L Prakesh. A text book of Dravyaguna Vijnana, vol 3, 106-Patha. Revised second edition. Chaukhamba Sanskrit Sansthan; 2021, 2022; 501,502.
11. Khare C.P, Indian Medicinal Plants. *Cyclea arnotii* Miers. Second Indian Reprint. Springer (India) Private Limited; 2008; 190.
12. Upadhye Anuradha, MS Kumbhojkar, VD Vartak.. Observations on wild plants used in folk medicine in the rural areas of the kolhapur district, Anc Sci Life. 1986; 6(2): 119-121.
13. PS Udayan, MK Harinarayanan, PV Tushar & Indira Balchandran. Some common plants used by Kurichiar tribes of Tirunelli forest, Wayanad district, Kerala in medicine and other traditional uses, Indian Journal of Traditional Knowledge. 2008;7(2):250-255.
14. VP Silja, K Varma, K Mohanan. Ethnomedicinal plant knowledge of the Mullu kuruma tribe of Wayanad district, Kerala. Indian Journal of Traditional Knowledge 2008; 7(4): 604-612
15. N Rajakumar, M.B. Shivanna. Ethno-medicinal application of plants in the eastern region of Shimoga district, Karnataka, India. Journal of Ethnopharmacology. 2009; 126; 64-73.
16. Bapalal V. Nighantu Adarsh (Purvardha) Shri Swami Atmanand Saraswati Ayurvedic Sanskrit Pharmacy Ltd. Surat, 1952; 19.
17. Anonymous Kaydeva Nighantu. Commentary by Sharma GP Chaukhamba Orientalia, Varanasi, 2006; 124-125.
18. Anonymous (1970). Charaka Samhita. Commentary by Shastry, K. N. Chaukhamba Vidvybhavan, Varanasi 1970; 233.
19. Manilal KS, Sabu. T. *Cyclea barbata* Miers (Menispermaceae): a new record of a medicinal plant from South India. Ancient Sci Life. 1985. 4(4);229-231.
20. Nadkarni AK. Indian Materia Medica. Popular Prakashan, Pvt. Ltd. Bombay. 1976; 14.
21. Khory R. Materia Medica of India and Their Therapeutics. Neeraj Publishers. 1927; 25.
22. Prasad NBR, Girija Devi RS, Hepsibah PTA. *Cyclea peltata* Diels - A possible substitute for *Cissampelos pareira* Linn. Ancient Sci Life. 1995; 15(2):150-2.
23. Hullatti KK, Gopikrishna UV, Kuppast IJ. Phytochemical investigation and diuretic activity of *Cyclea peltata* leaf extracts. J Adv Pharm Technol Res. 2011 Oct; 2(4): 241-4.
24. Pillai N Rakesh, Beny Baby. Anti fibrotic effect of ethanolic extract of *Cyclea peltate* (H.F and T) roots, on carbon tetrachloride induced liver fibrosis, Research Journal of Pharmacy and Technology. 2009;2: 201-205
25. BCV Sukanya, PR Bhat. Phytochemical, antimicrobial, antioxidant and immunomodulatory studies of leaf extracts of *Cyclea peltata* (Lam.) Hook. f. & Thomson, GSC Biological and Pharmaceutical Sciences, 2019; 09(03): 052-063.
26. Jimisha Judy, Ananda V, Visagaperumal, Vineeth Chandy.. Pharmacological Review On *Cyclea peltata*. International Research Journal of Modernization in Engineering Technology and Science 2022; 04:05.
27. Sivaraman T, Sreedevi NS, Meenatchisundaram S, Vadivelan R. Antitoxin activity of aqueous extract of *Cyclea peltata* root against *Najanaja* venom. Indian J Pharmacol. 2017Jul-Aug; 49(4): 275-281.
28. SR Snesha, I Arthi. Anthelmintic Activity of Methanolic Extract of Leaves of *Cyclea peltata* Lam and it's Statistical Analysis. International Journal of Ayurveda and Pharma Research 2023; 11:5.
29. Harindran, Sujesh M. Effects of *Cyclea peltata* (Hooks and Thom.) root extracts on Reproductive system of female rat. World Journal of Pharmacy and Pharmaceutical Sciences 2019; 8(7): 1217-1226
30. R Gandhimathi, Cheriyan Binoy Varghese, Paul A Deevan, A Saravanakumar, G Lakshmanan. α -amylase inhibition activity of phytoconstituents present in the roots of *Cyclea peltata*-an *in-silico* and *in-vitro* investigation. Preprints 20 June 2022.
31. VJ Shine, PG Lata, SR Suja, GI Anuja, B Sabulal, V Vilash, S Rajasekharan. Anti-hepatotoxic effect of Root Ethanol Extract of *Cyclea peltate* against Acetaminophen Induced Oxidative Stress in Wistar Rats and *in vitro* Primary Hepatocyte Culture. Columbia International Publishing American Journal of Experimental Biology 2014; 1: 1-5.
32. S Rajkumar, R Sambathkumar, Swaminathan Gomathi, C Kannan. Phytochemical And Neuro Pharmacological Evaluation of *Cyclea peltata* Lam Roots, Research gate 2021;4:212-223.
33. VJ Shine, PG Latha, S Shyamal, SR Suja, GI Anuja, S Sini, S Pradeep, S Rajasekharan. Gastric antisecretory and antiulcer activities of *Cyclea peltata* (Lam.) Hook. f. & Thoms. in rats. Journal of Ethnopharmacology 2009; 125:2.

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