

**THERAPEUTIC USES OF CHITRAKA (PLUMBAGO ZEYLANICA LINN.) WITH A
NOTE ON IT'S PHARMACOLOGICAL ACTIONS. -A REVIEW**Dr. V. G. Mulke*¹ and Dr. A. M. Ghotankar²¹PG Scholar, Department of Dravyaguna, CSMSS Ayurved College, Kanchanwadi, Aurangabad.²HOD, Professor, Department of Dravyaguna, CSMSS Ayurved College, Kanchanwadi, Aurangabad.***Corresponding Author: Dr. V. G. Mulke**

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ABSTRACT

Traditional system of medicinal plant consists of various medicinal and pharmacological uses. Medical practitioners are using medicinal plant widely for curing various diseases in their day to day practices, Chitraka (*Plumbago zeylanica Linn.*) is one amongst these, found all over the world, expressed a valuable tank of new bioactive molecules. The present review aimed to compile complete information of pharmacological action of Chitraka (*Plumbago zeylanica Linn.*) with special emphasis on its various classical and scientifically documents. Plant mainly contains plumbagin, naphthaquinones, alkaloids, glycosides, steroids, triterpenoids, tannins, phenolic compounds, flavanoids, glucopyranoside, sitosterol saponins, coumarins, carbohydrates, fixed oil and fats and proteins compounds. Is commonly used in Ayurvedic Preparations. Different parts of this plant are traditionally used for the treatment of illness including, rheumatic pains, liver diseases, fever, diabetes, kidney disease anti-fungal, anti-tumor, disease of heart.

KEYWORDS: Chitraka (*Plumbago zeylanica Linn.*) Phytoconstituent, Ayurveda, Pharmacological Action.**INTRODUCTION**

Plants are one of the most important sources of medicine, large number of Drugs are derived from plants, Chitraka has been botanically identified as *Plumbago zeylanica Linn.* belongs to family Plumbaginaceae. It is perennial, sub-scandant shrub, herb one of the common plants used in Indian traditional system of medicine. The family Plumbaginaceae consists of 10 genera and 280 species. *P. zeylanica* common, wild in cultivation due to Its more therapeutic uses.

P. zeylanica roots were reported to possess antioxidant, hypolipidemic, anti atherosclerotic, central nervous system stimulant and anti-fertility properties.^[1] The root is used as laxative, expectorant, astringent, abortifacient, and in dysentery.^[2,3] In traditional system of medicine to cure various ailments like body pain, headache, fever and inflammation.^[4]

The main purpose of reviewing the *Plumbago zeylanica* plant is to investigate the usefulness of plant for human health. It is an important herb in the Indian traditional medicine systems.

ClassificationKingdom: Plantae
Order: Caryophyllales
Family: PlumbaginaceaeGenus: *Plumbago*Species: *zeylanica***Classification according to Ayurveda**

Charak: Dipanya, Sulaprasmana, Arsoghna, Lekhanya.

Susruta: Pippalayadi, Mustadi, Amalakyadi.

Vagbhata: Pippalayadi, Mustadi, Varunadi, Aragwadhadi.^[5]**Synonyms of chitraka**

Sanskrit - Chitraka, Agni, Shikha, Vahni, Agnik, Hutashan, shikhi, vanhi, Nirdahani, Jyoti, Anal, vyal, Ushan, Dahana, Hutabhuk, Sikhi.

English - Ceylon leadwort, white leadwort.

Botanical Description

It is perennial herb, sometimes in shady places, stems- 0.6 -1.5 long somewhat woody, spreading, terete, striate, glabrous. leaves - thin 3.8- 7.5 by 2.2- 3.8 cm ovate, subacute, entire glabrous, somewhat glaucous beneath reticulately veined, shortly and abruptly attenuated into a short petiole. Petiole- Narrow, amplexicaul at the base and there often didated into stipule like auricles. flower - in elongate spikes rhachis glandular, striate, bracteoles ovate, acyminate, shorter than calyx, glandular or not *Capsule*-Enclosed Within the persistent calyx, oblong, pointed.

Seed- Oblong.

Flowering and fruiting time –winter season and onwards.^[6]

Ayurvedic properties of Chitraka^[7,8]

Guna -Laghu, Ruksha, Tikshana.

Rasa -Katu.

Virya- Ushana.

Vipaka- Katu.

Doshagnata- Kapha vata shamak.

Karma and uses

Chitraka has very useful medicine in traditional system hence take important place in Ayurveda.

Dipana, Pachana, Lekana, Grahi, Krimighna, Garbhashay sankochaka, Swedjana, Rasayana, Rochaka

Krimighna, Kushtahara, RaktapIttaprakopaka, Kaphaghna, Kanthya, Garbhasravakara, Garbhashaya Sankochak, Swedajanana, Jwaraghna, Shool, Shothahara, Lekhana, Vajikarana, Visphotajanana, Uttejaka, Madak, Katupaushatika, Rasayana, Triptighna, Stanyasodhak, Sukra sodhaka.^[9]

Phytochemical Constituents: Chitraka has been explored phytochemically by various researchers and found to possess number of chemical Constituent like plumbagin, free glucose and fructose and enzymes Protase, and Invertase, Chitranone. 3-Chloroblumbagin, Droserone. Elliptinone, Isozeylinone Isozellan-one, Zeylanone and Zeylinone, MarItone, Plumbagic acid, Dihydrosterone, B-sistosterol etc.^[10]

Part used, Medical Formulation and doses

Part used- Root, Bark

Some important formulation- Chitraka HarItaki, Chitrakadi vati, Chitraka Ghruta, Chitrakadi leha, Chitraka Rasayan.^[11]

Dose - Powder 1-2 gm.^[12]

The properties of Chitraka

Chitraka is useful in disease.^[13]

Arsha- Chitrakamool churna paste with Takra.

Atisar- Chitrakamool churna paste with Takra.

Grahani - Chitrakadya gutika Chitraka ghruta.

Siktameha - Chitrakamoola kwath is useful.

Pandu - Balamool and Chitraka 10gm to be taken with warm water.

Medorog - Chitrakamool churna with honey.

Shlipad - Chitrakamool with Devdaru lepa.

Vranashoth - Chitrakamool lepa.

Kushtha -Chitrakamool churna with water.

Switra kushtha - Chitraka and Trikatu are mixed with honey and cow urine should be kept in a jar coated with ghee for a night and take orally.

Rasayana- Chitrakamool churna With Ghruta or Honey or Milk for 1 month.

Pharmacological Action

Chitraka (Plumbago zeylanica Linn.) utilised for centuries from Samhita kala to treat a wide range of diseases, showed great potential as safe and Useful multi-purpose medicinal plant. Apart from Its traditional uses, A lot of recent researches have done hepato-protective, immunomodulatory, antitumor hypolipidemic and cardioprotective. Moreover, various parts of plants are reported to possess abortifacient, and anticancer etc.

Antibacterial Action

plumbagin induces ros-mediated apoptosis in human promyelocytic leukaemia cells *in vivo*-plumbagin, a naphthoquinone from the roots of *P. zeylanica* is known to possess anticancer and anti- bacterial Action. The results showed that i.p. injection of plumbagin (2 mg/kg body weight) daily for 3 weeks resulted in a 64.49% reduction of tumor volume compared with the control. These results indicate that plumbagin has potential as a novel therapeutic agent for myeloid leukemia.^[14]

Anti-bacterial Action of *P. zeylanica* roots on some pneumonia causing pathogens. The anti-bacterial Action of polar (aqueous) and non-polar (pet. Ether) extracts was prepared from the roots of *P. zeylanica*. Minimum inhibitory concentration value of this particular compound showed comparative Action resembling the commonly used broad spectrum antibiotic, tetracycline.^[15]

Antiviral Action

Antiviral Action of some Ethiopian medicinal plants used for the treatment of dermatological disorders. In this study, the antiviral Action of the 80% methanolic extracts of *Acokanthera schimperi*, *Euphorbiae schimperi*, *Inula confertiflora*,

Mutinus elegans, and *P. zeylanica* plants have been examined against cox-sackievirus B3 (CVB3), influenza A virus and herpes simplex virus type1 Kupka (HSV-1) using cytopathic effect (CPE) inhibitory assays in HeLa, MDCK, and GMK cells, respective lym CVB3 was inhibited by the extracts of *P. zeylanica* and HSV-1 by *I. confertiflora*.^[16]

Antiplasmodial Action

Study carried out in-vitro screening of Indian medicinal plants for antiplasmodial properties against Plasmodium falciparum. Of 80 analysed ethanol extracts, from 47 species, significant effects were found for 31 of the extracts one of that was *P. zeylanica*.^[17]

Anticonvulsant Action

Study on pharmacological and clinical therapeutically uses of Ayurvedic medicinal plants, one of which was *P. zeylanica*. Leaf extract of this plant were evaluated for anticonvulsant Action using PTZ induced convulsion and maximum electro shocked induced convulsion. It was found that extract has no anticonvulsant Action.^[18]

Antioxidant Action

In vitro antioxidant Action and total phenolic content of methanolic extracts of *P. zeylanica* (root), *A. calamus* (rhizome), *H. indicus* (stem) and *H. antidysenteryka* (bark). The order of antioxidant potential according to FTC assay was found to be highest in *P. zeylanica*.^[19]

Antiarthritic Action

The role of an ethyl acetate fraction of the root extract of *P. zeylanica* in Its antiarthritic Action in collagen type II-induced arthritis in DBA/1 mice and in the suppression of humoral antibody and stimulation of T cell mediated responses. PZE-6 suppressed collagen type II-induced arthritis in DBA/1 mice in a dose-dependent manner. In addition, the treatment With *P. zeylanica* stimulated Con A induced T-cell proliferation to normal levels in arthritic mice.^[20]

Wound healing Action

Wound healing effects of *H. indicum*, *P. zeylanica* and *A. indica* in rats. The ethanolic extracts of *H. indicum*, *P. zeylanica* and *A. indica* were evaluated for their wound healing Action in rats. *H. indicum* possesses better wound healing Action than *P. zeylanica* and *A. indica*.^[21]

Anti-inflammatory Action

Experimental study to evaluate anti-inflammatory Action of *Phyllanthus emblica*, *P. zeylanica* and *C. rotundus* in acute models of inflammation, namely carrageenan induced rat paw edema and acetic acid induced peritonitis in mice. In carrageenan induced paw oedema, *P. emblica*, *P. zeylanica* and *C. rotundus* showed a trend to reduce the oedema while the combination of *P. emblica* + *P. zeylanica* (PI: 20.64%) showed results comparable to aspirin (23.74%). Whereas in a model of acetic acid induced peritonitis, all the plant drugs, that is, *P. emblica*, *P. zeylanica*, *C. rotundus* and a combination of *P. emblica* + *P. zeylanica* showed a significant decrease in the protein content of the peritoneal exudates compared with the disease control group ($p < 0.05$).^[22]

Hyperlipidaemic Action

Effect of *P. zeylanica* in hyperlipidaemic rabbits and Its modification by vitamin E. There was significant reduction in serum total cholesterol, LDL cholesterol and triglyceride levels. Marked reduction was observed with the formulation of *P. zeylanica* and vitamin E. The total cholesterol/HDL and LDL/HDL cholesterol ratios were found significantly ($p < 0.01$) decreased.^[23]

Blood coagulation Action

The structure of *Plumbago zeylanica* active principle compound is similar to that of vitamin K. The *P. zeylanica* extract (2 mg/kg body weight) and naphthoquinone (2mg/kg body weight) given to individual groups were screened for Its effect on bleeding time (BT), clotting time (CT), prothrombin time (PT), platelet count and platelet adhesion in albino rats after 1-day, 15-day and 31-day treatment. There was no change observed in treated groups and control group but the platelet

adhesion was significantly decreased in *Plumbago zeylanica* and naphthaquinone-treated animals.^[24]

DISCUSSION

In this article reviews that Chitraka (*Plumbago zeylanica* Linn.) is used for centuries in Ayurvedic medicine for the treatment of various disease. It is also known as Agni. It's all synonyms are related to Agni. It useful in diseases of digestive system, such as Grahani, Arsha, Pandu, Kushta, Krimi, act as Dipan, pachana.

The traditional knowledge, medicinal uses, pharmacological and therapeutic applications of the plant *Plumbago zeylanica* L. Described. It content active chemical constituent such as plumbagin, Chitrane, zeylanone and many useful naphthaquinone as a multi-purpose medicinal uses.

CONCLUSION

The evidence presented in this review has showed that *Plumbago zeylanica* L. has great potential to be used medical practice for the treatment and management of various metabolic, hepatotoxic, diabetes, inflammation, viral, cancer and other disease complications.

REFERENCES

1. Kirtikar KP, Basu BD Indian Medicinal Plants. Jayyed Press, New Delhi, 2nd ed-4, 1975; 532.
2. Anonymous The Wealth of India. Publication and Information directorate. CSIR. New Delhi, 1989; 3: 163-164.
3. Bhattacharjee SK Handbook of Medicinal Plants. Pointer Publishers, 1998; 274.
4. Mittal V, Sharma SK, Kaushik D, Khatri M, Tomar K A comparative study of analgesic activity of *Plumbago zeylanica* Linn. callus and root extracts in experimental mice. Res. J. Pharm. Biol. Chem. Sci., 2010; 1: 830-836.
5. Dravyaguna vidnyana, Dr.J.L.N. sastry, vol.2. Reprint edition. Varanasi: Chaukhamba Orientalia, Varanasi, 2014; 314.
6. Sharma PC, Yelne MB, Dennis TJ, Database on Medicinal Plants Used in Ayurveda and Central Council For Research In Ayurveda & Siddha, Janakpuri, New Delhi Reprint, 2005.
7. Mishara Bhava, Commentary by Chunekar Krishanachandra, Edited by Pandey Gangasahaya, Bhavprakash Nighantu, Chaukhamba Bharati Academy, Varanasi, Reprint, 1999.
8. Sharma P.V. Dravya Guna Vigyana, Chukhambha Bharati Academy, Varanasi, Reprint, 2003; (2).
9. Smita S. Chaudhari, G.S.Chaudhari, A Review on *Plumbago zeylanica* Linn.-A Divine Medicinal Plant, int.j.pharm.sci.Rev. Res., 30(2); 20: 119-127.
10. Gupta A.K.Tendon Neeraj, Sharma Madhu. Quality standard of Indian Medicinal Plant, Indian Council of Medical Research, New Delhi, 2008; (7): 221.
11. Pandey Gyanendra. Dravyaguna Vigyana, Chaukhamba Krishanadas Academy, 2004; (1).

12. The Ayurvedic Pharmacopoeia of India. 1st Edition. New Delhi; Government of India, Ministry of Health and Family Welfare, Department of health, 1989; 1(1): 29.
13. Nighantu Adarsh, first volume, Shree Bapalal Vaidhya, Chaukhambha publication, Varanasi, Third edition, 2002; 797-798.
14. Xu KH, Lu DP Plumbagin induces ROS-mediated apoptosis in human promyelocytic leukemia cells in vivo. *Leuk Res*, 2010; 34: 658-665.
15. Lemma H, Debella A, Addis G, Kunert, Geyid A, Teka F, Yersaw K Anti-bacterial activity of *Plumbago zeylanica* L. roots on some pneumonia causing pathogens. *Ethiop. J. Sci.*, 2002; 25: 285-295.
16. Neubert R. Schmidt PC, Wutzler P, Schmidtke M Antiviral activities of some Ethiopian medicinal plants used for the treatment of dermatological disorders. *J. Ethnopharmacol.*, 2006; 104: 182-187.
17. Simonsen HT, Nordskjold JB, Smitt UW, Nyman U, Palpu P, Joshi P, Varughese G In vitro screening of Indian medicinal plants for antiplasmodial activity. *J. Ethnopharmacol.*, 2001; 74: 195-204.
18. Vishnukanta 1, Rana AC Evaluation of anti-convulsant activity of *Plumbago zeylanica* Linn leaf extract. *Asian J. Pharm. Clin. Res.*, 2010; 3: 76-78.
19. Zahin M, Aqil F, Ahmad I The in-antioxidant activity and total phenolic content of four Indian medicinal plants. *Int. J. Pharma. Pharm. Sci.*, 2009; 1: 89-95.
20. Poosarla, Athota RR. Alleviation of Collagen-induced Arthritis by *Plumbago zeylanica* in Mice. *Pharma. Bio.*, 2007; 45: 54-59.
21. Reddy JS, Rao RP, Reddy MS Wound healing effects of *Heliotropium indicum*, *Plumbago zeylanica* and *Acalypha indica* in rats. *J. Ethnopharmacol.*, 2002; 79: 249-251.
22. Dang GK, Parekar RR, Kamat SK, Scindia AM, Rege NN Antiinflammatory activity of *Phyllanthus emblica*, *Plumbago zeylanica* and *Cyperus rotundus* in acute models of inflammation. *Phytother Res.*, 2011; 25(6): 904-908.
23. Alpana R. Effect of *Plumbago zeylanica* in hyperlipidaemic rabbits and Its modification by vitamin E. *Indian J. Pharmaco.*, 1996; 28: 161-166.
24. R. Vijayakumar, M. Senthilvelan, R. Ravindran, R. SheelaDevi, *Plumbago zeylanica* action on blood coagulationprofile With and Without blood volume reduction, *Vascular Pharmacology*, 2006; 45(2): 86-90.
25. Yuvaraj D. Mandavkar and Sunil S. Jalalpure, A comprehensive review on *Plumbago zeylanica* Linn, 2011; 5(25): 2738-2747.