A Review on Medicinal Uses of *Bauhinia Variegata Linn.*

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ABSTRACT

Bauhinia variegata Linn (Mountain Ebony) is a medium-sized, deciduous tree, found all through India, climbing to a height of 1,300 m in the Himalayas. The plant is generally utilized by the tribals all through India and mainstream in different indigenous frameworks of drug like Ayurveda, Unani what's more, and Homeopathy. Taking after the different conventional claims on utility of this plant in curing number of sicknesses, significant endeavors have been made by scientists to confirm its utility through pharmacological screenings. The medicate has been depicted as Grahi, Krimighna, Kushtaghna, Gandamalanashaka, Vranaropaka, Mehaghna and Raktapittashamak. Impressive endeavors have been made by specialists to concentrate the concoction and organic capability of the plant. The detailed pharmacological exercises of Bauhinia variegata Linn. are hostile to diabetic, against ulcer, hostile to oxidant, nephroprotective, hostile to growth, hepatoprotective, calming, immunomodulatory, hostile to microbial, hostile to bacterial. Kanchanara is one of the real element of numerous essential plans utilized as a part of Ayurveda arrangement of pharmaceutical, for example, Kanchanara Guggulu, Kanchan gutika, Gandamala kundan rasa, Gulkand Kanchanara and Kanchanaradi Kwatha,Ushirasava, Chandanasava, Vidangarishta, Kanchanara drava, Kanchnara Varuna Kwatha.

Keywords – Bauhinia variegata, Pharmacological Activities, chemical constituents, medicinal uses

INTRODUCTION

Distinctive types of Bauhinia are referred to and utilized as Kanchnara in Indian arrangement of Medicine. Watt has depicted Bauhinia variegata Linn. As Rakta Kanchnar and Bauhinia racemosa Linn. As Shveta Kanchnar while in Bhavaprakash, other than Bauhinia variegata Linn., Bauhinia purpurea Linn., Bauhinia tomentosa is additionally said under Peeta Kanchnar.(Watt,1972; Bhavamisra, 2006).The family Bauhinia Linn. (Caesalpiniaceae) comprises of bushes or trees, once in a while climbers, dispersed all through the tropical areas of the world. Around 15 types of this family happen in India (Kirtikar and Basu ,1999). Bauhinias are essentially engendered from seeds; vegetative proliferation but inarching has not demonstrated much achievement. Numerous mechanically helpful items, for example, tannins, fibre, gum and oil are gotten from Bauhinia species. The plants bear fragrant and lovely blossoms and the greater part of the species are developed for decorative purposes. Bauhinias are additionally developed for afforestation and the make of wood fleece board (Puntambekar,1957). Among these, B tomentosa Linn, B racemosa Lam, B retusa Roxb, B purpurea Linn, B variegata Linn and B malabarica Roxb. Discovered wide application in conventional frameworks of drug (Daniel,2006).

Botanical Origin (Kirtikar and Basu,1994)
Bauhinia variegata Linn. Bauhinia purpurea Linn., Bauhinia tomentosa Linn.
Family: Caesalpinaceae

Taxonomy (Prakash et al.2014)

Kingdom	Plantae
Class	Dicotyledone
Subclass	Polypetalae
Series	Calyciflorae

How to cite this article: Singh A, Singh N, Pabla D; A Review on Medicinal Uses of Bauhinia Variegata Linn.; PharmaTutor; 2019; 7(6); 12-17; http://dx.doi.org/10.29161/PT.v7.i6.2019.12

Order	Rosales
Family	Caesalpiniaceae
Genus	Bauhinia
Species	ariegata

Vernacular Names(Lucas and Vijnana,2013)
Languages: - Vernacular Names
Sanskrit: - Kovidara
English:-Mountain ebony, Buddhist bauhinia
Hindi: - Kachnar, Kaniar
Marathi:-Raktakanchan
Gujarati: - Kovindara
Punjabi:-Kanchan
Kannada:- Kempumandara
Telgu ;-Devakanchanum
Tamil;-Sigappu mandaraii
Urdu:-Kachnal
Oria :-Kosonaro
Kashmiri:-Kanchana
Bengali:-Raktakanchana
Assami :-Shonapushpaka
Malayam:-Kovidaram, Suvarnnamandaram

Table 1: Chemical Constituents of *Bauhinia variegata* Linn

Root	Flavanone. dihydrodibenzoxepin. flavanol glycoside-5. 7. 3'. 4' - tetrahydroxy-3-methoxy-7-O-alpha-L-rhamnopyranosyl (l -3)-O-betagalactopyranoside (Mopuru *et al.*, 2003). (2S)-5.7-dimethoxy- 3’4’-methylenedioxyflavanone. dihydrodibenzoxepin. 5.6-dihydro- 1.7-dihydroxy-3.4-dimethoxy-2-methyldibenz [b,f]oxepin
Stem	5, 7-Dihydroxy flavanone - 4'-O-a- L-rhamnopyranosyl b-D- glucopyranoside (Gupta et al., 1979), 5, 7 - dihydroxy and 5,7 dimethoxy flavanone-4-O-a-L-rhamnopyranosyl-b-D-glucopyranosides (Gupta et al.,1979), hentriacontane, octacosanol, sitosterol. Stigmasterol (Prakash and Khosa. l978), neringenin-5,7-dimethylether-4'-rhamnoglucoside, lupeol (Gupta et al., l980), 5,7,3',4'-tetrahydroxy-3-methoxy-7-O-alpha-L-rhamnopyranosyl (l->3)-O-beta-galactopyranoside (Yadava et al., 2003), 2,7-dimethoxy-3-methyl-9,l0-dihydrophenanthrene -l,4-dione named as bauhinione
Flowers	Quercitroside. Isoquercitroside, rutoside, taxifoline rhamnoside, kaempferol-3-glucoside, myricetol glycoside (Duret and Paris, l977), apigenin-7-O-glucoside, quercetin, rutin, quercetrin (Abd-El-Wahab et al.,1987), apigenin, ascorbic, aspartic, glutamic, octadecanoic acid, keto acids, amino acid, tannins (Chowdhury et al., 1984), cyaniding-3-glucoside, malvidin-3-glucoside, malvidin-3-diglucoside, peonidin-3-glucoside, peonidin-3-diglucoside, 3-galactoside and 3-rhamnoglucoside of kaempferol

TRADITIONAL USES OF *BAUHINIA VARIEGATA* LINN (NADKARNI, 2005; CHANDRA ET AL., 2007; GUPTA,2012; AMBIKADATTA AND SAMHITA,2005; HRIDYAM,2014)..

- Charak has shown powder of its blossom to be licked with nectar to check draining disarranges.
- Charak has shown utilization of Kovidara alongside different medications as Khad yusha for curing draining heap
- Acharya Charak has additionally specified about the utilization of Karbudara and different medications like Yava, Tila, Upodika as Niruha Vasti to cure Parisrava
- Acharya Charak has additionally specified about the utilization of Karbudara and different medications like Aadhki, Kadam and Vidula as Vasti to cure Parikartika
- Kanchnara bark included with three myrobalans or Triphala and Pippali churna is suggested in Gandamala and also Galganda (Goiter). Kanchnara bark beat in rice water can likewise be given for curing Gandamala. Kanchnara guggul is additionally a noticeable definition in Indian solution which is habitually regulated for treatment of Galaganda, Gandamala, Granthi and other associated diseases72. In Siddha solution, one of its critical pharmaceutical arrangement is Mantharai Kudineer and it is utilized for Vata issue and Skin maladies.
- Sushruta has likewise proposed the utilization of powder of Madhuka, Shobhanjan, Kovidara and Priyangu for curing draining scatters (Raktapitta)

- Decoction of the bark of Kanchnara with powder of Shunthi included with part of nectar can cure scrofula (Gandamala) which is enduring from quite a while.
- Soup of blooms of Kovidara and Karbudara alongside blossoms of Sana, Shalmali, Dhatki, and Padma is cooked with Dadima without oil and is given in Asrigdara, Raktapitta, Daha and maladies of eye and midriff.
- A wash produced using the bark with the expansion of concentrate of Acacia Pods and Pomegranate blooms is a cure in salivation and sore throat and decoction of buds in hack, draining heaps, haematuria and menorrhagia. Dried buds are additionally valuable in looseness of the bowels, worms, heaps and diarrhea.

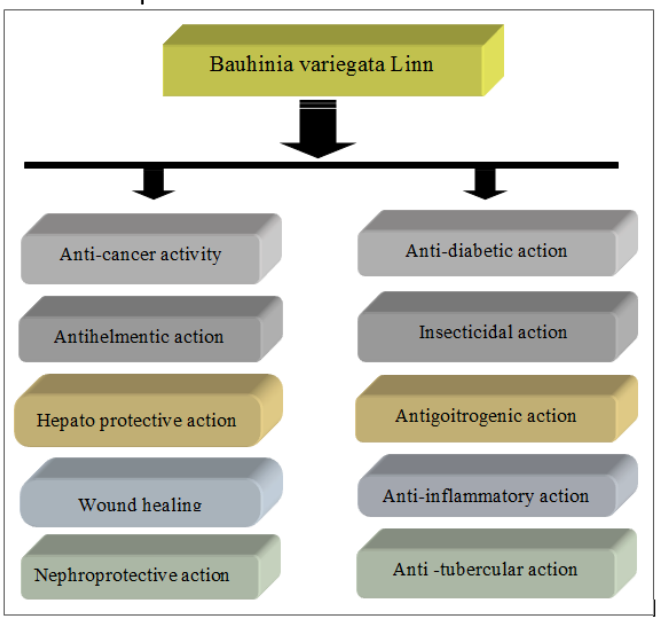

Figure 1: Pharmacological Activities of *Bauhinia variegata* Linn.

PHARMACOLOGICAL ACTIVITIES

Hepatoprotective effect: The ethanolic concentrate of the stem of B. variegata demonstrated chemoprevention against N-nitrosodiethylamine prompted test liver tumor in rats. Ethanolic extricate smothered liver tumor incited by N nitrosodiethylamine as uncovered by reduction in N-nitrosodiethylamine initiated raised level of serum glutamate pyruvate transaminase, serum glutamate oxaloacetate transaminase, basic phosphatase, add up to bilirubin, gamma glutamate Trans peptidase, lipid peroxidase, glutathione peroxidase and glutathione-S-transferees. The ethanolic concentrate of the stem bark of B. variegata (at the dosage of 100 and 200 mg/kg orally) demonstrated Hepatoprotective movement against carbon tetrachloride incited hepatotoxicity in rats, it diminished the level of AST, ALT, ALP and GGTP (Surendra and Alpana,2000).

Effect on wound healing: Extraction and entry point twisted models in pale skinned person Wistar rats, were utilized to assess the injury recuperating movement of the ethanolic and fluid concentrates of foundation of Bauhinia variegata at measurements of 200 and 400 mg/kg bw. Both fluid and ethanolic concentrates of foundation of Bauhinia variegata at both measurements created noteworthy injury recuperating by extraction and cut injury models, which was equivalent to that of standard (framycetin) in extraction wound model (Azevedo,2006).

Anti-cancer activity: An in vitro examine uncovered that Bauhinia variegata remove demonstrated hostile to tumor movement by restraining the development of these cell lines47. Another review found that methanolic concentrate of Bauhinia variegata leaves at measurement of 300, 600 and 900 mg/kg in cyclophosphamide-initiated mutagenesis in bone marrow cells of mice demonstrated ant mutagenic activity by keeping the arrangement of micronucleus and chromosomal aberrations(Bairagi et.,2012).

Anti-diabetic action: Oral organization of ethanolic, fluid and hydro-alcoholic concentrate of leaves and stem bark of Bauhinia variegata at various dosages i.e 200 and 400 mg/kg in streptozotocin (STZ) and alloxan-initiated diabetic rats lessened the raised blood glucose level by expanding glucose metabolism (Azevedo,2006).

Anti-helmintic activity: Watery and Chloroform concentrate of bark of B. variegata were examined for their hostile to helmintic action against Pheretima posthuma and Ascardia galli. All extricates displayed a measurements subordinate (25, 50what's more, 100 mg/ml) hindrance of unconstrained motility (loss of motion) and time of death of the worms. Remove gotten from bark not

just murdered the Pheretima posthuma additionally murdered the Ascardia galli. The perceptions were tantamount with standard medication piperazine citrate at a centralization of 20 mg/ml and refined water as control. Most extreme vermicide action was appeared by both concentrate at the centralization of 100 mg/ml. From the test performed, it can be said that the watery and chloroform concentrate of bark of B. variegata bearing a potential anthelmintic action (Bairagi et.,2012).

Insecticidal activity: Plant extract act as an effective measure for controlling insect pest like Plutella xylostella. B. variegata var. candida is a promising source of edible wild vegetable flowers with plenty of nutrients. This plant may serve as a potential source for low cost proteins. The tree is susceptible to 'Brown Root Rot' caused by Phellinusnoxius80. The abundance of phytophagousmites is higher, being Lorryia Formosa Cooreman the dominant species (Ragrigo et.,2007).

Anti-arthritic: Investigation of anti-arthritic activity of ethanolic extract of B. variegata by the oral administration of ethanolic extract at the tested dose level of 250 mg/kg on complete Freund's adjuvant (CFA) induced arthritis in rat for 15 days. At the end of 15 days, the rats were sacrificed, their blood was collected and then serum was separated. After that various parameters such as alanine amino transferase (ALT), alkaline phosphatase (ALP), total cholesterol and triglycerides were estimated. In the level of various antioxidant enzymes were also evaluated in liver and kidney of normal, arthritic control and extract treated rats such as catalase, glutathione peroxidase (GPx), superoxide dismutase (SOD) and lipid peroxidase (LPO). The result of these studies shows that administration of this significantly Paw Edema volume in rat and altered the biochemical parameters and also level of various antioxidant enzymes which got affected in arthritic rats. From this study, it was concluded that the ethanolic extracts of this plant showed significant antiarthritic effect in rats (Rajkapoor et.,2007; Bodake and Ram, 2007).

Anti-oxidant activity: An alternate some portion of B. variegata has been accounted for to contain quercetin, rutin, apigenin and epigenin 7-O-glucoside. Flavonoid and quercetin are powerful cancer prevention agents and known to balance the exercises of different protein frameworks due to their collaboration with biomolecules. Ethanolic and watery concentrates of B. variegata root created noteworthy cancer prevention agent action completed by in-vitro rummaging of free radicals utilizing 1, 2- diphenyl1-2-picrylhydrazyl (DPPH), nitric oxide and superoxide53. It might be the flavonoids and other phyto chemicals exhibit in the plant extracts. Ethanolic remove created essentially more prominent cell reinforcement movement than other extracts. In vitro cell reinforcement and free radical searching potential are of methanolic concentrates of B. variegata 50. Diverse parts of B. variegata like leaf, bark and blooms have free radical searching movement by hydroxyl radical searching technique. All concentrates have diverse level of cell reinforcement action. Among all concentrates methanol was found to be great dissolvable for extraction and having great cell reinforcement activity (Maldonadu et al.,2003; Rajani and Ashok,2009; Patil et al.,2010).

Anti-ulcer activity: Ethanolic concentrate of stem bark of B. variegata demonstrates the counter ulcer movement against gastric ulcer prompted by pyloric ligation and ibuprofen instigated ulcer demonstrate in rats. Ethanolic extricate the volume of gastric discharge, add up to, free corrosiveness and ulcer record regarding control which increment amid ulcer (Rajkapoor et al.,2003).

Antigoitrogenic: Ethanolic concentrates of B. variegata demonstrates antigoitrogenic movement against neomercazole instigated goiter. From these considers, it was presumed that ethanolic concentrate of B. variegata demonstrated huge antigoitrogenic movement at the dosage of 200 mg/day (Srivastava et al.,1985).

Nephroprotective: The nephroprotective movement of the ethanolic concentrate of Bauhinia variegata (Linn.) entire stem against cisplatin-prompted nephropathy was researched by an in vivo technique in rats. Treatment with the ethanol concentrate of Bauhinia variegata at the dose level of 400 mg/kg body weight for 14 days altogether limited the serum level of creatinine and urea, diminished pee

creatinine and egg whites with a critical weight pick up, and expanded pee yield at the point when contrasted and the poisonous gathering. The histological harms in the Bauhinia variegata remove treated gathering were insignificant as opposed to the harmful rats(Panda et al.,2011).

Anti-inflammatory effects: Phytochemical examination of non woody flying parts of Bauhinia variegata yielded 6 flavonoids with one triterpene caffeine. These seven mixes demonstrated calming action, they hindered the lipopolysaccharides and interferon γ prompted nitric oxide (NO) and cytokines (Koteswara et al.,2008).

Anti-tubercular activity: The clinical reviews have uncovered that arrangement of stem bark of Bauhinia upgrade the impact of Anti – tubercular medications utilized as a part of instance of Tubercular Cervical Lymphadenitis(Dixit,1967)

CONCLUSION

In this review study on the phytochemical and different pharmacology properties provide the information about the uses of this plant in various medicines.

Conflict of interest: None

Acknowledgment: Author is grateful to the colleague and friends.

REFERENCES

1. Azevedo C.R., Maciel F.M., Silva1 L.B., Ferreira A.T.S, Cunha M.D., Machado O.L.T., Fernandes K.V.S, Oliveira AEA, Filho JX(2006); “Isolation and intracellular localization of insulin-like proteins from leaves of Bauhinia variegate”; Brazilian J Medical Bio Res;39;1435-1444.
2. Bairagi, S.M., Aher, A.A. and Nimase, P.K.(2012); “In vitro anthehelmintic activity ofBauhinia variegata bark (Leguminosae)”.International J of Pharmacy andPharmaceutical Sciences, 4(3); 672-674.
3. Bodake, S.H. and Ram, A. (2007); “Hepatoprotective properties of Bauhinivariegata bark extract”; The Pharmaceutical Society of Japan”; 127(9); 1503-1507.
4. Daniel M. (2006) Medicinal Plants: Chemistry and Properties. Science Publishers, Enfield. 166.
5. Dixit B.S. 1967, Effect of Kanchanara Guggulu in Gandamala in children, Dept. of Prasuti Tantra, BHU.
6. Dr. K.M. Nadkarni, Indian Materia Medica(2005) Vol. 1, Second edition, Revised and enlarged by A.K. Nadkarni, Publisher Bombay Popular Prakashan; pp.184.
7. Dr. Prakash L. Hegde and Dr. Hurini A(2014); A Text book of Dravyaguna Vijnana, Volume II, New Delhi: Chaukhamba Publications, 1st Edition, Print:pp. 440.
8. Kailash Chandra, B.G. Chaudhari, B.P. Dhar, G.V.R. Joseph, A.K. Mangal, Rajesh Dabur, Tushar K. Mandal, S.P. Singh(2007) Database on medicinal plants used in Ayurveda, Volume 8, CCRAS, Dept. of Ayush, Ministry of Health and Family welfare, Govt. of India, Print;pp. 159.
9. Kirtikar K.R., Basu B.D (1994); Indian Medicinal Plants, Edited by E. Blatter, J.F. Caius and K.S. Mhaskar, Vol. 2, Dehradun: International book distributors;pp. 892
10. Kirtikar KR., Basu B.D (1999); Indian Medicinal Plants.Vol I, International Book Distributor, ehradun; 892-901.
11. Koteswara RY, Shih-Hua F and Yew-Min T(2008); “Anti- inflammatory activity of flavanoids and a triterpene caffeate isolated from Bauhinia variegate”; Phytotherapy Research; 22; 957-962.
12. Maldonadu P.D., Barrera, D., Rivero I.,Mata, R., Copos, O.N. and Pando, R.H (2003); “Antioxidant S-alIlcystein preventsgentamicin- induced oxidative stress and renaldamage”. Bio. Med; 35; 317-324.
13. Panda P.K., Pani S.R., Mishra S. and Sahoo,S. (2011); “Nephroprotective effect of Bauhinia variegata (Linn.) whole stem extractagainst cisplatin-induced nephropathy in rats”;.Indian Journal of Pharmacology; 43(2); 200-202.
14. Patil J.K., Jalalpure S.S., Hamid S. andAhirra R.A. (2010); “In vitro immunomodulatory activity of extracts of Bauhinia variegata Linn. stem bark on human neutrophils”; Iranian J. of Pharmacology and Therapeutics; 9; 41-46.

15. Prof. D. Shanth Kumar Lucas, Dravyaguna Vijnana (2013); Vol, 2, Varanasi: Chaukhambha Visvabharti, Reprint: p.146.
16. Puntambekar PR. (1957) Review on Bauhinians. Indian Forestry; 78, 39-44.
17. Ragrigo D.D., Reinaldo J.F.F. and Renato,B. (2007); "Mites (Acari: Arachnida) associated with Bauhinia variegata L.(Leguminosae) in Northeast of state of SaoPaulo"; Neotropical Entomology;36(2); 322-325.
18. Rajani P.G. and Ashok P (2009); "In vitroantioxidant and antihyperlipidemic activities of Bauhinia variegata Linn"; Indian J. Pharmacol; 41(5); 227-232.
19. Rajkapoor B., Jayakar B. and Murugesh, N.(2003); "Antitumour activity of Bauhiniavariegata on Dalton's ascetic lymphoma" J.Ethanopharmacology; 89; 107-109.
20. Rajkapoor B., Raichandran V., Gobinath,M, Anbu J. and Harikrishnan, N. (2007); "Effect of Bauhinia variegata on completefreund's adjuvant induced arthritis in rats"; J.Pharmacol Toxicol, 2; 465-72.
21. Sahu G, Gupta P(2012); "A Review On Bauhinia Variegata Linn"; International Research Journal of Pharmacy;3(1); ISSN: 2230-8407.
22. Sharma RK. Pharmacological evaluation of Bauhinia variegate Linn. for wound healing and nephroprotective activity. MSc thesis, Rajiv Gandhi University of Health Sciences, Karnataka 2010
23. Shastri-Ambikadatta - Sushruta Samhita(2005) part II, Varanasi: Chaukhamba Sanskrit Sansthan – Uttara sthan chapter 45; pp. 391.
24. Shri Bhavamisra, Bhavaprakasha Nighantu, Commentary by Prof. K.C. Chunekar, Edited by Late Dr. G.S. Pandey, Varanasi: Chaukhambha Bharati Academy, Reprint: 2006; p. 338.
25. Singh K.L, Singh D.K, Singh VK (2012); "Characterization of the molluscicidal activity of Bauhinia variegata and Mimusops elengi plant extracts against the Fasciola vector Lymnaea acuminate"; Rev. Inst. Med. Trop. Sao Paulo; 54(3);135-40.
26. Srivastava U.S., Jaiswal, A.K. and Abidi, R.(1985); "Juvenoid activity in extracts of certainplants"; Current Sciences;12; 576-78.
27. Surendra B.H. and Alpana R(200); "Hepatoprotective properties of Bauhinia variegata bark extract";The Pharmaceutical Society of Japan; 127(9);1503-1507.
28. The Ayurvedic Pharmacopoeia of India, Part I, Government of India, Ministry of health and family welfare, Dept. of ISM and H, New Delhi, vol. I, 2001.p.56.
29. Vagbhata, Ashtanga Hridyam, Commentary by Kaviraja Atrideva Gupta, Edited by Vaidya Yadunandana Upadhyaya, Varanasi: Chaukhambha Prakashan, Reprint: 2014; p.468.
30. Watt, G (1972); Dictionary of Economic products of India, Vol. I; Delhi; pp. 425-426.