Review Article

www.ijrap.net

KOKILAKSHA: A POTENTIAL AYURVEDIC HERB

Nikam Dattatrya*, Mundada Shreekant, Mishra Dayashankar
PG Department of Kayachikitsa, National Institute of Ayurveda, Jaipur, India

Received on: 02/08/12 Revised on: 30/10/12 Accepted on: 10/11/12

*Corresponding author
E-mail: drdattatryanikam@yahoo.com
DOI: 10.7897/2277-4343.03616
Published by Moksha Publishing House. Website www.mokshaph.com
All rights reserved.

ABSTRACT
Ayurveda, the science of life, deals with the holistic view of healthy living. It covers various physiology as well as pathology of diseases and also their treatments. Since, Ancient times, several diseases have been treated by administration of plant extracts based on traditional medicine. Investigation of traditionally used medicinal plants thus valuable on two parts-one of them is source of potential chemotherapeutic drugs and second one is as a measure of safety for the continued use of medicinal plants. The whole plant of *Astercantha longifolia* is used in traditional Ayurvedic medicine for the treatment of sexual disorders, inflammatory disorders and urinary disorders.*Astercantha longifolia* mainly contains lupeol, stigmasterol, an isoflavone glycoside, an alkaloid and small quantities of uncharacterized bases. This paper explains the evidence based information regarding the pharmacological activity of this plant. It has many ethno botanical as well as ethno medicinal properties.
KEYWORDS: Ayurveda, Pharmacological action, *Astercantha longifolia,* ethno botanical, ethno medicinal.

INTRODUCTION

Kokilaksha an Ayurvedic herb grows throughout India, in plains, especially in marshy places. It is an erect, annual, growing 1-1.5m in height. It has several synonyms in Ayurvedic texts -Iksura, Srngali, Vajrakantaka, Picchila, Vajra, and Kokila. According to Ayurveda Kokilaksha is sweet and bitter in taste. It is sweet in the post digestive effect and has cold potency. It alleviates vata and pitta doshas and aggravates the kapha doshas.

Kokilaksha whole plant, seeds and kshar are used for traditional medicinal purpose in sexual disorders like premature ejaculation, nocturnal emissions, in urinary disorders like renal stones, urinary incontinence and as anti-inflammatory in rheumatoid arthritis and gout. Also leaves of this plant helps to promote bile secretions and stimulates liver, hence beneficial in Hepatitis and Liver diseases.

The Kshar is best panacea for Ascites and Urinary stones. The whole plant juice reduces burning sensation and quenches the thirst.

Astercantha longifolia have synonyms- *Hygrophila auriculata* (Schumach.) Heine. And *Hygrophila spinosa* T. Anders.

Phytochemistry

Phytochemical studies have shown that the different parts of the *Astercantha longifolia* have different chemical constituents. They are as follows:-

The whole plant contains-

Lupeol, stigmasterol, isoflavone glycoside, alkaloid and small quantities of uncharacterized bases.

The seed contains-

Aasterol I, II, III, and IV, 2.Asteracanthine, 3.Asteracanthicine, 4.Amino acids -histidine, lysine and phenyl-alanine.

The fresh flowers contains-

Apigenin – 7 – 0 – glucoside.[1]

Biological Activity

Kokilaksha have different biological activities as follows-

Antitumor activity

Petroleum ether extract of the roots exhibited antitumor activity in Ehrlich Ascites carcinoma (EAC) - and sarcoma-180 (S-180)–bearing mice. The extract suppressed significantly the tumor fluid volume at the end of a 3 weeks experiment. It decreased about 50% of packed cell volume and increased the life span of EAC/S-180–bearing mice in a day-dependent manner. Red blood cell (RBC) count, hemoglobin content, and white blood cell count significantly increased to normal after extract treatment of the tumor-bearing mice. It also inhibited the rapid increase of the body weight of tumor-bearing mice. This finding supports its traditional use in cancer and blood disorders.[2]

Anti-inflammatory activity

Petroleum ether, chloroform, alcoholic, and aqueous extracts of the leaves of *Astercantha longifolia* were evaluated for their anti-inflammatory effect in Wistar rats of both sexes. The results revealed that chloroform and alcoholic extracts significantly reduced carrageenan-induced rat paw edema in a dose-dependent manner, whereas petroleum ether and aqueous extracts did not show any significant anti-inflammatory activity. The obtained result supports the traditional claim of the plant for its anti-inflammatory properties.[3-5]

Antipyretic activity

Petroleum ether, chloroform, alcohol, and aqueous extracts of *Astercantha longifolia* leaves were evaluated for their antipyretic activity on the basis of their effect on Brewer's yeast-induced pyrexia in rats.[6,7] at doses of 200 and 400 mg/kg. The results showed that chloroform and alcohol extracts have significant antipyretic activity, but petroleum ether and aqueous extracts failed to lower the raised body temperature in rats. Chloroform extract significantly decreased the elevated rectal temperature 3 h after the administration of a dose of 400 mg/kg whereas

the alcoholic extract reduced the hyperthermia at both doses 1 h after administration.[8-10]

Hematopoietic activity

Hematopoietic activity of *Astercantha longifolia* was evaluated using cyclophosphamide-induced anemia in rats. Chloroform extract of the leaves at both 250 and 500 mg/kg doses significantly improves RBC and hemoglobin counts for 7 days and cyclophosphamide-induced bone marrow suppression after 21 days of treatment. It is also found that it increases bone marrow cellularity.[11]

Hepatoprotective activity

Hepatoprotective effect of aqueous extract of *Astercantha longifolia* root in carbon tetrachloride-induced liver damage was studied in albino rats to support the traditional claim. The roots were found to be rich in antioxidants. Liver damage in rats was induced by carbon tetrachloride. To find out the hepatoprotective activity, the aqueous extract of the plant root samples were administered to rats for 15 days. The serum marker enzymes aspartate transaminase, alanine transaminase, and γglutamyl were measured in experimental animals. The increased enzyme levels after liver damage with carbon tetrachloride were nearing normal value when treated with aqueous extract of the root samples. Histopathologic observation also proved the hepatoprotective activity of the root samples. Hepatoprotective activity of *Astercantha longifolia* stem is also reported.[12-15]

In another study, the antihepatotoxic effect with treatment of methanolic extracts of the seeds of this plant was studied on rat liver damage induced by a single dose of paracetamol (3 g/kg, p.o.) or thioacetamide (100 mg/kg, s.c.) by monitoring several liver function tests, namely, serum transaminases (SGOT and SGPT), alkaline phosphatase, sorbitol dehydrogenase, glutamate dehydrogenase, and bilirubin in the serum. Furthermore, hepatic tissues were processed for assay of triglycerides and histopathologic alterations simultaneously. A significant hepatoprotective activity of the methanolic extract of the seeds was observed. These studies support its traditional role as being hepatoprotective.[15]

Diuretic activity

The screening was performed according to the method described by Lipschitz *et al*. Male Wistar albino rats (150–200 g) were used for the experiment. The animals were divided into different groups: the control group received normal saline (25 mL/kg body weight, p.o.); the second group received frusemide (10 mg/kg, p.o.), and other groups received doses of extracts/fractions (200 mg/kg each), in normal saline. The volume of urine collected was measured at the end of 5 h and the total urine volume and concentrations of Na^+, K^+, and Cl^- in the urine were determined. The alcoholic extract of *Astercantha longifolia* at doses of 200 mg/kg showed a significant increase in the total urine volume and concentrations of Na^+, K^+, and Cl^- in the urine in the rats. This finding supports its traditional use as a diuretic.[16,17]

Anti diabetic activity

In 1989, the hypoglycemic activity of *Astercantha longifolia* in human subjects was reported. Treatment of streptozotocine-induced diabetic rats with ethanolic extracts from the aerial parts of *Astercantha longifolia* at doses 100 and 250 mg/kg for 3 weeks showed a significant reduction in the blood glucose levels, thiobarbituric acid reactive substances, and hydroperoxide in both liver and kidney. This also significantly increased the glutathione, glutathione peroxidase, glutathione S-transferase, and catalase, which is comparable to those of the control group. This study shows the antidiabetic activity along with potent antioxidant potential in diabetic conditions. It is useful in treating diabetes as per the traditional system.[18]

Antihelminthic activity

Petroleum ether, chloroform, alcohol, and aqueous extracts of leaves of *Astercantha longifolia* in different concentrations (25, 50, 100 mg/mL in 1% Tween 80 in normal saline) were evaluated for anthelminthic activity. The results revealed that the alcoholic extract produced significant anthelminthic activity, whereas chloroform and aqueous extract showed moderate activity and petroleum ether extract is having the least anthelminthic activity.[19]

Antibacterial activity

The antibacterial activity of petroleum ether, chloroform, alcohol, and aqueous extracts of leaves of *Astercantha longifolia* were evaluated using disc-diffusion method. At a concentration of 100 mg/disc showed a significant increase in the diameters of the zone of inhibition (mm) for *Escherichia coli* (NCIM No. 2341), *Staphylococcus aureus* (NCIM No. 2654), *Bacillus subtilis* (NCIM NO. 2195), and *Pseudomonas aeruginosa* (NCIM No. 2914) in Petri dishes. This finding confirms its traditional use in bacterial infection.[20,21]

Analgesic activity

Analgesic activity of *Astercantha longifolia* leaves was studied using hot plate and tail flick by thermal method and acetic acid-induced writhing test in chemical method in mice. The petroleum ether, chloroform, alcohol, and aqueous extracts of leaves at a dose of 200 and 400 mg/kg of b.w. significantly increased the pain threshold of mice toward the thermal source in a dose-dependent manner and also inhibited the abdominal constriction produced by acetic acid. This reveals its analgesic activity by central as well as peripheral mechanisms.[22]

Antimotility

The petroleum ether, chloroform, alcohol, and aqueous leaf extracts of *Astercantha longifolia* at a dose of 200 and 400 mg/kg showed a dose dependent decrease in the distance traveled by charcoal meal through the gastrointestinal tract. This supports its traditional role in the treatment of diarrhea and dysentery.[23,24]

Antioxidant activity

Phytochemicals of *Astercantha longifolia* have been shown to possess significant antioxidant properties that may be associated with lower incidence and lower mortality rates of degenerative diseases in human.[31] Various *In vitro* and *In vivo* antioxidant activities have been carried out on various extracts of different parts of *Astercantha longifolia*. The root extracts showed the presence of the nonenzymatic antioxidants, total phenols, flavonoids, and tannins. This finding suggests its possible use in diseases in which free radicals plays an important role.[26]

CONCLUSION

In this review, the pharmacological studies conducted on *Astercantha longifolia* indicate the immense potential of this plant in the treatment of conditions, such as diarrhea; inflammatory ailments, including liver and kidney disorders, as well as microbial and bacterial infections; cancer, and others. Regarding the plant, the studies indicate that this has an important antioxidant activity due to the presence of water-soluble compounds with potent free radical-scavenging effects. As the global interest toward traditional medicines over the conventional treatment is increasing, due to safe and well-tolerated remedies provided by them for the chronic illness with lesser side effects, this review concludes *Astercantha longifolia* as a potentially safe and effective plant that has important medicinal values and benefits.

REFERENCES

1. Dr.K.C.Chunekar, Guduchyadivarga, Bhavprakasha Nighantu, Chaukamba Sanskrit Sansthan, Varanasi, 2009, p 417
2. Mazumdar UK, Gupta M, Maiti S, Mukherjee D. Antitumor activity of *Hygrophila spinosa* on Ehrlich ascites carcinoma and sarcoma-180 induced mice. Indian J Exp Biol. 1997; 35:4737
3. Patra A, Murthy PN, Jha S, Aher VD, Chattopadhyay P, Panigrahi G, et al. Anti-inflammatory and antipyretic activities of *Hygrophila spinosa* T.Anders leaves (Acanthaceae) Trop J Pharm Res.2009;8:133–7 http://dx.doi.org/10.4314/tjpr.v8i2.44521
4. Borgi W, Ghedira K, Chouchane N. Antiinflammatory and analgesic activities of *Zizyphus lotus* root barks. Fitoterapia. 2007; 78: 16–9 http://dx.doi.org/10.1016/j.fitote.2006.09.010 PMid:17107758
5. Lipschitz WL. Activity on urinary tract. In: Vogel HG, Vogel WH, editors. Drug Discovery and Evaluation. New York: Verlag Berlin Heidelberg Springer; 1997. p. 390–417
6. Ahmed N, Hussain KF, Sarfaraj M, Zaheen M, Ansari H. Preliminary studies on diuretic effect of *Hygrophila auriculata* (Schum) Heine in rats. Int J Health Res. 2009;2:59–64
7. Vijayakumar M, Govindarajan R, Rao GM, Rao CV, Shirwaikar A, Mehrotra S, et al. Action of *Hygrophila auriculata* against streptozotocin-induced oxidative stress. J Ethnopharmacol. 2006; 104: 356–61. http://dx.doi.org/10.1016/j.jep.2005.09.030 PMid:16289604
8. Patra A, Murthy PN, Jha S, Aher VD, Chattopadhyay P, Panigrahi G, et al. Anti-inflammatory and antipyretic activities of *Hygrophila spinosa* T.Anders leaves (Acanthaceae) Trop J Pharm Res. 2009;8:133–7 http://dx.doi.org/10.4314/tjpr.v8i2.44521
9. Jain BB, Rathi BS, Thakurdesai PA, Bodhankar SL. Antipyretic activity of aqueous extract of leaves of *Cocculus hirsutus*. Indian J Nat Prod. 2007;23:26–9
10. Metowogo K, Aklikokou AK, Agbonon A, Eklu-Gadegbeku K, Gbeassor M. Anti-ulcer and antiinflammatory effects of hydro-alcohol extracts of *Aloe buettneri* A. Berger (Liliaceae) Trop J Pharm Res. 2008; 7: 907–12 http://dx.doi.org/10.4314/tjpr.v7i1.14676
11. Pawar RS, Jain AP, Kashaw SK, Singhai AK. Haematopoetic activity of *Asteracantha longifolia* on cyclophosphamide induced bone marrow depression. Indian J Pharm Sci. 2006;3:337–40
12. Usha K, Kasturi GM, Hemalatha P. Hepatoprotective effect of *Hygrophila spinosa* and *Cassia occidentalis* on carbon tetrachloride induced liver damage in experimental rats. Indian J Cli Biochem. 2007; 22: 132–5 http://dx.doi.org/10.1007/BF02913331 PMid:23105700 PMCid:3453824
13. Shanmugasundaram P, Venkataraman S. Hepatoprotective and antioxidant effects of *Hygrophila auriculata* (K.Schum) Heine Acanthaceae root extract. J Ethnopharmacol. 2006;104:124–8 http://dx.doi.org/10.1016/j.jep.2005.08.058 PMid:16213687
14. Kshirsagar AD, Ashok P. Hepatoprotective and antioxidant effects of *Hygrophila spinosa* (K.Schum) Heine Acanthaceae stem extract. Biosci Biotech Res Asia. 2008;5:657
15. Singh A, Handa SS. Hepatoprotective activity of *Apium graveolens* and *Hygrophila auriculata* against paracetamol and thioacetamide intoxication in rats. J Ethnopharmacol. 1995;49:119–26 http://dx.doi.org/10.1016/0378-8741(95)01291-5
16. Haddian W, Kerpscar A. Bioassay of diuretics. J Pharmacol Exp Ther. 1943;79:97–110
17. Ahmed N, Hussain KF, Sarfaraj M, Zaheen M, Ansari H. Preliminary studies on diuretic effect of *Hygrophila auriculata* (Schum) Heine in rats. Int J Health Res. 2009;2:59–64
18. Vijayakumar M, Govindarajan R, Rao GM, Rao CV, Shirwaikar A, Mehrotra S, et al. Action of *Hygrophila auriculata* against streptozotocin-induced oxidative stress. J Ethnopharmacol. 2006; 104: 356–61. http://dx.doi.org/10.1016/j.jep.2005.09.030 PMid:16289604
19. Patra A, Murthy PN, Jha S, Aher VD. Anthelmintic and antibacterial activities of *Hygrophila spinosa* T Ander. Res J Pharm Tech. 2008;1:531–2.
20. Mali RG, Hundiwale JC, Sonawane RS. Evaluation of *Capparis decidua* for anthelmintic and antimicrobial activities. Indian J Nat Prod. 2004;20:10–3.
21. Patra A, Murthy PN, Jha S, Sahu AN, Roy D. Analgesic and antimotility activities of leaves of *Hygrophilia spinosa* T Anders. Pharmacologyonline. 2008;2:821–8.
22. Patra A, Murthy PN, Jha S, Sahu AN, Roy D. Analgesic and antimotility activities of leaves of *Hygrophilia spinosa* T Anders. Pharmacologyonline. 2008;2:821–8.
23. Biswas S, Murugesan T, Sinha S, Maiti K, Gayen JR, Pal M, et al. Antidiarrhoeal activity of *Strychnos potatorum* seed extract in rats. Fitoterapia. 2002; 73: 43–7 http://dx.doi.org/10.1016/S0367-326X(01)00368-9
24. Malick CP, Singh MB. Plant enzymology and histoenzymology. New Delhi: Kalyani Publishers; 1980. p. 286.
25. Usha K, Kasturi GM, Hemalatha P. Hepatoprotective effect of *Hygrophila spinosa* and *Cassia occidentalis* on carbon tetrachloride induced liver damage in experimental rats. Indian J Clin Biol.2007;22:132–5.http://dx.doi.org/10.1007/BF02913331 PMid:23105700 PMCid:3453824
26. Shandrel SH Method in food analysis. New York: Academic Press; 1970. p.709.

Cite this article as:
Nikam Dattatrya, Mundada Shreekant, Mishra Dayashankar Kokilaksha: A potential Ayurvedic herb. Int. J. Res. Ayur. Pharm. 2012; 3(6):780-782

Source of support: Nil, Conflict of interest: None Declared