



A REVIEW ON SICKLE BUSH: A LESSER KNOWN MEDICINAL SHRUB

Harshavardhan Mishal^{1*} and Rashmi Mishal²

¹MET's Institute of Pharmacy, Adgaon, Nashik-422003.

²Sir Dr. M. S. Gosavi College of Pharmaceutical Education & Research, Prin T A Kulkarni Vidyanagar, Nashik-422008.

Article Received on
25 Dec. 2018,

Revised on 15 Jan. 2019,
Accepted on 05 Feb. 2019

DOI: 10.20959/wjpps20193-13219

***Corresponding Author**

Harshavardhan Mishal

MET's Institute of
Pharmacy, Adgaon, Nashik-
422003.

ABSTRACT

In spite of many synthetic compounds, the most efficient drugs available have their roots directly or indirectly related with the plant kingdom. Many medicinal plants have proven to possess the effective pharmacological & therapeutic actions in various ailments. *Dichrostachys cinerea* W & A, a plant widely used by the tribals of Satpura range forests of Maharashtra state has been reported to possess antibacterial, nephroprotective, free radical scavenging and anti snake venom activities. This review highlights some of its phytochemical & pharmacological aspects.

KEYWORDS: Sickle Bush, *Dichrostachys cinerea*.

ABBREVIATION: *D. cinerea*- *Dichrostachys cinerea*.

INTRODUCTION

Dichrostachys cinerea.^[1] W & A (Mimosaceae) "Sickle bush" is a small thorny shrub about 7 to 8 meters tall with lateral dense shoots. It is locally known as "Hiver" in this Khandesh region & found throughout the dry and warm parts of India. Its leaves are bipinnate & each pinna bears a gland. The bicoloured pendant flowers are 2 to 2.5 cm long. Fruit pods are twisted and are indehiscent. It serves as host plant to the lac insects & is also used as a folk medicine since ancient times. It is observed that tribals of this satpura range forests viz Kokani, Pawara & Bhil etc use decoction of its roots for treating the snake bite victims. The plant parts are also used to treat ophthalmia, urinary calculi & rheumatism. The extensive reference of *Dichrostachys cinerea* W A in Ayurvedic literature & as "Vurtuli" in Hindi has

attracted many scientific workers and several pharmacognostical & pharmacological studies have been carried out on this drug. Roots and leaves are the major ingredients of the folk remedies. This review highlights the various chemical moieties present in different parts of this plant, responsible for its therapeutic activity.

Bioactive Compounds

Extensive work has already been reported on *D.cinerea*. Preliminary phytochemical studies^[2,3,4] have revealed the presence of large number of chemical groups like alkaloids, tannins, polyphenols, sterols and saponins etc. Moreover chemical studies have also revealed the presence of a new isomer of mesquitol. In addition number of other anti oxidant chemical constituents^[5] have been reported like β -amyrin, Friedelan-3-one, Friedelan -3- β -ol, α -amyrin. Isolation of a new hydroxyl ester, 6-hydroxy pentacosylpentanoate along with n-triacontane, 1-octyl docosonoate, ceryl creotate, friedelin, stigmasterol, epifriedelinol, γ -sitosterol, β -sitosterol and lacceric acid from the ethanolic extract of *D.cinerea* heartwood have also been reported by Jain *et al.* A new isomer of mesquitol (2, 3-trans-3, 4, 7, 8 tetrahydroxyflavan-3-ol)^[6] was reported earlier and has shown to possess free radical scavenging activity.

Pharmacological Reports

According to the classical literature^[7] & Ayurveda, roots of *Dichrostachys cinerea* are supposed to be hot, bitter, and improve appetite. Roots are astringent to bowels, cure rheumatism, strangury, urinary calculi and renal troubles, while young shoots are bruised and applied to the eyes in cases of ophthalmia. Further pharmacological studies regarding these & other activities have been undertaken by various workers.

Antibacterial & Analgesic Activity: Earlier work reported on this aspect was in 1999.^[8] This was further summarized in 2009.^[9] Potent anti bacterial action of the Methanolic, Chloroform & water extracts of *D. cinerea* aerial parts has been reported against both gram positive & gram negative bacteria like *E. coli*, *Klebsiella pneumoniae*, *Proteus pestis*, and *Proteus vulgaris* More activity against gram positive bacteria at low concentration is demonstrated against *Staphylococcus aureus*, *Pseudomonas*, *Salmoella typhi*, *Bacillus brevis*, and *Shigella*. Prominent analgesic activity is also reported by significant reduction in the writhes induced by Acetic acid in dose dependent manner when compared to Aspirin by the same workers.

Anti asthmatic & Bronchodilator Property: Marked broncho relaxation effect and asthmatic property, complying many facets such as adrenergic receptor activation, opening of Potassium channels and antagonistic action against H1- Histaminergic receptors by hydro alcoholic extract of *Dichrostachys cinerea* on the tracheal smooth muscles of guinea pig has been shown by Raissa^[10] *et al.*

Anti lice Activity: *D. cinerea* has been reported to have significant *in vitro* anti lice^[11] activity. In comparison to the marketed preparations ethanolic extract of *D. cinerea* leaves with coconut oil has showed significant reduction in mortality time of head lice & pediculicidal action.

Nephroprotective Activity: Sreedevi *et al*^[12] have studied the pharmacological actions of alcoholic extracts of roots *D. cinerea* against the Cisplatin induced renal injury in rats. Cisplatin (Cis-diamaine dichloro platinum II) is a potent anti cancer agent used to treat variety of tumours. Nephro toxicity is a dose limiting side effect of Cisplatin. Alcoholic extract of roots have been reported to show marked nephroprotective activity against Cisplatin induced renal damage. This curative action of alcoholic extract has been said to exhibit dose dependent changes in the serum markers level & urinary functional parameters.

Anti oxidant, Anti inflammatory and free radical scavenging activity: Cellular damage or oxidative injury occurs due to the generation of free radicals or reactive Oxygen species. Mostly these are generated through the normal metabolism of drugs & environmental chemicals. Many medicinal plants have shown ample therapeutic potential in this regard due to their anti oxidant & free radical scavenging activity.

Sini^[13] *et al* have demonstrated significant anti oxidant & free radical scavenging activity of *D. cinerea* against DPPH free radical assay in their study of total 18 plants. Free radical formation is one of the underlying causes of number of human neurodegenerative disorders including inflammation and diabetes. Reports are also available about the anti inflammatory^[14] activity of methanolic extract of fresh leaves of *D. cinerea* against mouse paw edema induced by Russell's viper (*Vipera russelli*) venom.

Anti diarrhoeal activity: More recently the anti- diarrhoeal activity of ethanolic extracts of *D.cinerea* bark, leaves and roots was evaluated by Jayakumari^[15] *et al.* by castor oil induced diarrhoeal model and small intestine motility testing albino mice.

All three extracts have been reported to reduce the number of defecation and wet faecal matter in a dose dependent manner.

Anti snake Venom Property: Ethno medical investigations^[16] have revealed that tribals in many parts of Satpura range forests frequently use root decoctions of many plants including *Dichrostachys cinerea* for treating snake bite victims, in India.

While worldwide over 700 species^[17,18] of flowering plants are used to treat snake bite. Prominent anti snake venom activity of alcoholic extracts of *D.cinerea* roots & fresh leaves has been reported against Russell's viper (*Vipera russelli*)^[19] & Indian Cobra (*Naja naja*)^[20] venom.

Other Reported Activities: Recently Immunomodulatory effect of this plant has been studied by Hurinanthan^[21] on human peripheral blood mononuclear cells, by using freshly harvested lymphocytes in MTT assay. Apart from these activities, mosquito repellent activity of *D. cinerea* has also been evaluated by Maharaj^[22] *et al.*

CONCLUSION

The extensive literature survey has revealed that *Dichrostachys cinerea* is an important plant with variety of ingredients, which is used in the form of crude dosage forms in folk medicine by tribals since ancient times. The main pharmacological properties indicated its anti bacterial, and anti snake venom activity.

The researches are still insufficient and so many aspects are unexplored, such as chemical constituents of root portion and their isolation as well as their systematic studies in treating the snakebite victims. This needs due separate attention. Further studies should be carried out to explore the concealed areas and their practical clinical application which can be utilized for welfare of human beings.

CONFLICTS OF INTEREST

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

REFERENCES

1. Chopra R.N., Nayar S.L., Chopra I.C. "Glossary of Indian Medicinal Plants" National Institute of Science Communication (CSIR), New Delhi, 1999; 95.
2. Joshi K.C., Sharma T, *J Indian Chem Soc.*, 1977; 54: 649-650.
3. Thammanna & Narayana Rao, "Medicinal Plants of Tirumala" Sri Prasad VS, E.O. T.T.D., Tirupati, 1990; 36.
4. Joshi K.C., Sharma T, Triterpenoids and some other constituents from *Dichrostachys cinerea* *Phytochemistry*, 1974; 13(9): 2010-2011.
5. Jain R, Saxena U, Aliphatics and triterpenoids from the heartwood of *Dichrostachys cinerea*. *J Indian Chem Soc*, 2003; 80: 656-658.
6. Rao J.R., Tiwari A.K., Kumar U.S., Reddy S.V., Ali A.Z., Rao J.M. Novel 3-O-acyl-mesquitol analogues as free radical scavengers & enzyme inhibitors: Synthesis, biological evaluation & structure activity relationship. *Bio Org Med Chem Lett.*, 2003; 18,13(16): 2777-80.
7. Kirtikar K.R., Basu B.D, "Indian Medicinal Plants" Bishan Singh Mahendra Pal Singh: Dehardun, 1984; 2: 912-913.
8. Eisa M.M., Almagboul A.Z., Omer M.E.A., Elegami A.A., Anti bacterial activity of *Dichrostachys cinerea*, *Fitoterapia*, 2000; 71(3): 324-325.
9. Mishra U.S., Behera S.R, Murthy P.N., Kumar M, Kumar D, Anti bacterial and analgesic effects of the leaves of *Dichrostachys cinerea*. *Int J Pharm & Pharm Sci*, 2009; 1(2).
10. Raissa R.R Aworet-Samseny, Alain D'souza, Fidele Kphe, Kiessun Konate, Jacques Y Datte *Dichrostachys cinerea* (L) Wight et Arn (Mimosaceae) hydro-alcoholic extract action on the contractility of tracheal smooth muscle isolated from guinea-pig. *BMC Complementary And Alternative Medicine*, 2011; 11-23.
11. M. Vijayalakshmi, Periyannagam K, Lakshmana P.S. *in vitro* Anti lice activity of *Dichrostachys cinerea* (L) Wight & Arn., *Int J Pharm Tech Res.*, 2010; 2(4): 2210-2213.
12. Sreedevi A, Bharati K, KVSRRG Prasad, Effect of alcoholic extract of roots of *Dichrostachys cinerea* Wight & Arn against cisplatin induced nephrotoxicity in rats. *Nat Prod Radiance*, 2009; 8(1): 12-18.
13. Sini K. R., Sinha B.N., Karpagavalli M, Determining the antioxidant activity of certain medicinal plants of Attapady (Palakkad) India using DPPH Assay. *Current Botany* 2010 1(1): 13-17.

14. Mishal H.B. Mishal R., Studies on the anti inflammatory activity of *Dichrostachys cinerea* W and A against mouse paw edema induced by *Vipera russelli* venom. *Adv Pharmacol Toxicol*, 2006; 7(1): 43-46
15. Jayakumari S, Srinivasa Rao G.H., Anbu J, Ravichandran V Antidiarrhoeal activity of *Dichrostachys cinerea* (L) Wight & Arn. *Int J Pharm & Pharm Sci.*, 2011; 3(3): 61-63.
16. Bhamre P. B. Some anti venom medicinal plants from tribals of Dhule district (Maharashtra) *New J Sci Tech.*, 1995; 1(1): 35-37.
17. Houghton P.J., *Medicament ET Nutrition: L'Approche Ethnopharmacologique*, 1993; 263-273.
18. Mishal H.B, On the prospects of medicinal plants against snake bite, *Indian Drugs*, 2002; 39(10): 511-514.
19. Mishal H.B. Screening of Anti Snake venom Activity of *Dichrostachys cinerea* W & A *J. Nat Remedies*, 2002; 2(1): 92-95.
20. Mishal H.B, Neutralization of lethal activity of Indian cobra (*Naja naja*) venom by extracts of the plant *Dichrostachys cinerea* Wight & Arn (Leguminosae). *Indian drug*, 2007; 44(1): 34-38.
21. Hurinanthan V, Immune modulatory effect of *Dichrostachys cinerea*, *Carpobrotus dimidiatus*, *Capparis tomentosa*, *Leonotis leonurus* (Dissertation) Durban University of Technology (SA), 2009.
22. Maharaj R, Maharaj V, Newmarch M, Crouch N R, Bhagwandin N, Folb P I, Pillay P, Gayaram R, Evaluation of selected South African ethnomedicinal plants as mosquito repellents against the *Anopheles arabiensis* mosquito in a rodent model. *Malaria Journal*, 2010; 9: 301.