Journal of Advances and Scholarly Researches in Allied Education
Vol. XIV, Issue No. 3, (Special Issue) February-2018, ISSN 2230-7540

Assessment of Holarrhene Antidysenteric Phytochemical and Pharmacological Aspects (Wall.)

Prem Shanker Mishra*

Assistant Professor, Department of Pharmacy, Galgotias University, Greater Noida, Uttar Pradesh, India

Abstract – The efficacy, low cost and low side effects correlated with medications result in an ever growing amount of interest in medicinal plants. For the medicinal usage of their stemb bark, their leaves and their Ayurvedic seeds is prescribed for the wall of the Apocynaceae genus. Holarrhene antidysenterica(syn.H. pubescens). Studies of the phytochemical and pharmacological existence of the plant throughout the past century generated significant findings with respect to the present chemical components and also confirmed the herbs' historically asserted properties: analgesic, anti-bacterial, anti-diarrhoeal, antiamoebic, anti-inflammatory and anti-hemorrhoidal activity. Furthermore, several other properties such as anti-malaria, anti-diabetic, anti-urolithic, antimutagenic, CNS, antigiotensin-conversion enzyme inhibitory activity and acetylcholinesterase have recently been discovered. This analysis addresses in greater depth the results of studies of the abovementioned properties of the plant and 68 alkaloids, which are derived from different plant components, to support their widely used treatment of a number of diseases and recommends potential study guidelines.

Keywords – Anti-diabetic, Conessine, Holarrhena antidysenterica, Pharmacology, Phytochemistry

- ***X*** -

1. INTRODUCTION

Medicinal plants have existed for years but before the foundation of human civilizations their significance as a supply of vital medicines remained unknown. The creation preceded by the early medical literature including the Ayurvedic Rig Veda and Sushruta Samhita, the Dioscorides' De Materia Medica, the Ebers Papyrus from ancient Egypt and the Chinese Pen Tsao. Ayurveda is the primary source of ancient medical expertise of India, in which three "doshas" or body structures, kapha, pitta and vata, are the basic concept. In certain areas of India the medicine systems of Unani and Siddha are also essential, which say that certain elements contribute to good health if they are present in a balanced state, while their imbalance results in different types of diseases.

Anti-dysenteric Holarrhene (Roxb. ex Fleming) Wall, or Wallrch, is classified as Tellicherry Bark (Engel) or Kurchi (Hindi) and is of Apocynaceae's family. (Syn. Holarrhena pubescens, Buch.Ham.) Wallrch ex. Don. It is found in tropical and subtropical regions of Asia and Africa. In India it is found across the world, particularly in the leafy tropical Himalayan forests, at altitudes of 900 to 1250 m above sea level.

H. antidysenterica is used for the treatment of atisaara in Indian ayurvedic scheme (diarrhoea and dysentery). According to Charaka, the pods have stanyasodhana (alactodepurant), ama and asthapanopagus are indrayava (semans) and vamaca and arsoghna are present in the plant with respective emetic and anti-haemorrhoidal properties. Susruta credits diuretic seed and the plant

as sukrasodhana in general (sperm-purifier). The plant is identified by the Susruta Samhita as an antiseptic, vermifuge, febrifuge and detoxifier. Malignant sores, leprosy, diarrhoea and every other virulent skin disease are assumed to be cured. In Western Ayurveda, it is suggested that the herb cure obesity, asthma, bronchopneumonia, hepatosplenomegaly and rheuma. A major component in many Ayurvedic preparations including Kutajghan Dati, Kutajarista and Kutaja Churna are the H-antidysenteric agent used in the treatment of dysentery, diarrhoea, fever and bacterial infection. Recently, many experiments have been conducted on phytochemicals separation and characterisation, as well as many pharmacologic features dependent on laboratory animal testing of H. antidysenterica.

2. PHARMACOLOGICAL PROPERTIES

2.1. Anti-diabetic efficacy

A recent research showed strong recovery from oral dosages of 300 mg/kg and 600 mg per kg of ethanol extract from seeds in diabetic rats. The blood glucose, serum cholesterol, trigyceride, aspartate transaminase, alkaline transaminase, urea, creatinine and uric acid decreased significantly per week of the procedure. Their weight improved significantly. The weight of rats increased considerably. Similar effects in streptozotocin-induced rats have also been demonstrated through methanol seed extracts. α-glucosidase The inhibition of H. hydromethanol seed extract was seen in normaloglycemic rats. This enzyme is used to absorb glucose and thus to regulate postprandial diabetes may play an important role. Transaminase (GOT) glutamate oxaloacetate and transaminase glutamate (GPT) activities in the liver and the kidneys were stated to not be metabolic toxic to hydromethanol seed extract in another research.

2.2. Anti-diarrhoeal property

Ethanolic seed extracts of H. antidysenterica have shown significant increase in their dry faeces' weight and have decreased the decrease in bee oil-induced diarrhoea in in vivo rats' defecation. Often known as watery and spirited bark extracts, the shigella flexneri, shigella boydii and salmonella enteritidis, are their conduct against E. coli (EIEC). Extracts of water and methanol leaves from H. antidysenterica have been blocked in the growth of Salmonella typhimurium, vibrio cholerae, vibrio alginolyticae, vibrio cholera 0139, E. coli 0,157:H7 or salmonella cyphi.

2.3. Anti-inflammatory and analgesic property

The H. antidysenterica methanolic bark extract was seen to decreases in the amounts of nitric or malondialdehyde mediated colitis in 2,4-dinitrobenzene sulfonic acid, except in albino wistar rats, the sum of superoxide dismutase and glutathione. Rats have defied cell rupture, mucosal layers inflammatory and cell inflammatory infiltration. In addition, the reduction of rat paw oedema in carrageenan-induced paw oedema in Swiss albino mice was seen in methanol leaf extracts. H. antidysenterica was cited for analgesic properties of Ayurveda. The Swiss mice and wistar rats had an analgesic activity with the extract of methanol bark.

2.4. Antioxidant/free radical scavenging property

Free radical scavenging compounds have been developed as a cure and tissue protection against oxidative damage. It has been established. Methanolic leaf extracts recently observed to scavenge superoxide ions and hydroxyl ions as well as decreased converting capacity of fe3 + to fe2+ have been studied for the antioxidant property of H. antidysenterica. The effectiveness of these results was also seen to be commensurate with the extract concentration. In the plant's hydro-methanolic seed extracts, the deoxyribose-degradation inhibition was also seen by

OH−ion; nitrite formation by competition with O2, H2O2 degrade; and lipid peroxidation inhibition, both proceeding from the fraction of ethyl acetate.

2.5. Anti-urolithic property and anti-haemorrhoidal action

H. antidysental H. Gross aqueous methanol extracts significantly lower the size and convert in vitro of CA (COM) to CADs of calcium oxalate crystals (CAD). The extract eliminates cell toxicity (induced by COM) and lactate activity by dehydrogenase. The extract was tested in vivo for male wistar rats, with a substantial reduction in polyurea, water intake, Ca++ excretion and glass growth.

H. antidysenterica stem Bark Extract in the form of "Kutaja tvak churna" demonstrated curing action in bleeding piles patients.

2.6. Diuretic property and anti-amoebiasis

Aqueous H. antidysenterica seed extract has been shown to improve the wistar rats' urinary production by a dose range of 30-100 mg/kg. The sum of Na+ and K+ ions excreted by the urine of treated rats was also found in significant raise.

Fifteen days with a regular dose of bark powder totally cures the amobiasis user. The therapeutic effectiveness of "Amoebin cape," an amebiase medication with H. antidysenterica as one component, was studied in another clinical triale.

2.7. Inhibition of acetylcholinesterase and CNS-stimulant activity

Acetilcholinesterase inhibition is desirable if neurological disorders like Alzheimer's disorder are handled. Although the AChE-inhibiting alkaloids of some plants are already established, a research has examined certain H. antidysenterica alkaloids for similar behaviour. Conessimin was the most profound impact with IC 50 meaning of 4 μM out of five extracted alkaloids (conessin, isoconessimin, conessimin, conarrhimine and conimin). The analysis found that these alkaloids can theoretically be used in medicinal products to cure neurological conditions.

The CNS stimulating action of methanol bark extract on Swiss albino mice was studied in separate studies. The findings indicate that irrespective of the dose, the extract reduced and relaxed the muscles' grip capacity and the locomotive operation, which showed a depriming impact on the CNS.

2.8. Anthelminthic and anti-microbial activity

There are important effects of the in-vitro operation of bark acoustic extracts on Pheretima posthuma (earthworm). The concentration-dependent areas of inhibition of EPEC bacterial cultures were seen in ethanolic seed extracts. Because EPEC is antibiotically immune to many, the ethanol extract is considered an antibacterial promising agent. 2 In one sample, E. coli was inhibited with petroleum ether extract at 50 μg/mL with a minimum inhibition level (MIC) of 50 μg /mL and higher MIC levels in methanol and chloroform extracts. But H. antidysenterica was moderately active in comparison to other species.

2.9. Anti-mutagenic and anti-hypertensive activity

An anti-mutagenic function of H. antidysenterica was studied, where methanol bark extract of the plant revealed anti-mutagenic potency in the Salmonella typhimurium strains of sodium azide and methyl methane sulphonate.

Anti-hypertensive plants are studied for their capacity to suppress angiotensin secretion, contributing to elevated blood pressure due to vasoconstriction. The adequate inhibition of the angiotensin converting enzyme (ACE) was found in ethanolic seed extracts.

2.10. Anti-malarial activity

There has been important findings in the bark extracts for in vitro and in vivo anti-malarial activity measured against the isolates of Plasmodium falciparum and the Swiss mouse of P. berghei respectively. The most significant anti-plasmodium action was the chloroform bark extract, with an average IC50 value of 5.7 μg/ml per in-vitro trial, and 70% in-vivo parasitemia suppression of 30 mg/kg.

3. CHEMICAL CONSTITUENTS

A variety of H. antidysenterica chemicals often include stems, barks, leaves and certain plants. Steroidal alkaloids, flavonoids, triterpenoids, phenolic acids, tannins and resins are the main constituents. The following are the 68 alkaloids present in various pages of H. antidysenterica. Three, two, two, nine;

3.1. From both stem bark and seeds

Conessine ($C_{24}H_{40}N_2$)

Isoconessine ($C_{24}H_{40}N_2$)

Conessimine/Isoconessimine ($C_{23}H_{38}N_2$)

Conarrhimine ($C_{21}H_{34}N_2$)

3.2. From stem bark

Holarrifine ($C_{24}H_{38}N_2O_2$)

Kurchamide, Kurcholessine, Trimethylconkurchine ($C_{24}H_{38}N_2$)

N-Methylholarrhimine ($C_{22}H_{38}N_2O$)

N-Methylholarrhimine ($C_{22}H_{38}N_2O$),

NNN'N′-Tetramethylholarrhimine ($C_{25}H_{44}N_2O$),

Conessidine ($C_{21}H_{32}N_2$),

Holarrhidine ($C_{21}H_{36}N_2O$),

Kurchenine ($C_{21}H_{32}N_2O_2$),

Holarrhessimine ($C_{22}H_{36}N_2O$),

Holarrhine ($C_{20}H_{38}N_2O_3$),

Conkurchinine ($C_{25}H_{36}N_2$),

Kurchamine ($C_{22}H_{36}N_2$),

7α-Hydroxyconessine ($C_{24}H_{40}N_2O$),

Kurchilidine ($C_{22}H_{31}NO$),

Neoconessine (isomer of conessine) ($C_{24}H_{40}N_2$),

Holadysenterine ($C_{23}H_{38}N_2O_3$),

Kurchessine ($C_{25}H_{44}N_2$),

Lettocine ($C_{17}H_{25}NO_2$),

Kurchimine ($C_{22}H_{36}N_2$),

Holarrhenine ($C_{24}H_{40}N_2O$),

Holarrhimine/Kurchicine ($C_{21}H_{36}N_2O$),

Holacine ($C_{26}H_{44}N_2O_2$),

Holafrine ($C_{29}H_{46}N_2O_2$),

Holadysone ($C_{21}H_{28}O_4$),

Holacetine ($C_{21}H_{32}N_2O_3$),

3α-Aminoconan-5-ene ($C_{22}H_{36}N_2$),

Dihydroisoconessimine($C_{23}H_{40}N_2$),

Conamine ($C_{22}H_{36}N_2$),

Conkurchine ($C_{20}H_{32}N_2$),

Pubadysone ($C_{21}H_{26}O_3$),

Puboestrene ($C_{20}H_{24}O_3$),

Pubamide ($C_{21}H_{27}NO_3$),

Holadiene ($C_{22}H_{31}NO$),

Kurchinidine ($C_{21}H_{29}NO_2$),

Kurchinine ($C_{19}H_{24}O_3$),

Pubescine ($C_{22}H_{26}N_2O_4$),

Norholadiene ($C_{21}H_{29}NO$),

Pubescimine ($C_{24}H_{40}N_2O$),

Holonamine, Regholarrhenine A ($C_{22}H_{31}NO_2$),

Regholarrhenine B ($C_{21}H_{29}NO_2$),

Regholarrhenine C ($C_{22}H_{34}N_2$),

Regholarrhenine D ($C_{23}H_{38}N_2O$),

Regholarrhenine E ($C_{25}H_{44}N_2O_2$),

Regholarrhenine F ($C_{25}H_{44}N_2O$).

3.3. From leaves

Holantosine-A ($C_{28}H_{47}NO_6$),

Holantosine-B ($C_{28}H_{45}NO_5$),

Holantosine-C ($C_{28}H_{47}NO_6$),

Holantosine-D ($C_{28}H_{45}NO_5$),

Holantosine-E ($C_{28}H_{47}NO_6$),

Holantosine-F ($C_{28}H_{45}NO_5$),

Holarosine A ($C_{30}H_{47}NO_6$),

Holarosine B ($C_{30}H_{47}NO_6$),

Holarricine ($C_{21}H_{32}N_2O_3$),

Kurchiphyllamine, Kurchaline, Kurchiphylline ($C_{23}H_{47}NO_2$).

3.4. From seeds

Conimine ($C_{22}H_{36}N_2$),

Antidysentericine ($C_{23}H_{36}N_2O$).

4. CONCLUSION

Diseases have been associated with humans throughout their lives. They reduce the well-being of citizens and in acute circumstances will lead to death. Similarly, once a negative charge in an atom is stabilised, nature is also a source of remedies for therapeutic plant diseases. H. antidysenterica has been used for traditional management of diseases such as diarrhoea, dysentery and helminthia. But laboratory experiments have made it possible to identify more pharmacology of plants such as anti-inflammatory, anti-oxidant and anti-malarial behaviours, with new techniques introduced in recent years. The large volume of active values of the plant can be due to several activities presented. After a comprehensive literature analysis, 68 alkaloids were found in this report. While significant results were found for the various practises discussed throughout the report, more research is necessary to determine the hypothesis that is present with each measure. This allows drugs to synthesise new alkaloid compounds along with other compounds.

REFERENCES

1. "Department of AYUSH." Department of AYUSH. Ministry of Health & Family Welfare, Government of India.

2. A. Dey, J.N. De Ethnobotanical Survey of Purulia district, West Bengal, India for medicinal plants used against gastrointestinal disorders

3. S. Dev (2006). A Selection of Prime Ayurvedic Plant Drugs: Ancient-modern Concordance Anamaya, New Delhi:

4. A. Lather, V. Gupta, P. Bansal, R. Singh, A.K. Chaudhary (2010). Pharmacological potential of ayurvedic formulation: Kutajghan-Vati – a review J Adv Sci Res, 1 (2), pp. 41-45

5. K.R.P. Shenoy, S.N. Yoganarasimhan (2009). Antibacterial activity of Kutajarista – an Ayurvedic preparation Ind J Trad Knowl, 8 (3), pp. 362-363

6. D.H. Tambekar, S.B. Dahikar (2010). Exploring antibacterial potential of some ayurvedic preparations to control bacterial enteric infections J Chem Pharm Res, 2 (5), pp. 494-501

7. U.P. Keshri, S. Chandra, J. Sharma (2012). Antidiabetic efficacy of ethanolic extract of Holarrhena antidysenterica seeds in Streptozotocin-induced diabetic rats and its influence on certain biochemical parameters J Drug Deliv Ther, 2 (4), pp. 159-162

8. S. Mana, S. Singhal, N.K. Sharma, D. Singh (2010). Hypoglycemic effect of Holarrhena antidysenterica seeds on streptozotocin induced diabetic rats Int J Pharm Tech Res, 2 (2), pp. 1325-1329

9. K.M. Ali, K. Chatterjee, D. De, K. Jana, T.K. Bera, D. Ghosh (2011). Inhibitory effect of hydro-methanolic extract of seed of Holarrhena antidysenterica on alpha-glucosidase activity and postprandial blood glucose level in normoglycemic rat J Ethnopharmacol, 135, pp. 194-196

10. K.M. Ali, K. Chatterjee, D. De, T.K. Bera, D. Ghosh (2009). Efficacy of aqueous extract of seed of Holarrhena antidysenterica for the management of diabetes in experimental model rat: a correlative study with antihyperlipidemic activity Int J Appl Res Nat Prod, 2 (3), pp. 13-21.

11. S.K. Panda, N. Patra, G. Sahoo, A.K. Bastia, S.K. Dutta (2012). Antidiarrhoeal activities of medicinal plants of Similipal Biosphere Reserve, Odisha, India Int J Med Arom Plants, 2 (1), pp. 123-134.

12. V.C. Darji, S.S. Deshpande, A.H. Bariya (2012). Effects of methanolic extract of Holarrhena antidysenterica bark against experimentally induced inflammatory bowel disease in rats Int Res J Pharm, 3 (9), pp. 152-154.

13. P.S.S. Ganapathy, Y.L. Ramachandra, S.P. Rai (2010). Anti-inflammatory and analgesic activities of Holarrhena antidysenterica Wall. Leaf extract in experimental animal models Int J Biomed Pharma Sci, 4 (2), pp. 101-103.

14. R. Solanki, D. Madat, K. Chauhan, S.P. Adeshara (2010). Analgesic activity of Holarrhena antidysenterica (Apocynaceae) bark Int J Pharma Phytochem Res, 2 (4), pp. 5-7

15. P.S.S. Ganapathy, Y.L. Ramachandra, S.P. Rai (2011). In vitro antioxidant activity of Holarrhena antidysenterica Wall. Methanolic leaf extract J Basic Clin Pharma, 2 (4), pp. 175-178.

16. K.M. Ali, A. Ghosh, K. Chatterjee, et. al. (2011). Free radical scavenging activity of seed of Holarrhena antidysenterica: an in vitro studyJ Pharm Res, 4 (6), pp. 1631-1632.

17. A. Khan, S.R. Khan, A.H. Gilani (2012). Studies on the in vitro and in vivo antiurolithic activity of Holarrhena antidysenterica Urol Res, 40 (6), pp. 671-681.

18. A. Pal, P.P. Sharma, P.K. Mukherjee (2009). A clinical study of Kutaja (Holarrhena antidysenterica Wall) on ShonitarshaInt Quar J Res Ayu, 30 (4), pp. 369-372.

19. A. Khan, S. Bashir, A.H. Gilani (2012). An in vivo study on the diuretic activity of Holarrhena antidysenterica Afr J Pharm Pharmacol, 6 (7), pp. 454-458.

Corresponding Author

Prem Shanker Mishra*

Assistant Professor, Department of Pharmacy, Galgotias University, Greater Noida, Uttar Pradesh, India