



ANTIBACTERIAL ACTIVITY OF STEM BARK OF *HOLARRHENA ANTIDYSENTERICA* WALL AGAINST HUMAN PATHOGENIC BACTERIA

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Abstract: Plants known to possess several antibacterial properties are shown in all traditional medicine. The stem barks of *Holarrhena antidysenterica* Wall., were collected and extracted in the petroleum ether, chloroform, ethanol and water by Soxhlet assembly. The antibacterial activity various extracts of stem bark of *Holarrhena antidysenterica* wall was studied against the *Escherichia coli*, *Salmonella typhi* and *Staphylococcus aureus*. Present work suggested that *Staphylococcus aureus* was more susceptible to the water and ethanol extracts of the stem bark of *H. antidysenterica* Wall. The ethno medicinal uses of *Holarrhena antidysenterica* wall barks were reported and documented.

Keywords: *Holarrhena antidysenterica* Wall, antibacterial activity, stem bark extracts.

INTRODUCTION

Now a days, “Scientists and Researchers” are very much interested on research of natural plant products all over the world and a large number of substantiation have shown the immense potential of medicinal plants used traditionally (Habib *et al.*, 2005). Plant drugs are frequently considered to be less toxic and more free from side effects than synthetic ones (Pari, 2000; Tiwari *et al.*, 2008). The study of indigenous plant use by people of a particular culture and region is known as Ethnobotany. Medicinal plants are important with respect to new drug and pharmacological research development. They are widely used and accepted as home remedies and raw materials for the pharmaceutical industry. The use of plants as medicines dates back to ancient times. Chinese physicians used *Ephedra* tea for asthma, hay fever and colds in 3,000BC (Chevallier, 1996). Recently, the use of medicinal plants increased substantially (Khan *et al.*, 2001).

Holarrhena antidysenterica Wall., (Apocynaceae), commonly known as “Kutaja”, is an important plant used in indigenous systems of medicine as remedy for bronchitis, hematuria, spermatorrhoea, epilepsy, asthma, piles, leprosy, eczema, diarrhea, fevers and jaundice (Bhattacharjee, 2000; Guha *et al.*, 2001). *Holarrhena* is a genus of trees or shrubs distributed throughout the tropical and subtropical regions of the world. It is a small deciduous tree with white flowers and found throughout the dry forests of India even as far as Travancore (Gopal, 1996). The different parts of the plant were used since antiquity in the indigenous system of medicine. As far as our knowledge goes, antibacterial activity of *H. antidysenterica* against the enteric pathogens has not been reported from India (Ballal, 2001).

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The present attempt was undertaken to find the antibacterial activity of the petroleum ether, chloroform, ethanol and aqueous extracts of stem bark of *Holarrhena antidysenterica* against the known enteric pathogens.

MATERIALS AND METHODS

Stem bark of *Holarrhena antidysenterica* Wall was washed under running tap water, shade dried and then homogenized to fine powder and stored in airtight bottles.

Preparation of Crude extract:

Different solvents like Petroleum ether, ethanol, Chloroform and water were chosen for successive solvent extraction based on polarity using Soxhlet extraction apparatus and the extracts of *Holarrhena antidysenterica* Wall were concentrated under reduced pressure using rotary evaporator (Gunasekaran and Selvarajan, 2009).

Test Organisms

Authentic cultures of human pathogenic bacteria viz., *Escherichia coli* (MTCC 7410), *Salmonella typhi* (MTCC 733) and *Staphylococcus aureus* (MTCC 7443) were obtained from Microbial Type Culture Collection, Chandigarh, India and they are used for the antibacterial activity against the plant extracts.

Disc diffusion method:

Antibacterial activity is studied by using the disc diffusion method (Kirby *et al.*, 1966). The discs were put in a clean glass bottle and sterilized at 121°C for 15 min in an autoclave. Broth dilution assay was used to screen the extracts for antibacterial activity.



RESULT AND DISCUSSION

The stem bark of *Holarrhena antidysenterica* Wall., were collected and extracted in the petroleum ether, chloroform, ethanol and water by Soxhlet assembly. The antibacterial activities were observed in the various extracts of stem bark of *Holarrhena antidysenterica* against the *Escherichia coli* (MTCC 7410), *Salmonella typhi* (MTCC 733) and *Staphylococcus aureus* (MTCC 7443) which were shown in table 1.

Table.1: Showing antibacterial activity of the *Holarrhena antidysenterica* Wall stem bark extracts.

Test organisms	Zone of inhibition (in mm)			
	Petroleum ether	Chloroform	Ethanol	Water
<i>Escherichia coli</i>	13	12	13	16
<i>Salmonella typhi</i>	10	09	11	14
<i>Staphylococcus aureus</i>	12	11	21	18

In the present study, extracts of the stem bark of *Holarrhena antidysenterica* Wall was inhibited the growth of used test pathogen, but their effectiveness varied. The medicinal properties of the plant could be attributed to presence of one or more of the detected plant natural products. The maximum antibacterial activity was shown against the *Staphylococcus aureus* in the ethanol extract as compared to others. The fig. 1 showed that antibacterial analysis of stem bark of *Holarrhena antidysenterica* Wall.

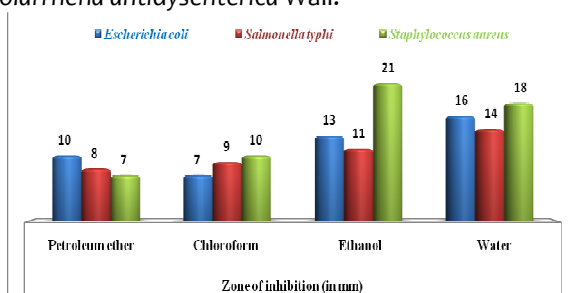


Fig.1: Antibacterial activity of *H. antidysenterica* stem bark extracts

The use of this plant by the various Indian tribals in cases of number of ailments like weakness, stomach pain, diarrhoea and cholera. Similar findings of Ballal et al in., (2001) observed that both aqueous and alcoholic extracts of the stem bark of *H. antidysenterica* can be carried out against a battery of enteric pathogens, causative agents of diarrhoea in infants and adults. Farrukh et al., (2006) studied that the anti-methicillin resistant *Staphylococcus aureus* (MRSA) activity of ethanolic extracts of *Holarrhena antidysenterica* wall barks were detected with inhibition zone size ranged from 11 to 44 mm.

CONCLUSION

The antibacterial activity of the stem bark of *Holarrhena antidysenterica* against the *Escherichia coli*, *Salmonella typhi* and *Staphylococcus aureus* have been less documented so far in Indian literature. Present work suggests that both water and ethanol extracts of the stem bark of *H. antidysenterica* Wall was carried out against human pathogens, causative agents of diarrhoea, dysentery and cut-wounds in infants and adults. The ethno medicinal uses of *Holarrhena antidysenterica* wall barks were reported and documented for futures.

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