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Antibacterial potential of methanolic extract of *Achyranthes aspera* L.

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Abstract

In the present study, to evaluation of antibacterial activities of methanolic extracts of *Achyranthes aspera* L. were the studied for disk diffusion method. The results of the present study were observed that maximum activity of root extract of *A. aspera* active against *Staphylococcus aureus*. The conclusion of the study was good antibacterial activity of *Achyranthes aspera* L. observed by the human pathogens.

Keywords: *Achyranthes aspera* L.; Antibacterial activity; extracts, active principles

1. INTRODUCTION

Traditional knowledge of medicinal plants were used from generation to generation for more than hundred years ago. The medicinal plants are used to traditionally cure several diseases. The medicinal plants were used for several activities for many microorganisms that leads for treating microbial diseases. The medicinal plants contain a wide variety of active principles that is effective for treatment of several diseases. The plant extracts consist many active components, including flavonoids and alkaloid compounds and these extract is having greater minimal antibacterial activity than particular components [1]. The medicinal plants of *Achyranthes aspera* are an important medicinal plant and all parts are used in medicines, seeds and roots are the most. *Achyranthes aspera* L. belongs to the family Amaranthaceae. It is a local name of nayuruvi. *Achyranthes aspera* L is distributed throughout the tropical and subtropical regions, including the Indian sub-continent, Africa, Australia and America [2]. The roots or leaves paste of *A. aspera* with water or milk while applying on the skin as it may lead to skin rashes and skin irritation due to its hot potency [3-6]. A literature survey of this plant is studied for pharmacological and anti-bacterial properties [7]. *The aim* of this present study, to evaluate the antibacterial activity of whole plants, *Achyranthes aspera* L. active against human pathogenic bacteria.

2. MATERIALS AND METHODS

2.1 Plant materials and extraction

The plant materials of *Achyranthes aspera* L. were collected from the Sivanthipatti, Tirunelveli District, Tamilnadu. The plant materials of leaves and stem were separated, washed with running water and air dried. The air dried plant materials were ground in the coarsely powdered. 100g of powder materials extracted with 500ml methanol for 5 h. The successfully collected extracts were filtered and excess of solvent removed from distillation method. Finally, the extracted substance was resuspended in the organic solvents at a concentration of 100 mg/ml prior it was tested for the antimicrobial activity.

2.2 Preliminary Phytochemical Screening

The extracts were subjected to preliminary phytochemical investigation of active compounds were detected for the presence of different colours. Air-dried and powdered materials were screened for the presence of alkaloids, flavonoids, triterpenoids, saponins and tannins were qualitative identified by the according to standard methods [8-10].

2.3 Bacteria and growth conditions

The selected six bacterial species were employed as test bacteria which include *Bacillus subtilis, Salmonella typhi, Pseudomonas aeruginosa, Staphylococcus aureus Proteus mirabilis* and *Vibrio cholera*. These bacteria were cultured on Mueller-Hinton broth and grown in Mueller-Hinton Agar (MH). Inocula were prepared by adding an overnight culture of the teste bacteria in MH broth. The cells were incubated to grow until they obtain the McFarland standard 0.5 (approximately 10^5-10^8 CFU/ml).

2.4 Determination of antibacterial activity

In vitro antibacterial activity was examined for methanolic extract of *A. aspera*. The antibacterial activity of plant part

extracts against six pathogenic bacteria was investigated by the agar disk diffusion method [11-13]. Each extract of *A. aspera* was diluted for 100µg/ml. Mueller-Hinton sterile agar plates were seeded with indicator bacterial strains (10^8 cfu) and allowed to stay at 37°C for 12 hours. The zones of growth inhibition produced around the disks were measured after 12h incubation at 37°C for bacteria. The activities of the bacteria to the plant extracts were determined by measuring the sizes of inhibitory zones (including the diameter of disk) on the agar surface around the disks, and values <8 mm were considered as not active against bacteria.

3. RESULTS AND DISCUSSION

In the present study observed that the preliminary phytochemical investigation of active compounds of methanolic extract of *A. aspera* plant parts results were represented in the table-1. Active compounds of phenolic compound were more quantity of color display in the all parts of the roots, leaves and stems of A. aspera. The active principles are cure several diseases and many phytochemical constituents were preparing for the formulation of several drugs in cancer, fever, AIDS etc. These active principles of *these* plants make them of more importance in medicine. Previously, *the active constituents* of saponins of plants have often considered as antibacterial, anti-inflammatory and antitumor activities are reported in several authors [14-15]. Flavonoids, alkaloids and terpenoids are considered to be antimicrobial and antidiarrheal activities are reported [16].

The results of the antibacterial determined for methanolic extracts of the root, leaf and stem of *Achyranthes aspera* active against the six bacterial species are investigated in a disc-diffusion assay (Table-2). The maximum activity of root extract of *Achyranthes aspera* active against *Staphylococcus aureus*. Similar studies of alcoholic extracts of leaves of *Cassia fistula* have active against *S. pyogenes* and *S. aureus* and *P. aeruginosa* [17]. The result of the active principle in the present study showed that the plant extract contains more or less the same components like saponin, triterpenoids, flavonoids, and alkaloids. The conclusion of the present study, results showed that this plant contains rich in bioactive compounds of tannin and phenolic compounds. These compounds may be acted as antibacterial activity against tested bacteria. Further work is necessary to isolate and characterize the active principles present in the all the extracts of *A. aspera*.

Table -1 : Preliminary investigation of phytochemicals constituents of *A. aspera* roots, leaves and stem

Sl. No	Active Constituents	Plant parts		
		Roots	leaves	stem
1	Alkaloids	++	++	++
2	Flavonoids	+	+	+
3	Phenolic Compounds	+	+++	+++
4	Essential Oils/ Fixed Oils	+	+	+
5	Saponins	+	+	+
6	Tannins	+	+	+

Color indication (+ low quantity) (+ + medium quantity) (+++ high quantity)

Table -2: The antibacterial effect of methanolic extracts of *A. aspera* L. against tested bacteria

Sl. No	Tested Bacteria	Zone of inhibition of Plant parts extract (mm)		
		Roots	leaves	stem
1	*Bacillus subtilis*	11	14	12
2	*Salmonella typhi*	13	15	14
3	*Pseudomonas aeruginosa*	11	14	13
4	*Staphylococcus aureus*	17	14	11
6	*Proteus mirabilis*	13	11	14
6	*Vibrio cholera*	11	13	12

*Results may be varied from different locality of Collection of species

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