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Research Article

Antibacterial Activity of Stem Bark of Salvadora Oleoides Decne.

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ABSTRACT
The antibacterial activity of the various extracts of the stem bark of Salvadora oleoides Decne. , was evaluated by the agar well diffusion method. The extracts were prepared by continuous hot percolation method with chloroform and methanol. Aqueous extract was prepared by maceration. The presence of phytosterols, flavonoids, tannins, phenols, carbohydrates, proteins and amino acids were detected in the preliminary phytochemical tests. Moderate antibacterial activity was observed in the extracts (250µg/ml) against some pathogenic microorganisms when compared with the standard ciprofloxacin.

Key words: Salvadora oleoides Decne.,antibacterial, ciprofloxacin.

INTRODUCTION

The use of medicinal plants play a vital role in covering the basic health needs in developing countries and these plants may offer a new source of antibacterial, antifungal and antiviral agents with significant activity against infective microorganisms [1]. There are numerous examples of antimicrobials of plant origin
that have an enormous therapeutic potential [2]. Several phytoconstituents like flavanoids [3], phenolics and polyphenols [4], tannins [5], terpenoids [6], sesquiterpenes [7] etc., are effective antimicrobial substances against a wide range of microorganisms.

Salvadora oleoides which belongs to family Salvadoraceae, a family of 3 genus and 12 species, distributed mainly in tropical and sub tropical Asia and Africa. In India this medicinal plant found in states like Haryana [8] and Rajasthan [9], where this is locally called as bada pilu or vridhpilu [10]. Salvadora oleoides Decne. (Family: Salvadoraceae) [11] is a shrub or occasionally a small tree [12] attaining the height of 2-6 m high, much branched leaves simple opposite, petiolate, linear [13], (Fig. 1). The leaves of plant is acrid, sweet, sour, appetizer, laxative, carminative [10], stem bark is stimulant [14], alexipharmic; useful in piles, bronchitis, disease of the Spleen [15], rheumatic pain [16], reported the antihyperlipidimic activity [17] and plant also diminishing the death rate [18]. This plant due to rich therapeutic values is also included in restoration programs of many countries in Africa and Asia [19].

The antioxidant activity of hydro-alcoholic extracts of stem bark of this plant was proved in our earlier work. In our present work we extended the study to screen the antimicrobial activity against nine different bacterial strains.

MATERIALS AND METHODS

Plant material collection: The plant Salvadora oleoides Decne. (Fig.1) (stem bark) chosen for the present investigation was collected in the months of April 2008, from Pali, Mohindergarh, Haryana, India and was identified and authenticated by Dr.H.B.Singh Head, Raw Material, herbarium and museum division, NISCAIR, New Delhi Ref.niscair/rhmd/Consult/-2008-9/971/02) and a sample has been retained in the department.

Preparation of the extracts: About 450 g of the coarse powder was extracted with ethanol followed by chloroform by continuous hot percolation method (Soxhlet apparatus). The marc was then macerated with water to get aqueous extract. All the extracts were then evaporated under reduced pressure and they were stored in refrigerator till use.

Phytochemical studies: All the extracts were subjected to preliminary phytochemical screening to identify the constituents present in them [20, 21].

Microorganisms: A total of eight bacterial and two fungal species were used in this study. Microorganisms were procured from Microbial type culture collection (MTCC), Chandigarh, National collection of industrial microorganism (NCIM), Pune and American type culture collection (ATCC). The list of microorganisms used in this study is included in the Table 1

Antimicrobial activity : Agar well diffusion assay: All the extracts were dissolved in DMSO (1%) to get a concentration of 250µg/ml. Agar plates were used for the study using cup plate method. The microorganisms were inoculated on the agar medium by spread plate technique. Four wells were bored in each plate and 10 µl of the extract samples were added in the well plate. The inoculated plates were incubated at 37°C for 24 h. Antimicrobial activity was evaluated by measuring the zone of inhibition against the test organisms. All the assays were carried out in triplicate and the results recorded as mean ± SEM of the three experiments. Ciprofloxacin at the concentration of 1 mg/ml (10 µl/well) was used as standard.

RESULTS AND DISCUSSION

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Fig. 1.

Table 1. Antimicrobial activity of the extracts of *Salvadora oleoides Decne.* stem bark

S.No	Microorganisms	Conc. of extract (g/ml)	Zone of inhibition			Standard ciprofloxacin 100 g/ml
			Chloroform extract (mm)	Aqueous extract (mm)	Methanolic extract (mm)	
1	S. typhi (ATCC 12176)	250	9	13	10	32
2	B. Lintus (NCIM 2018)	250	6	16	11	29
3	K. pneumonia (NCIM 2707)	250	6	12	13	33
4	S. griseus (NCIM 2623)	250	6	11	11	30
5	B. subtilis (NCIM 2063)	250	7	12	12	33
6	S. aureus (ATCC 29737)	250	10	13	13	34
7	S. albus (NCIM 2178)	250	9	14	12	31
8	E. coli (ATCC 10536)	250	11	14	9	40
9	P. aeruginosa (NCIM 2206).	250	6	15	16	35

The methanolic and aqueous extracts of the stem bark of Salvadora oleoides exhibited moderate antibacterial activity with all the tested strains of microorganisms at 250 µg/ml concentration on comparison with the standard ciprofloxacin. The obtained activity may be due to the presence of flavonoids and tannins (presence is confirmed by the preliminary phytochemical studies). Further studies are under progress to characterize the active principles.

CONCLUSION

Since ancient times, plants have been a veritable source of drugs. However, man tends to ignore the importance of herbal medicine. Recently, much attention has been directed towards extracts and biologically active compounds isolated from popular species. Different extracts from traditional medicinal plants have been tested to identify the source of the therapeutic effects. Some natural products have been approved as new antibacterial drugs, but there is still an urgent need to identify novel substances that are active towards pathogens with high resistance.

Multiple drug resistance has developed due to indiscriminate use of commercial antimicrobial drugs that are commonly used in the treatment of infectious diseases, making it a global growing problem. There is an urgent need to develop new antimicrobial drugs for the treatment of infectious diseases from medicinal plants, which may be less toxic to humans and possibly with a novel mechanism of action.

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