Journal of Botanical Research
ISSN: 0976-9889 & E-ISSN: 0976-9897, Volume 4, Issue 1, 2013, pp.-28-30.
Available online at http://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000251

PHYTOCHEMICAL SCREENING AND ANTIMICROBIAL ACTIVITY OF SOME MEDICINAL PLANTS OF BIDAR, KARNATAKA STATE, INDIA

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Received: October 15, 2013; Accepted: October 24, 2013

Abstract- Antibacterial and Antifungal activity of aqueous, Petroleum ether, chloroform and Ethanol extracts of Indian medicinal plant *Adathoda vasica, Saraca indica, Moringa oelifera and Boerhaavia diffusa* was investigated against *E. coli, Aspergillus niger* and *Aspergillus flavus* spp. The preliminary screening of Phytoconstituents and antibacterial and antifungal activity was performed by agar well diffusion method against pathogenic species. The organic extracts i. e. Petroleum ether, chloroform and Ethanol extracts of *Adathoda vasica, Saraca indiaca, Moringa oleifera, Boerhaavia diffusa* plants have exhibited moderate to significant antibacterial and antifungal activity. The aqueous extract showed no activity on agar well diffusion in all organisms. The significant antibacterial activity was compared with standard antibiotics Ampicillin and Tetracycline. The results obtained in the present study suggest that they can be used in treating diseases caused by the test organisms.

Keywords- Phytoconstituents, Antimicrobial, Agar diffusion

Citation: Patil M.S., Mahantesh S.P. and Patil C.S. (2013) Phytochemical Screening and Antimicrobial Activity of Some Medicinal Plants of Bidar, Karnataka State, India. Journal of Botanical Research, ISSN: 0976-9889 & E-ISSN: 0976-9897, Volume 4, Issue 1, pp.-28-30.

Introduction

India is rich in medicinal plant biodiversity; all known types of agro-climatic, ecologic and edaphic conditions are met within India. India is rich in all three levels of biodiversity, as species diversity, genetic diversity and ecological biodiversity, as species diversity, genetic diversity and habitat diversity. In India thousands of species are known to have medicinal value and the use of different parts of several medicinal plants to cure specific aliments has been in vogue since ancient times [1].

Herbal medicine is still the mainstay of about 75-80% of the whole population, mainly in developing countries. For primary health care because of better cultural acceptability better compatibility with the human body and fewer side effects. However, the last few years have seen a major increase in their use in the developed world. Plants have been the traditional habitat diversity [2]. Plants have been the traditional knowledge to preventive and curative medicines was available in ancient scholastic works included in the Atharva veda, Charaka, Sushruta, etc. An estimate suggests that about 13,000 plant species worldwide are known to have use as drugs.

Plants have proved to be significant natural resources for medicines; documentation of their use in medicine originates from ancient times. Ethno botanical and ubiquitous plants provide a rich resource for natural drug research and development [3]. Medicinal plant based drugs have the added advantage of being simple, effective and offering a broad spectrum of activity with greater emphasis on preventive action [4]. Higher plants play an important role in providing new remedies and in some cases, they are important sources for old remedies.

According to Wyk, et al [5], 50% of the drugs used in the clinical treatment are derived from the plant sources. In recent years, pharmaceutical companies have spent a lot of time and money in developing natural products extracted from plants, to produce more cost effective remedies that are affordable to the population. The rising incidence in multidrug resistance amongst pathogenic microbes has further necessitated the need to search for newer antibiotic sources. Until natural products have been approved as new antibacterial drugs, there is an urgent need to identify novel substances active towards highly resistant pathogens [6,7]. The trend of using natural products has increased and the active plant extracts are frequently for new drug discoveries and for the presence of antimicrobials [8]. The objective of the present investigation was to evaluate the qualitative analysis of Phytochemical and antibacterial efficacy of some selected four Indian medicinal plants.

Materials and Methods

Collection of Plant and Identification

The medicinal plants such as *Adathoda vasica, Saraca indica, Moringa oelifera* and *Boerhaavia diffusa* are collected in the area of Sadhu ghat near Bidar, Karnataka.The plants were taxonomically identified by the Dr. C. S. Patil, Head Department of Botany, B. V. Bhoomaraddi College of UG and PG Bidar, Karnataka.

Preparation of the Extract

The collected plants leaves are disease free, fresh, and are air dried. The dried plant leaves were crushed by using pestle and mortar. The air dried leaves powder is stored in air tight bottle. The extraction was carried out by the use of Soxhlet extractor, with the use of various organic solvents like Petroleum ether, Chloroform and Alcohol. After the extraction the filtrate were evaporated, concentrated mass obtained was weighed, dissolved in 10% v/v of DMSO (Di Methyl Sulfoxide) for further investigations.

Microorganisms Used

One Bacterial (*E. Coli*) and two fungal (*Aspergillus niger* and *Aspergillus flavus*) pathogens are collected from Department of Microbiology, Gulbarga University, Gulbarga, they are further maintained on nutrient agar slants at 4°C until further use in experiments.

Qualitative Phytochemical Study

The Preliminary Phytochemical constituents were qualitatively analyzed for four medicinal plants by using adopting standard methods Harborne, et al [9,10].

Antibacterial Activity Study

To determine the antimicrobial activity of plant extracts. The modified agar-well diffusion method of Cappuccino and Sherman [11] was employed to study the antibacterial activity of the plant extracts. 3.7% of Muller Hinton Agar was mixed with distilled water and autoclaved at 15 lb pressure for 15 minutes. After autoclaving, it was allowed to cool to 45-50°C. Then the medium was poured into sterilized Petri dishes with a uniform depth of approximately 4 mm. The agar medium was allowed to cool to room temperature. For the transformation of Bacteria to Petridis a swab dipped in standard inoculums was used. After dipping, the swab was used to spread the bacteria on the media in a confluent lawn. Then the Petri dishes were left for 3 to 5 minutes. Using cork borer, 6 mm diameter wells were made in all the plates. Different extracts were added to the groove with one blank of each. Plates were incubated for 24 hrs. at 37°C. After 24 hrs. the plates were examined.

Results were recorded, as the presence or absence of inhibition zone. The inhibitory zone around the well indicated absence of Bacterial growth and it was reported as positive and absence of zone is negative. The diameters of the zones were measured using diameter measurement scale. The effect of plant extract was compared with that of standard antibiotic tetracycline and ampicilin.

Results

Qualitative Phytochemical Study

The preliminary phytochemical analysis reveals the presence or absence of secondary metabolites in *Adathoda vasica, Saraca Indiaca, Moringa oleifera,* and *Boerhaavia diffusa* plants are shown in [Table-1].

Antibacterial Activity Study

In the present study the Petroleum ether, Chloroform, Ethanol and aqueous extraction of all plants were screened for anti bacterial and anti fungal activity against *E. coli, Aspergillus niger* and *Aspergillus flavus* at the concentration of 250 µg (25 mg)/ml and 500 µg (50 mg)/ml per well using agar well diffusion method.

The organic extracts i.e. Petroleum ether, chloroform and Ethanol extracts of *Adathoda vasica, Saraca Indiaca, Moringa oleifera* and *Boerhaavia diffusa* plants have exhibited moderate to significant antibacterial and antifungal activity. The aqueous extract showed no activity on agar well diffusion in all organisms. The results were shown in [Table-2].

Table 1- The Phytochemical analysis of the extracts

Phytocontituents and Tests / Plants	*Adathoda vasica*	*Saraca indica*	*Moringa oleifera*	*Beorhaavia diffusa*
Alkaloids (Wagner Test)	-	+	-	-
Flavanoids (Shinoda Test)	+	-	-	-
Glycosides (Molischs Test)	+	+	-	-
Phenol (Phenol Test)	+	+	+	+
Saponines (Foam Test)	+	+	+	+
Sterols (Burchard Test)	+	+	+	+

Table 2- Antibacterial (E. coli) and Antifungal (Aspergillus niger & Aspergillus flavus) activity of some medicinal plant extracts

Sl. No	Plants	Conc. (µg /ml)	*E. coli* Zone of inhibition in mm			*Aspergillus niger* Zone of inhibition in mm			*Aspergillus flavus* Zone of inhibition in mm		
			Petroleum Ether	Chloroform	Alcohol	Petroleum Ether	Chloroform	Alcohol	Petroleum Ether	Chloroform	Alcohol
1	*Adathoda vasica*	250	14.1	16.8	23.4	14.1	16.8	23.4	14.1	17.2	17.3
		500	14.2	18.5	27.5	14.2	18.5	27.5	10.9	20.2	21.2
2	*Saraca indica*	250	20.2	12.1	12.2	20.2	12.1	12.2	18.9	16.2	16.2
		500	22.4	19.2	18.9	22.4	19.2	18.9	15.1	13.2	10.7
3	*Moringa oleifera*	250	14.2	12.3	17.2	14.2	12.3	17.2	13.2	16.6	22.4
		500	14.4	20.4	21.9	14.4	20.4	21.9	16.2	17.6	23.2
4	*Beohaavia diffusa*	250	12.5	12.2	19.2	12.5	12.2	20.5	15.4	12.1	16.1
		500	18.5	18.2	20.5	18.5	18.2	19.2	12.6	10.1	19.9

Discussion

Qualitative Phytochemical Study

The preliminary analysis reveals the presence of flavanoids and alkaloids in *Adathoda vasica*, and absent in *Saraca indiaca, Moringa oleifera, Boerhaavia diffusa*. The Glycosides are present in *Adathoda vasica* and *Saraca indica* and are absent in *Moringa oleiofera* and *Boerhaavia diffusa*. Phenols, Saphonines and Sterols are present in *Adathoda vasica, Saraca indiaca, Moringa oleifera* and *Boerhaavia diffusa*. By our Phytochemical analysis we have concludes that the plant extracts of *Adathoda vasica* contains all the secondary metabolites except alkaloids.

Antimicrobial Activity Study

The plants which are selected shown better antimicrobial activity against bacterial and fungal species. The leaf extract of *Adathoda vasica* which was prepared in petroleum ether, Chloroform and Alcohol are very effective against *E. Coli* however the solution which was prepared in water didn't showed any effect against the bacterial strain. The maximum activity is shown by *Adathoda vasica* followed by *Boerhaavia diffusa, Saraca indica* and *Moringa oleifera.*

The antifungal activity is shown by all four plants assayed against *E. coli*, *A. Niger* and *A. flavus*. In antifungal activity *Adathoda vasica, Saraca indica* and *Moringa oleifera* have shown good result but *Beorhaavia diffusa* is not. The maximum antifungal activity was shown by *Adathoda vasica* and followed by other three plants.

The zone of inhibition diameter formed by these plants extract are varies from 0.3 to 23.2 mm and we have compared these with standard antibiotics, similar work and results observed.

Conclusion

In our study it conclude that all the plants used shown the good results, but the plant *Adathoda vasica* is rich in all the Phytochemical constituents and showing maximum antibacterial and antifungal activity, from this we can purify and standardize the drugs to treat diseases.

Conflicts of Interest : None declared.

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