PHYTOCHEMICAL INVESTIGATION AND ANTIBACTERIAL ACTIVITY OF HEMIGRAPHIS COLORATA LEAF EXTRACT

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Abstract

Screening of phytochemicals is a valuable stair in the revealing of bioactive principles present in particular medicinal plant and may lead to novel drug discovery. In the present study, the physicochemical parameters were analysed in *Hemigraphis colorata* leaves. Screening of the plants was performed using standard methods and resulted in the detection of the presence of tannins, flavonoids, phenolics, saponins, steroids, alkaloids, Phytosterols, Triterpenes, Glycosides, proteins, Coumarins and Carbohydrates present in Hemigraphis colorata leaves. Further studies are needed with this plant to evaluate their pharmacological potentials such as antibacterial activity of the bioactive compounds responsible for their activities and other medicinal values.

Index terms: Medicinal plant, *Hemigraphis colorata*, Physico-chemical parameters, Antimicrobial activity.

Introduction

Natural products especially from plant sources, including species have been investigated for their characteristics and health effects. Plants have designed the basis of classy traditional medicine practices that have been used for thousands of years by people in China, India and many other countries[1]. Now day's herbal products have potential for treatment of many diseases. Cancer is a worldwide disease causes death approximately 22% up until 1990. In 2000 there were 10 million new cases and over 6 million deaths worldwide. Most of the plants possess many biological activities such as Antioxidant, Anticancer, Antimicrobial, Antidiabetic, Anti-inflammatory, Anthelmintic, Anti-nociceptive, Anti-diarrheal, Anti-elasticity and Antidiuretic activity**.**

Plant chemicals are regarded as secondary metabolites because the plants that manufacture them may have little need for them. They are synthesized in all parts of the plant body; bark, leaves, stem, root, flower, fruits, seeds etc. i.e. any part of the plant body may contain active components[2]. These chemical substances are called secondary metabolites. The most important of these bioactive groups of plants are alkaloids, terpenoids, tannins, saponins and phenolic compounds[3]. Correlation between the phytoconstituents and the bioactivity of plant is desirable to know for the synthesis of compounds with specific activities to treat various health ailments and chronic disease as well. Generally, the presence of different phytochemicals in crude plant extracts has been linked to the detrimental effects of leachates, root exudates or decomposing residues of such plants on the other vegetation or succeeding crops [4]. Owing to the significance in the above context, such preliminary phytochemical screening of plants is the need of the hour in order to discover and develop novel therapeutic agents with improved efficacy. Phytochemical analyses of several species of medicinal plants and allelopathic activities of the crude chemical compounds on crops and plants have yielded positive results[5]. The present study revealed the qualitative phytochemistry of *Hemigraphis colorata* medicinal plant used by the peoples of Kanyakumari District, Tamilnadu, India.

MATERIALS AND METHODS

Collection of Plant Material

The matured leaves of *Hemigraphis colorata* was collected from Kuzhithurai of Kanyakumari district. Freshly collected *H. colorata* leaves were washed in running tap water washed for 3 minutes. Then the plant parts were rinsed with sterile distilled water thoroughly to remove residues. Excess moisture was removed from the sterilized leaves .Then they were subjected to solvent and crude extraction

Phytochemical screening Preliminary qualitative phytochemical screening was carried out with the following methods [6].

Saponins:Forth test: About 2g of the powdered sample is boiled with 20ml of distilled water in a water bath and filter. 10 ml of the filtrate is mixed with 5 ml of distilled water and shake

vigorously for a stable persistent forth. The frothing is mixed with 3 drop of olive oil and shakes vigorously. The formation of emulsion for the positive result can be observed.

Steroids: Libermann Burchard test: To 0.5 ml of the extract, add 2ml of acetic anhydride and 2ml of concentrate H2SO4 along the sides of the tube. The formation of green colour indicates the presence of steroids.

Glycosides: Keller-Killani test: To 5ml of the extract is treated with 2ml of glacial acetic acid containing one drop of ferric chloride solution and 1ml of concentrated sulphuric acid. A brown ring at the interface indicates the presence of cardiac glycosides.

Terpenoids: Salkowski test: To 5ml of the extract, add 2ml of chloroform and 3ml of concentrated H2SO4. Formation of yellow colour ring at the interface of the two liquids that turns reddish brown colour after two minutes, showed the presence of terpenoids.

Phenols: Liebermann’s test: To 1ml of extract add 1ml of sodium nitrite, few drops of diluted sulphuric acid and 2ml of diluted NaOH. Appearance of deep red or green or blue colour indicates presence of phenol.

Tannins: Modified Prussian blue test: To 1ml of the extract, add 1ml of 0.008M potassium ferricyanide and 1ml of 0.02M FeCl3 in 0.1 M HCl. Appearance of blue colour indicates the presence of tannins.

Saponins: Test for coumarins

10% NaOH (1ml) was added to 1 ml of the plant extracts. Formation of yellow colour indicates the presence of coumarins [7].

Proteins: Xanthoprotein test

The extracts were treated with few drops of concentrated nitric acid. Formation of yellow colour indicates the presence of proteins [8].

Test for carbohydrates:Molisch’s test

To two or three ml of the aqueous extract two drops of alpha napthol solution in alcohol is added and shaken well. Then add concentrated sulphuric acid from the sides of the test tube. Violet ring formation indicates the presence of carbohydrates [9].

Antibacterial activity

Antibacterial activity of samples was determined by agar well diffusion method according to National Committee for Clinical Laboratory Standards (NCCLS). Inoculum

containing 106 cfu/ml of each bacterial culture to be tested was spread on nutrient agar plates with a sterile swab moistened with the bacterial suspension. Subsequently, wells of 8 mm diameter were punched into the agar medium and filled with 100 µl (25 mg/ml) of sample and allowed to diffuse at room temperature for 2 h. The plates were then incubated in the upright position at 37° for 24 h. while standard antibiotic discs of imepenem (10 µg). After incubation, the diameters of the growth inhibition zones were measured in mm [10].

Results and Discussion

The preliminary qualitative phytochemical screening of the H. colorata leaves was done to assess the presence of bioactive components. The hot water extract of *H. colorata l*eaf shows positive result in carbohydrates, tannins and negative results in alkaloids, tapernoids, saponins, flavonoids, cardiac glycosides, steroids, phenols, proteins and amino acids were determined[11]. (Table 1).

Table 1: Preliminary phytochemical screening Analysis of *H. colorata* leaves

Name of the phytochemical	**Name of the test**	**A**	**C**	**E**
Alkaloids	Wagner's test	+	+	-
Saponins	Froth test	+	-	-
	Foam test	+	-	-
Phenol	Ferric chloride test	+	+	+
Phytosterols	Libermann- Burchard's test	+	+	-
Proteins	Xanthoprotein test	+	+	-
Triterpenes	Salkowski test	+	+	+
Glycosides	Glycoside test	+	-	-
	Concentrate sulphuric acid test	+	-	+
Tannins	Lead acetate test	+	-	-
Steroids	Salkowski's test	+	+	-
Coumarins	10%NaOH+1ml plant extract	+	-	+
Flavonoids	Pew's test	+	+	+
	NaOH test	+	+	+

Carbohydrates	Molisch's test	+	-	-

where, A-Aqueous extract, C - Chloroform extract, E - Ethanol extract,

+ indicates present, - indicates absent

Antibacterial Activity

In present study, the leaf extract of *H. colorata* showed antibacterial activity against the tested pathogens Escherichia coli and Basillus subtilis. The maximum Zone was observed for *E.coli* (13 mm) at the concentration of 80 mg/mL, while for , Basillus subtilis the maximum Zone was recorded as 12 mm, at the concentration of 80 mg/mL. This shows that the plant has significant antimicrobial activity [12].

Conclusion

Many plants are known to have beneficial therapeutic effects has noted in the traditional Indian system of medicine, Ayurveda. The effects of plant extracts on bacteria have been studied by a very large number of researchers in different parts of the world. Hence the last decade witnessed and increased in the investigation of plants as a source of human disease management. Based on above ideas *H. colorata* possessed medicinal properties and so it can be used to discover bioactive natural products that may serve as leads for the development of new pharmaceuticals that address unmet therapeutic needs such screening of warriors natural organic compounds and identifying active agents is the need of the hour, because successful prediction of lead molecule and drug like properties at the onset of drug discovery will pay off later in drug development. From the results of the study it is concluded that *H. colorata* possessed considerable level of bioactive compounds and therefore, these species can be used as a potential source of drugs.

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