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Research Article

Evaluation of Phytochemical and Antimicrobial Activity of Indigofera Uniflora

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ABSTRACT

Indigofera uniflora Buch. Distributed in the sourthern part of India particularly in TamilNadu. The selected medicinal plant was collected from tirunelveli district. The work carried out in the plant is much less, the present work was designed to investigate the prelimanary phytochemical and antimicrobial activity of the whole plant. Phytochemical screening of extracts of *Indigof era uniflora* revealed the presence of carbohydrate, alkaloids, glycosides, flavonoids, tannins, phenolic compounds and saponins. The extracts had shown the activity to inhibit the growth of gram positive bacteria namely *Staphylococcus aureus, Bacillus substilis, Streptococcus faecalis,* gram negaitive *bacteria Esterichia coli ,Pseudomonas aeruginosa* and *Klebsiella pneumonia* and the zone of inhibition of 18-24 mm respectively. Anti fungal activity against fungi strains such as *Aspergillus niger, Aspergillus fumigatus, Mucor, Candida albicans*. This study *Indigofera uniflora* have profound antimicrobial effect.

INTRODUCTION

India is the birth place of renewed system of indigenous medicines such as Siddha, Ayurveda and Unani. Traditional systems of medicines are prepared from a single plant or combinations of more than one plant. These efficiency depends in the current taxonomic identity of plant species, use of proper plant part and its biological potency which in turn depends upon the presence of required quantity and nature of secondary metabolite in a raw drug. In this modern world, nowadays plant based drugs are widely used and many countries contributes 40-50% of their total, health budget in the production of novel drugs[1-2].

Indigofera is a large genus of about 700 species of lowering plants belonging to the family Fabaceae. They occur throughout the tropical and subtropical regions of the world, with a few species reaching to temperature zone in eastern Asia. The species are shrubs, though some are herbaceous and a few can become small trees up to 5-6 m (16-20 ft) tall[3-4].

Of the various *Indigofera* species and *Indigofera tinctoria* and *Indigofera suffruticosa* are especially used to produce the dye indigo[5]. Several species of this group are used in anticancer therapy[6]. The herbs are generally regarded as an analgesic with anti inflammatory activity. *Indigofera articulate* is used for toothache and *Indigofera oblongifolia was used as an anti-inflammatory* for insect stings, snakebites and swellings. *Indigofera aspalathoides* have also been used as anti-inflammatories[7]. The aim of the study was to carry out the preliminary phytochemical and antimicrobial activity of the extracts of *Indigofera uniflora Buch.* and it is a perennial with slender branched stems, leaves are small and pale green color. The entire plant is traditionally used for various ailments. So it is very essential to determine the speciality of the plant with respect to the medical application.

MATERIALS AND METHODS

Plant materials and Extraction

The plant was collected in Tirunelveli district, TamilNadu, South India. Plants were confirmed by Botanist, Central Siddha Research Unit, Tirunelveli.

The collected plants were shade dried and coarsely powdered by using mixer grinder. These coarse powders (20g) were then subjected to successive extraction in various solvents by gradually increasing the polarity such as hexane, chloroform and methanol (each 250 ml) by using Soxhlet apparatus. The collected extracts were then taken up for further investigations. The DMSO (Dimethyl sulfoxide) is act as dissolved solvents for these extracts.

Evaluation of Antimicrobial Activity[8]

Bacteria tested

Totally six bacterial strains were used throughtout the investigation namely *Staphylococcus aureus, Bacillus substilis, Streptococcus faecalis* (*gram positive*), *Esterichia coli ,Pseudomonas aeruginosa* and *Klebsiella pneumonia* (*gram negaitive*).The fungal strains used in the study viz., *Aspergillus niger, Aspergillus fumigatus, Mucor, candida albicans* .

Antimicrobial Activity

Antimicrobial activity was screened by disc diffusion method (Maruzella and Percival). The inocula were prepared by inoculating the test organisms in culture media and incubating them for 24 hrs at 37ºC for the bacteria, while for fungi Saboraud's dextrose broth was used and was incubated for 48 hrs. The respective standard drugs (Table - 2) were tested for positive control, the plates were incubated at 37ºC for 24hrs. The diameter of the inhibition zones observed and its value noted (in mm).

Preliminary Phytochemical Analysis

The preliminary phytochemical studies were carried out by the methods described by Siliva[9].The plant extracts was assayed for the presence of glycosides, flavonoids, tannins, phenolic compounds and saponins.

RESULTS

The results of preliminary phytochemical analysis on the plant of different solvents extracts of *I. uniflora* showed for the presence of some preliminary phytochemical substances like of carbohydrate, alkaloids, glycosides, flavonoids, tannins, phenolic compounds and saponins (Table – 1).

The results of antimicrobial activites of aqueous, hexane, chloroform and methanol extracts from the plant of *I. uniflora* showed wide spectrum of activity against tested microorganisms namely *Staphylococcus aureus, Bacillus substilis, Streptococcus faecalis* (*gram positive*), *Esterichia coli ,Pseudomonas aeruginosa* and *Klebsiella pneumonia* (*gram negaitive*).The fungal strains used in the study viz., *Aspergillus niger, Aspergillus fumigatus, Mucor, candida albicans* (Table – 2). All the organisims found to be better activity.

DISCUSSION

Herbal plants are nature's gift used to prevent and control the diseases in all over theworld. The results highlighted that antimicrobial activities of crude extracts of *I. uniflora* were tested against six bacterial strains four fungi strains respectively and better activity was noted in most of the bacteria, the organic solvents extracts of medicinal herbs contributed better antibacterial activity because of the easy extraction of bioactive chemical constituents. The overall results focuses the plant extracts may be potent bacteriostatic/ bactericidal agents against bacterial strains.

The results from this investigation indicates that the medicinal plants extracts offer significant potential for the development of novel antibacterial therapies and treatments of several diseases caused by microorganisms. This study support further research will be needed for identification of the bioactive compounds of the plant which are responsible for the pharmacological action against the disease causing human pathogens.

Table 1: **Prelimanary Phytochemical screening of the plant of *Indigofera uniflora***

Constituents	Extracts		
	Hexane	Chloroform	Methanol
Alkaloids	+	-	-
Flavonoids	+	-	+
Saponins	+	+	+
Tannins	+	-	+
Steroids	-	+	+
Carbohydrates	+	-	+
Glycosides	-	+	+
Proteins	+	-	-
Terpenoids	+	+	+
Phenolic groups	+	-	+

+ = Positive, - = Negative

Table 2: Antimicrobial Activity of organic solvents extract of *I.uniflora*

Organisms Tested	Diameter of zone of growth inhibition (in mm)		
	Hexane (µg/ml)	Chloroform (µg/ml)	Methanol (µg/ml)
Staphylococcus aureus	24	14	22
Bacillus substilis	20	18	24
Streptococcus faecalis	30	12	22
Esterichia coli	22	14	24
Pseudomonas aeruginosa	30	18	22
Klebsiella pneumoniae	24	12	22
Aspergillus niger	24	18	20
Aspergillus fumigates	22	12	24
Mucor	24	12	24
Candida albicans	22	18	24
Standard antibiotic: Ciprofloxacin (5µg/disc) , Clotrimaxozole (100 units/disc)			

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