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PHYTOCHEMICAL AND ANTIMICROBIAL PROFILE OF *TEPHROSIA PURPUREA*

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ABSTRACT

In the present study the phytochemical analysis and Anti microbial activity were performed on different solvent extractions like Hexane, Ethyl acetate, Methanol, Ethanol and Aqueous extract of *Tephrosia purpurea*. Among the all solvent extracts methanol, ethanol and aqueous extracts have shown the presence of phytochemicals (flavonoids, tannins, phenols, cardiac glycosides). Anti microbial activity was screened with some gram positive (*Staphylococcus aureus*) and gram negative (*E.coli*) and few fungal strains in methanol, ethanol and aqueous extracts. The maximum inhibitory zone of was noted in the methanolic extracts, which exhibited *Tephrosia purpurea* possess potent antimicrobial effect. The positive effect of *Tephrosia purpurea* validates its therapeutic potential against infectious diseases.

Keywords: Phytochemical Screening, Anti microbial activity, *Tephrosia purpurea*.

INTRODUCTION

From ancient times plants have provided a source of inspiration for novel drug compounds, as plant derived medicines have made large condition to human health well being. Medicinal plants and herbal preparations have recently received considerable attention and have been found to be promising choice over modern medicines, in a number of studies. According to World Health Organization (WHO) more than 80% of the world's population uses of plants for the treatment of their diseases [1,2]. *Tephrosia purpurea* belongs to the family Fabaceae, subfamily Faboideae, tribe Millettieae, and it is a highly branched suberect herbaceous perennial, up to 60 m in height with spreading branches; the leaves are imparipinnate, with narrow, oblanceolate leaflets; the flowers are red or purple in extra-axillary racemes, the pods are slightly curved, 3-4.5 cm long, grey, smooth and containing 5-10 seeds per pod [3]. The plant grows abundantly in the upper Gangetic plains, and western Himalayas. The herb is commonly grown as a green manure in paddy fields in India and in tobacco and rubber plantation in other countries. In the Ayurvedic system of medicine, the whole plant has been used to cure tumours, ulcers, leprosy, allergic and inflammatory conditions such as rheumatism, asthma and bronchitis [4]. *T. purpurea* is an important drug of indigenous systems of medicine and has been attributed a number of medicinal properties in ayurveda. The plant has been claimed to cure disease of kidney, liver, spleen, heart and blood. Plant is used as antipyretic, as a remedy for

impotency and to treat asthma, bronchitis, diarrhea, rheumatism and dental caries 2, 3[5]. The root contains tephrosin, deguelin, isotephrosin and rotenone. Leaves contain 2% glycoside osyritin, β -sitosterol, rutin and lupeol 4. Present work was undertaken to study antioxidant potential of the plant.

MATERIALS AND METHODS

Leaves of *Tephrosia purpurea* were collected from fields near to Nagamagalum Hills, Krishnagiri district, Tamilnadu, India.

Preparation of Plant Extracts

The samples of *Tephrosia purpurea* were collected and washed well in tap water first and then with the distilled water. About 20 gm of the sample were taken along with 200 ml of ethanol, chloroform, Hexane and methanol for using soxhlet apparatus used for qualitative analysis.

Phytochemical Analysis

The powdered plant material was subjected to preliminary phytochemical analysis to test presence or absence of phytochemical constituents the qualitative analysis of tannins, phenols, glycosides, alkaloids, steroids and flavonoids were analyzed by standard method [8].

Antibacterial Assay

The same method as for bacteria adopted.

RESULTS

Table 1. Preliminary phytochemical screening of selected solvent extracts of *Tephrosia purpurea*

S.No	Parameter	Ethyl alcohol	Methanol	Hexane	Chloroform
1.	Alkaloids	++	++	++	--
2.	Flavonoids	+	+	+	+
3.	Tannins	++	++	++	++
4.	Steroids	++	++	+	-
5.	Phenol	+	++	+	++
6.	Cardio glycosides	++	+	++	++
7.	Quinone	--	+	--	--
8.	Terpenoid	-	+	-	-
9.	Resins	-	-	-	+

(+) as indicate presence, (-) as indicate absence

Table 2. Antibacterial activity of selected solvent extracts of *Tephrosia purpurea*

Species	Methanol				Ethyl alcohol				Chloroform				Hexane			
	25µg	50µg	75µg	100µg	25µg	50µg	75 µg	100µg	25µg	50µg	75µg	100µg	25 µg	50 µg	75 µg	100µg
<i>Staphylo coccus aureus</i>	10± 0.1	13± 0.1	15.1± 0.5	16.9± 0.1	9.5± 0.4	12± 0.1	12.8± 0.2	-	8.5± 0.3	3.5± 0.3	6.0± 0.1	7.1 ± 0.3	8.0± 0.1	10.0± 0.1	15.0± 0.2	17.1± 0.1
<i>E.coli</i>	11± 0.1	12± 0.2	16.1± 0.1	19± 0.1	9± 0.1	11± 0.2	19.1± 0.1	22± 0.1	11.5± 0.1	4.5± 0.1	6.1± 0.3	9.1± 0.2	11± 0.2	9.0± 0.4	13.0± 0.5	15.0± 0.1

Values are Mean ± S.D

Table 3. Antifungal activity of different solvent extracts of *Tephrosia purpurea*

Species	Methanol				Ethyl alcohol				Chloroform				Hexane			
	25µg	50µg	75µg	100µg	25µg	50µg	75µg	100µg	25µg	50µg	75µg	100µg	25µg	50µg	75µg	100µg
Erythro mycin	10± 0.4	9.0± 0.3	12± 0.6	10.0± 0.5	11± 0.7	10± 0.5	12± 0.9	10± 0.4	9± 0.8	10± 0.6	12± 0.3	13± 0.2	9± 0.9	10± 0.6	11± 0.2	10± 0.4
Aspergillus niger	2.5± 0.1	4.5± 0.5	5.0± 0.4	8.0± 0.5	5.0± 0.6	8.5± 0.5	2.0± 0.9	2.0± 0.9	8.5± 0.3	3.5± 0.3	6± 0.1	7.1± 0.3	8± 0.1	3.0± 0.1	5.0± 0.2	6.0± 0.1
Alternaria	2.0± 0.8	4.0± 0.4	3.0± 0.3	6.0± 0.7	6.0± 0.5	7.0± 0.2	2.5± 0.4	6.5± 0.5	3.5± 0.1	4.5± 0.1	6.1± 0.3	9.1± 0.2	3.5± 0.2	9± 0.4	4.8± 0.5	7.0± 0.1

Values are Mean ± S.D

Antibacterial activity of plant extracts was carried using cup-plate agar diffusion method with some minor modifications. The inoculate medium was incubated in 24 hours [9].

Antifungal Assay

The same method as for fungal adopted. The cup-plate agar diffusion method was adopted with some minor modifications to assess the antifungal activity of prepared extracts. The inoculate medium was incubated in 24 hours [10].

DISCUSSION

Phytomedicine derived from plants have shown treatment on inter taken infectious disease including opportunities AIDS infection. Historical plants are provided source of impression novel drug compounds has plant derived medicine have made large contribution to human

health and well being (11). The preliminary phytochemical results of selected solvent extracts of *Tephrosia purpurea* were show in the Table 1. Secondary metabolites like steroids, saponins, triterpenoids, Alkaloids, carbohydrate, flavonoids, tannins, glycosides, and polyphenols were tested in all extracts. Tannins, flavonoids, Alkaloids, glycosides, steroids were present in all solvents extract. Resins were present in chloroform extracts. Quinone were present in methanol and are completely absent in all the other extracts [12]. The quantitative analysis results explores the presence of good store of phytochemical constituents, which signifies *Tephrosia Purpurea* will certainly provide valuable therapeutic natural tool for number of infections.

Antimicrobial Activity

The antimicrobial activity was performed based on the phytochemical results. Among all extracts, methanol, ethyl alcohol, chloroform, and hexane were selected for

antimicrobial activity and tested against Gram- positive, Gram- negative and fungal species (*Staphylococcus aureus*, *Escherichia coli* and *Aspergillus niger* and *alternaria*) The results revealed that the extracts showed moderate to high antimicrobial activity against all the tested microbial strains. Among all the solvents, ethanol was proved as the most effective solvent for extracting broad spectrum of antibacterial compounds from plants [13]. The antibacterial activity of the plants may be due to the presence of various active principles in them. In the present study the inhibitory action of the *Tephrosia purpurea* extract was found to increase with an increase in concentration against the selected bacterial and fungal strains. The zone of inhibition developed against the bacterial species seems to be interesting and notable. All the organisms responded to the plant extract but inhibitory zone developed varied according to the concentrations. The antimicrobial activity was evaluated from the zone of inhibition (Table-2). With increase in concentration of the extracts from 25 to 100 µl an apparent increase in antimicrobial activity was observed in all the extracts. Methanol extract at a concentration of 75 to 100 µl showed the highest degree of inhibition followed by methanol and ethyl alcohol extracts (Table 2).

Antifungal activity of various solvent extracts of *Tephrosia purpurea* (Methanol ethyl alcohol ,chloroform and Hexane) were studied using Rose Bengal Agar medium by Cup diffusion method using erythromycin as standard against the fungal strain are *A.niger* and *Alternaria* the zone of inhibition assessed in millimeter in diameter. The fungal strains *A. niger* and *Alternaria* were used for this study [14]. From the table 3, the methanolic extract of *Tephrosia purpurea* exhibited effective zone of inhibition and compared with this standards erythromycin

against the fungal strains namely *Aspergillus* and *Alternaria*. It show the zone of inhibition at 50µl (3.0mm) and moderate zone of inhibition at 75µl (6.5mm) *Alternaria* seems to be lethal to the *Tephrosia purpurea*. The antifungal activity of methanol extract of *Tephrosia purpurea* possess notable zone of inhibition. The zone of inhibition of two different fungal strains *A. niger* and *Alternaria* [15] both the sample species (*A. niger* and *Alternaria*) showed responses against *Tephrosia purpurea* at varied concentration from 25 to 100µl. From the selected extracts of *Tephrosia purpurea* , ethyl alcohol extract showed the maximum zone of inhibition against *Aspergillus niger* and *Alternaria*. The results revealed that the selected extracts *Tephrosia purpurea* showed moderate to high antimicrobial activity against tested against microbial strains.

These plants have a wide range of therapeutic activity. The study has revealed the presence of many secondary metabolites and bioactive phyto compounds in the use of *Tephrosia Purpurea* which might be of a very important medicinal value [16-21]. They are more effective against human pathogens such as *E.coli*, *staptylococcus*, The antimicrobial activity of the crude extract from the leaves of *Tephrosia purpurea* may be due to the presence of various phytochemical constituents in them. Further study is needed for the isolation of the bioactive constituents present in *Tephrosia purpurea* plant there by it can recommended as a natural source to act as novel antimicrobial agents

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