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RESEARCH ARTICLE

SCREENING OF MEDICINAL PLANT *JUSTICIA GENDARUSSA BURM.F* FOR ITS ANTIBACTERIAL AND ANTIOXIDANT ACTIVITY FROM DIFFERENT LOCALITIES

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ABSTRACT

Justicia is a genus of about 420 species of flowering plants in the family Acanthaceae native to tropical to warm temperate regions of the America with two species occurring north into cooler temperate regions. *Justicia gendarussa* is a traditional medicine used in treating ailments such as arthritis, paralysis, diaphoretic, diuretic, antispasmodic properties. The term Phytochemical means the chemicals found in plants. The phytochemical screening demonstrated the presence of different types of compounds like carbohydrates and flavonoids. Antibacterial activity reported against pathogens such as *Escherichia coli, Stretomyces aureus. Pseudomonas* showed that the plant extract can be used to treat diseases caused by these bacteria. Antioxidant activity was determined at ambient temperature by means of a 2,2-diphenyl-1-1-picrylhydryzyl (DDPH) colorimeter.

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INTRODUCTION

Justicia is a genus of about 420 species of flowering plant in the family *Acanthaceae*. The whole plant is useful in treating various diseases and disorders. Antimicrobial drugs either kill microbes (microbicidal) or prevent the growth of microbes (microbiostatic). Antioxidant are radical scavengers which protect the human body against free radicals that may cause pathological conditions such as ischemia, anaemia, asthma, arthritis, inflammation, neuro-degeneration, Parkinson's diseases, mongolism, ageing process and perhaps dementias. A rapid, simple and inexpensive method to measure antioxidant capacity of food involves the use of the free radical, 2, 2-diphenly-1-picrylhydrazyl (DPPH).The DPPH method\can be used for solid or liquid samples and is not specific to any particular antioxidant component, but applies to the overall antioxidant capacity of the sample. The aim of the study was to screen the plant material for its phytochemical, antibacterial and anti-oxidant collected from different localities.

MATERIALS AND METHODS

Justicia gendarussa were collected from Ariyalur, and Chennai Pachiappa's College. Leaves of *Justicia gendarussa* were shade dried finely powdered and were put in different solvents (Acetone, Chloroform, Distilled water, Ethanol) and kept in a shaker for two days. The extract is subjected to evaporation under sunlight used for antimicrobial and antioxidant analysis. All the extracts obtained by successive extraction method are subjected to qualitative phytochemical analysis.

Phytochemical test (Kokate, 2001)

1. Test for Carbohydrates

To 2ml of plant extract, 1ml of Molisch's reagent was added. Presence of purple (or) reddish colour indicates presence of Carbohydrates.

2. Test for Tannins:

To 1ml of plant extract, 2ml of 5% ferric chloride was added. Formation of dark blue or greenish black colour indicates the presence of tannins.

3. Test for Saponins:

To 2ml of filtrate, 2ml of Distilled water was added and shaken in a graduated cylinder for 15mins lengthwise of 1cm, layer of foam indicates the presence of Saponin.

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4. Test for Flavanoids:

To 2ml of filtrate, 1ml of 2N NaOH was added presence of yellow colour indicates the presence of flavonoids.

5. Test for Alkaloids:

To 2ml of filtrate, 2ml of concentration HCl was added. Then few drops of Mayer's reagent were added. Presence of green colour (or) white colour precipitate indicates the presence of Alkaloids.

6. Anthocyanin & Betacyanin:

To 2ml of filtrate, 1ml of 2N Sodium hydroxide and heated for 5mins at 100°c formation of yellow colour indicates the presence of Betacyanin & formation of blue green colour indicates the presence of Anthocyanin.

7. Test for glycosides:

To 2ml of filtrate, 1ml of glacial acetic acid & 5% ferric chloride was added. Then few drops of concentrated H_2So_4 were added. Presence of green colour indicates the presence of glycosides.

8. Test for Protein:

To 2ml of filtrate, 1ml of 0.2% Ninhydrin reagent was added and heated blue colour reveals the presence of proteins.

Antibacterial activity

Peptone was taken as control for antibacterial activity. Bacterial culture was inoculated in the test tubes. To check the turbidity the following microorganisms were treated with the extract *Staphylococcus aureus, Klebsiellapneumonia, Pseudomonas aeruginosa.*

Anti oxidant/free radical scavenging activity

The extract was filtered and dried. The extract was dissolved in methanol with a final concentration of 1mg/ml. The free radical scavenging activity of the extract was analysed by the DPPH. The extracts were dissolved in 1ml of methanol and mixed with 1ml of DPPH solution. The mix was vortex and incubated for 30mins. The O.D of the solution was then measured at 517nm in UV spectrometer.

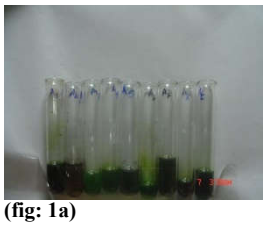
$$\text{Radical scavenging activity} = \frac{\text{Absorbance of Control} - \text{Absorbance of Sample}}{\text{Absorbance of control X 100}}$$

RESULTS

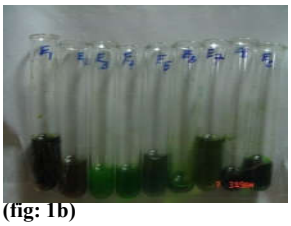
The results of phytochemical analysis of *Justicia gendarussa* leaves extracts from different localities were tabulated (Table 1) and illustrated (Fig 1a-3d). Antibacterial activity of *Justicia gendarussa* leaves (Fig 4) and antioxidant activity of *Justicia gendarussa* leaf extracts were tabulated (Table 2).

Results of phytochemical analysis of *Justicia gendarussa*

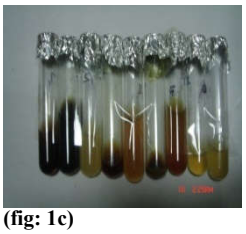
Sample 1



(fig: 1a)



(fig: 1b)

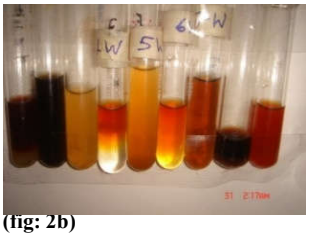


(fig: 1c)

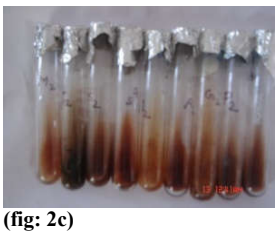
(fig: 1d)

Sample 2

(fig: 2a)



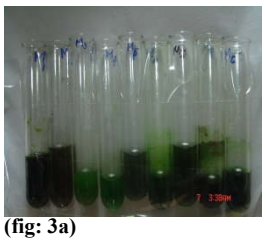
(fig: 2b)



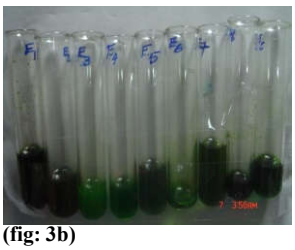
(fig: 2c)

(fig: 2d)

Sample 3

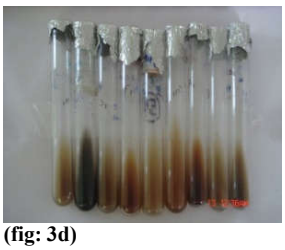


(fig: 3a)



(fig: 3b)

(fig: 3c)



(fig: 3d)

Table 1. Phytochemical analysis of *Justicia gendarussa*

Sample 1 (Ariyalur)					Sample 2 (Chennai Pachippas)				Sample3(Tissue Hardened Plant)			
Phytochemicals	AC	ETH	CHF	AQ	AC	ETH	CHF	AQ	AC	ETH	CHF	AQ
Alkaloids	+	+	-	+	-	-		-	-	-	+	-
Carbohydrates	+	-	+	+	+	+	+	+	+	+	+	+
Flavonoids	+	+	-	+	-	-	+	-	+	-	-	+
Glycosides	-	-	-	+	-	-	+	-	+	-	+	+
Saponins	+	+	+	+	+	-	+	-	+	-	+	+
Tannins	-	+	-	+	-	-	-	-	-	-	-	-
Protein	-	+	-	+	-	+	-	+	-	+	-	+

AC –Acetone; ETH-Ethanol; CHF-phytochemical. Chloroform; AQ-Aqueous.
'+' indicates the presence of the particular phytochemical
'–' indicates the absence of the particular phytochemical

Table 2. Antioxidant activity of *Justicia gendarussa* O.D Taken At 517nm

Solvent	Sample1	Sample2	Sample3
Aqueous	57.42	.891	8.016
Ethanol	73.68	0	30.25
Acetone	62.5	83.84	52.98
Chloroform	45.52	94.5	78.08

Fig.4. Antibacterial activity of *Justicia gendarussa* in sample 3

DISCUSSION

Phytochemical analysis

Phytochemical analysis of the leaf extract of *Justicia gendarussa* on three different locations shows that the alkaloids were absent in sample 2 (Fig2a -2d) and 3 (Fig 3a -3d) but were present extract of sample 1(Fig 1a-1d) Carbohydrates were present in all three samples except ethanol extract of sample 1 (Fig 1b). Flavonoids were present in all extracts of sample3 (Fig 3a -3d) and aqueous extract of sample1 (Fig 1d).But it was entirely absent in sample2 (Fig2a -2d). Glycosides in sample 1(Fig 1a-1d) and 3(Fig 3a -3d) and were absence in sample 2. Saponins were present in the ethanol extract of sample3 (Fig 3a -3d).Tannins were present in sample 1(Fig 1a-1d) and 3(Fig 3a -3d) but it was absent in sample 2 except acetone and ethanol extract. Sample 1(Fig 1a-1d) and 3 (Fig 3a -3d) had more phytocompounds than sample 2 (Fig2a -2d). On the whole, aqueous was able to extract the bioactive compounds well.

Antibacterial activity

The extracts of Sample 1 and 2 have shown no effects against the tested bacteria and there was no Zone formation in any of the extracts. Graph represents the zone of formation (mm) of Sample 3 (Fig 4) for all the tested organisms and shows maximum activity against bacilli for the acetone and ethyl acetate extracts.

Antioxidant activity

The chloroform extract of Sample 2 showed 94.30% inhibition of DPPH radicals and acetone extract (Sample 2) showed 83.84% inhibition of DPPH radicals. The chloroform extract of leaf (Sample 2) shows increase percentage of free radical scavenging activity. On comparing antioxidant activity (Table 2) of the three different samples of *Justicia gendarussa* the chloroform extract of sample 2 showed the maximum percentage inhibition of DPPH radicals among the other two different samples.

Conclusion

Justicia gendarussa collected from different localities exhibited various phytochemical, antibacterial and antioxidant properties. Phytochemical screening revealed the presence of bioactive components. Antibacterial activity showed that the extract can be treated against different bacteria like *Escherichia coli, Stretomyces aureus* and. *Pseudomonas.* Antioxidant activity showed maximum inhibition of DPPH. This plant has more medicinal values. Hence this plant can be used in therapeutic purposes in future.

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