

Phytochemical Screening and Antioxidant Activity of *Justicia tranquebariensis* and *Bauhinia Racemosa*

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Abstract

Introduction: The phytochemicals in medicinal plants are defined as bioactive non nutrient plant compounds in fruits, vegetables and grains that have been linked to reducing the risk of major chronic diseases. The medicinal plant are promising to have such have effective medicinal property due to presence of phytochemical compounds like alkaloids, tannins, flavonoids and phenolic compounds. The present study aimed to find the phytochemicals present in hexane and ethyl acetate extracts of *Justicia tranquebariensis* and *Bauhinia racemosa* and also find out the antioxidant property of these plant extracts. **Methods:** Phytochemicals present in the hexane and ethyl acetate extract of *Justicia tranquebariensis* and *Bauhinia racemosa* were identified by chemical methods. Antioxidant property was done by DPPH free radical scavenging method. **Results:** In *Justicia tranquebariensis*, hexane extract showed positive for flavonoids, alkaloids and coumarins. Ethyl acetate extract showed positive for flavonoids, alkaloids, cardiac glycosides, terpenoids, coumarins and steroids. Hexane extract of *Bauhinia racemosa* showed positive for flavonoids, alkaloids, quinines, cardiac glycosides, terpenoids and coumarins. Ethyl acetate extract showed positive for flavonoids, alkaloids, cardiac glycosides, terpenoids, coumarins and steroids. Ethyl acetate showed better extraction of phytochemicals than Hexane. Hexane and ethyl acetate extracts of *Justicia tranquebariensis* exhibited 66% and 90% respectively of free radical scavenging activity at a concentration of 150µg. Extracts of *Bauhinia racemosa* showed less antioxidant activity. **Conclusion:** This study suggests that the *Justicia tranquebariensis* extracts have good antioxidant property, which might be helpful in preventing of slowing they progress of diseases involved as result of oxidative stress.

Keywords

Alkaloids, Flavonoids, *Justicia tranquebariensis*, Antioxidant Activity and Ethyl Acetate

1. Introduction

Medicinal plants, as source of remedies, are widely used as alternative therapeutic tools for the prevention or treatment of many diseases. The recent studies have investigated that the antioxidant effect of plant products is mainly attributed to phenolic compounds such as flavonoids, phenolic acids, tannins etc [1], [2]. Accumulation of free radicals can cause pathological conditions such as ischemia, asthma, arthritis, inflammation, neuro-degeneration, Parkinson's diseases, mongolism, ageing process and perhaps dementia. Natural antioxidants have become the target of a great number of research studies in finding the sources of potentially safe, effective and cheap antioxidants [3]. Herbal drugs containing free radical scavengers are known for their therapeutic

activity [4]. In the present study the phytochemical screening and antioxidant activities of two medicinally important herbs *Justicia tranquebariensis* and *Bauhinia racemosa* were taken to identify its phytoconstituents and radical scavenging capacity.

Justicia tranquebariensis (Acanthaceae) is a small shrub, which is widely distributed in the southern parts of India. Some species of the genus *Justicia* have been used in the traditional system of medicine for the treatment of fever, [5] pain [6], inflammation [7], diabetes [8], diarrhea [9] and liver diseases [10]. The juice of small of small and somewhat fleshy leaves of this species of *Justicia* is considered by the natives of India as cooling and aperients, and is prescribed for the children in the smallpox, in the doses of a table-spoonful or two, twice daily; bruised leaves are also applied to blows and other external injuries [11]. As far as our

literature survey could ascertain, no information was available on the protective and curative effect of *Justicia tranquebariensis* leaf extract. Therefore the aim of this study was to investigate the protective and curative effect of *Justicia tranquebariensis* from India.

Bauhinia racemosa Lam. (Caesalpiniaceae) is a small bushy tree with drooping branches. The leaves are green and broader than long. The flowers are white or pale yellow, terminal or leaf-opposed racemes.[12-14] A new tetracyclic lupenol, betulin, β -sitosterol, and tetracyclic 2, 2-dimethylchroman have been isolated from the roots.[15,16] The seed contains flavonoids, crude protein, and lipid.[17,18] A methanolic extract of the stem and bark are used as an anti-inflammatory, analgesic and antipyretic.[19] A methanolic extract of the flower buds is used in the treatment of peptic ulcer.[20] The whole plant is used as a veterinary medicine in central India.

2. Materials and Method

2.1. Chemicals and Reagents

DPPH (2, 2-diphenyl-1-picrylhydrazyl) and all other chemicals and reagents used were of the highest analytical grade commercially available (21).

2.2. Collection and Identification of Plant Materials

Fresh leaves of *Justicia tranquebariensis* and *Bauhinia racemosa* were collected from Chinnapaliyapattu, Tiruvannamalai, Tamilnadu, India and presidency college, Chennai, Taminadu, India. The plants were identified by the Taxonomist at the Institute (NIPRD).

2.2.1. Phytochemical Tests

Preliminary phytochemical tests were carried out for aqueous extract of *A. deliciosa* to identify different phyto-constituents [21].

2.2.2. Test for Carbohydrates

To 2ml of plant extract, 1ml of Molisch's reagent and few drops of concentrated sulphuric acid were added. Presence of purple or reddish color indicates the presence of carbohydrates.(22)

2.2.3. Test for Tannins

To 1ml of plant extract, 2ml of 5% ferric chloride was added. Formation of dark blue or greenish black indicates the presence of tannins.(23)

2.2.4. Test for Saponins

To 2ml of plant extract, 2ml of distilled water was added and shaken in a graduated cylinder for 15 minutes lengthwise. Formation of 1cm layer of foam indicates the presence of saponins.(24)

2.2.5. Test for Flavonoids

To 2ml of plant extract, 1ml of 2N sodium hydroxide was added. Presence of yellow color indicates the presence of

flavonoids.(25)

2.2.6. Test for Alkaloids

To 2ml of plant extract, 2ml of concentrated hydrochloric acid was added. Then few drops of Mayer's reagent were added. Presence of green color or white precipitate indicates the presence of alkaloids.(26)

2.2.7. Test for Quinones

To 1ml of extract, 1ml of concentrated sulphuric acid was added. Formation of red color indicates presence of quinones.(27)

2.2.8. Test for Glycosides

To 2ml of plant extract, 3ml of chloroform and 10% ammonia solution was added. Formation of pink color indicates presence of glycosides.(28)

2.2.9. Test for Cardiac Glycosides

To 0.5ml of extract, 2ml of glacial acetic acid and few drops of 5% ferric chloride were added. This was under layered with 1 ml of concentrated sulphuric acid. Formation of brown ring at the interface indicates presence of cardiac glycosides.(25)

2.2.10. Test for Terpenoids

To 0.5ml of extract, 2ml of chloroform was added and concentrated sulphuric acid was added carefully. Formation of red brown color at the interface indicates presence of terpenoids.(25)

2.2.11. Test for Phenols

To 1ml of the extract, 2ml of distilled water followed by few drops of 10% ferric chloride was added. Formation of blue or green color indicates presence of phenols.(27)

2.2.12. Test for Coumarins

To 1 ml of extract, 1ml of 10% NaOH was added. Formation of yellow color indicates presence of coumarins.(27)

2.2.13. Phlobatannins

To 1ml of plant extract few drops of 2% HCL was added appearance of red color precipitate indicates the presence of phlobatannins.(25)

2.2.14. Steroids and Phytosteroids

To 1ml of plant extract equal volume of chloroform is added and subjected with few drops of concentrated sulphuric acid appearance of brown ring indicates the presence of steroids and appearance of bluish brown ring indicates the presence of phytosteroids.(29)

2.2.15. Anthraquinones

To 1ml of plant extract few drops of 10% ammonia solution was added, appearance pink color precipitate indicates the presence of anthraquinones.(25)

2.2.16. Antioxidant Activity

The ability of the extracts to annihilate the DPPH radical (1, 1-diphenyl-2-picrylhydrazyl) was investigated by the

method described by (Blois 1958). Stock solution of leaf extracts was prepared to the concentration of 1mg/ml. 100µg of each extracts were added, at an equal volume, to methanolic solution of DPPH (0.1mM). The reaction mixture is incubated for 30min at room temperature; the absorbance was recorded at 517 nm. The experiment was repeated for three times. BHT was used as standard controls. The annihilation activity of free radicals was calculated in % inhibition according to the following formula % of Inhibition = (A of control – A of Test)/A of control * 100

3. Results

In *Justicia tranquebariensis*, hexane extract showed positive for flavonoids, alkaloids and coumarins. Ethyl acetate extract showed positive for flavonoids, alkaloids, cardiac glycosides, terpenoids, coumarins and steroids. Hexane extract of *Bauhinia racemosa* showed positive for flavonoids, alkaloids, quinones, cardiac glycosides, terpenoids and coumarins. Ethyl acetate extract showed positive for flavonoids, alkaloids, cardiac glycosides, terpenoids, coumarins and steroids. Ethyl acetate showed better extraction of phytochemicals than Hexane. Hexane and ethyl acetate extract of *Justicia tranquebariensis* exhibited 66% and 90% respectively of free radical scavenging activity at a concentration of 150µg. Extract of *Bauhinia racemosa* showed less antioxidant activity. (Figure 1,2,3,&4 and Table 1&2)

Table 1. Phytochemical screening of *Justicia tranquebariensis* extracts.

Justicia tranquebariensis		
Phytochemical test	Inference	
	Hexane	Ethyl acetate
Carbohydrates	-	-
Tannins test	-	-
Saponin test	-	-
Flavonoid test	+	+
Alkaloid test	+	+
Quinones	-	-
Glycosides test	-	-
Cardiac glycosides test	-	+
Terpenoids test	-	+
Triterpenoids	-	-
Phenols	-	-
Coumarins	+	+
Proteins	-	-
Steroids and Phytosteroids	-	+
Phlobatannins	-	-
Anthraquinones	-	-

4. Discussion

The importance of medicinal values of plants has been accepted in the past few decades. Plants produce a very diverse group of secondary metabolites with antioxidant potential. Antioxidants block the action of the free radicals which have been implicated in the pathogenesis of many diseases and in the aging process. The free radicals are governing the important biological processes which are necessary for the body. The free radicals are necessary but at

the same time harmful for the body. Hence if has a number of mechanisms are minimizes the free radical induced damage. The enzymes involved in repairs, the damage caused by free radicals are superoxide dimutase, catalase, glutathione, peroxidase and glutathione reductase.(30,31 and 32)

Table 2. Phytochemical screening of *Bauhinia racemosa* extracts.

Bauhinia racemosa		
Phytochemical test	Inference	
	Hexane	Ethyl acetate
Carbohydrates	-	-
Tannins test	-	-
Saponin test	-	-
Flavonoid test	+	+
Alkaloid test	+	+
Quinones	+	-
Glycosides test	-	-
Cardiac glycosides test	+	+
Terpenoids test	+	+
Triterpenoids	-	-
Phenols	-	-
Coumarins	+	+
Proteins	-	-
Steroids and Phytosteroids	-	+
Phlobatannins	-	-
Anthraquinones	-	-

In our study hexane and methanol extract of *Bauhinia racemosa* showed positive for presence of flavonoid, alkaloid, quinones, cardiac glycosides, terpenoids, coumarins, steroids. Manohas et al. (33) reported that methanol and aqueous extracts showed positive for carbohydrates, glycosides, alkaloids, phytosterol, saponins, flavonoids, gums and mucilage, tannins, fixed oil and fats.

Akilandeswari et al. (34) reported that the leaf of *Justicia tranquebariensis* showed, positive for phytosteroids, flavonoids, glycosides, and absence of triterpenoids, alkaloids, saponins, tannins. From our study, hexane and ethyl acetate extracts of *Justicia tranquebariensis* exhibited positive for presence of flavonoids, alkaloids, cardiac glycosides, terpenoids, coumarins and steroids. Balamurugan et al.(35) reported that ethanol extract of the aerial portions of *Justicia tranquebariensis* showed free radical scavenging activity. In this study hexane and ethyl acetate extracts of *Justicia tranquebariensis* exhibited 66% to 90% free radical scavenging activity at a concentration of 150µg.

5. Conclusion

Phytochemical screening of Hexane and ethyl acetate extracts of *Justicia tranquebariensis* and *Bauhinia racemosa* had revealed the presence of flavonoids, alkaloids, cardiac glycosides, terpenoids, coumarins, steroids. From this study, it has been concluded that *Justicia tranquebariensis* extracts have show significant antioxidant activity than *Bauhinia racemosa*. This plant might be helpful in preventing of slowing the process of diseases involved as result of

oxidative stress.

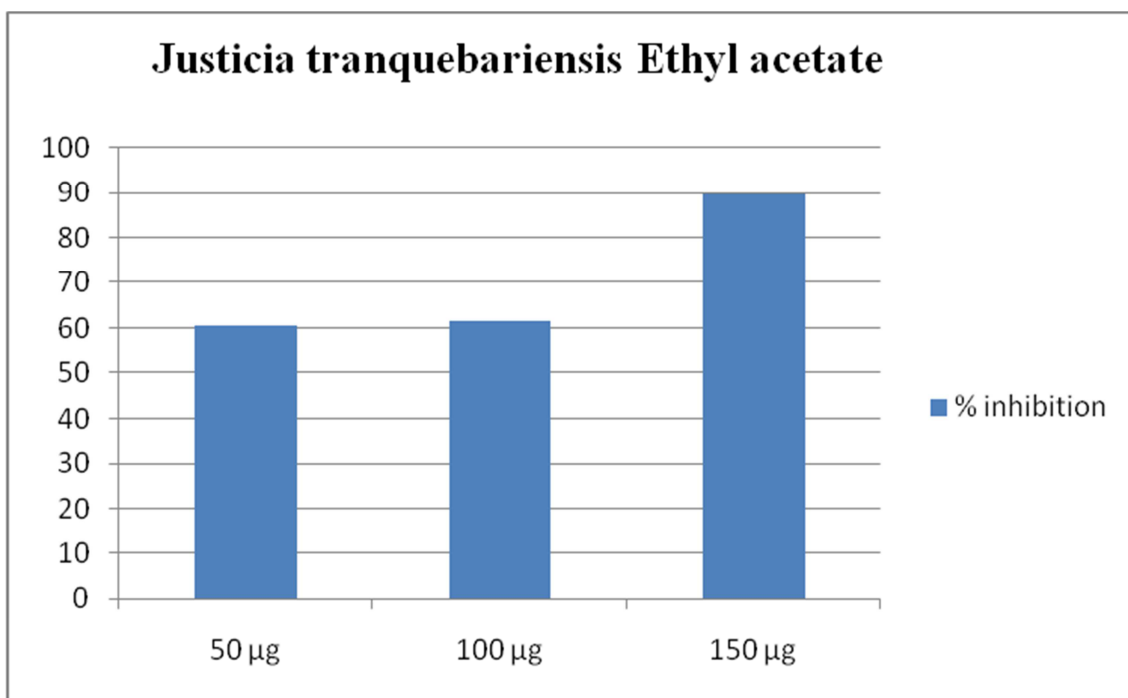


Figure 1. Antioxidant activity ethyl acetate extract of *J. tranquebariensis*.

Concentration µg/ml
X-axis – concentration of sample
Y-axis – percentage of inhibition

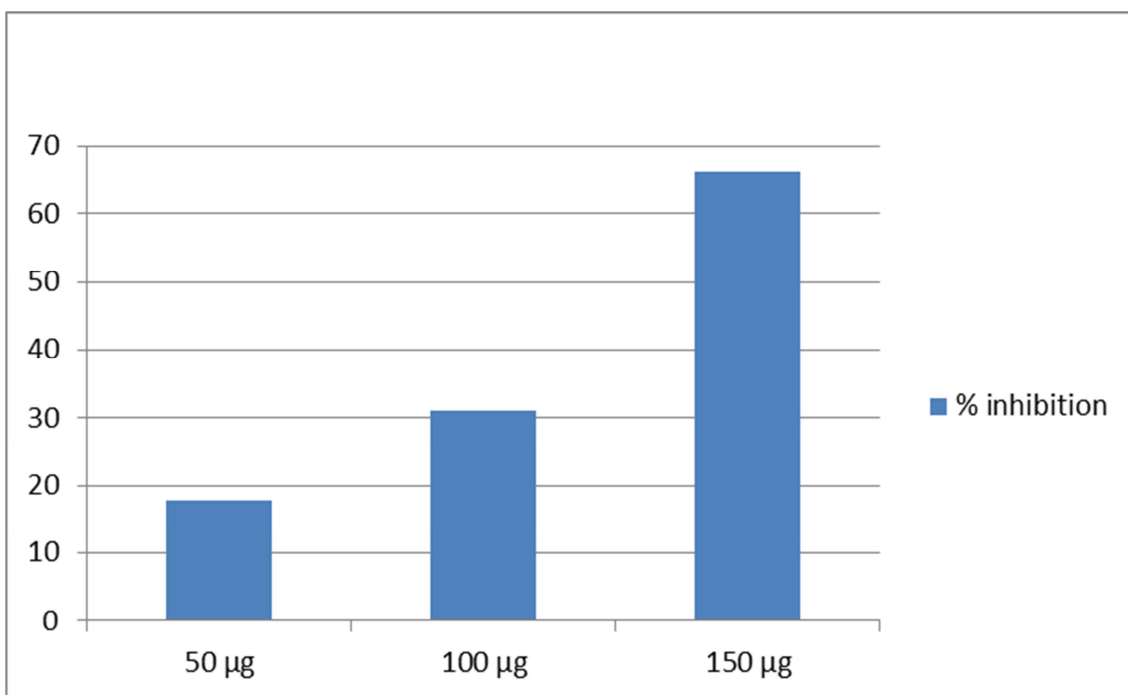


Figure 2. Antioxidant activity hexane extract of *J. tranquebariensis*.

Concentration µg/ml
X-axis – concentration of sample
Y-axis – percentage of inhibition

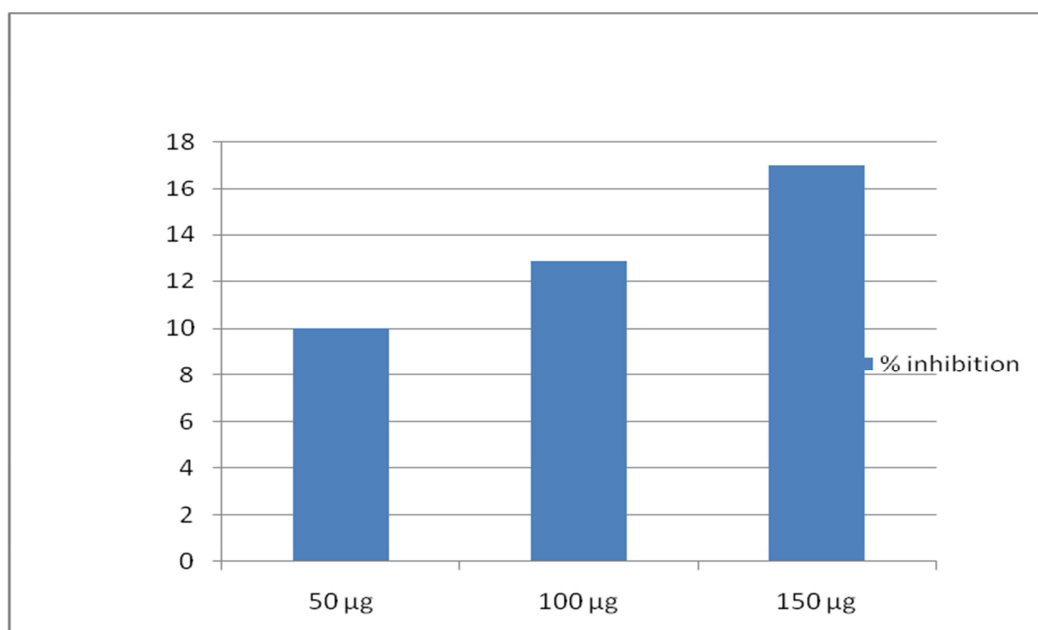


Figure 3. Antioxidant activity ethyl acetate extract of *Bauhinia racemosa*.

Concentration µg/ml
X-axis – concentration of sample
Y-axis – percentage of inhibition

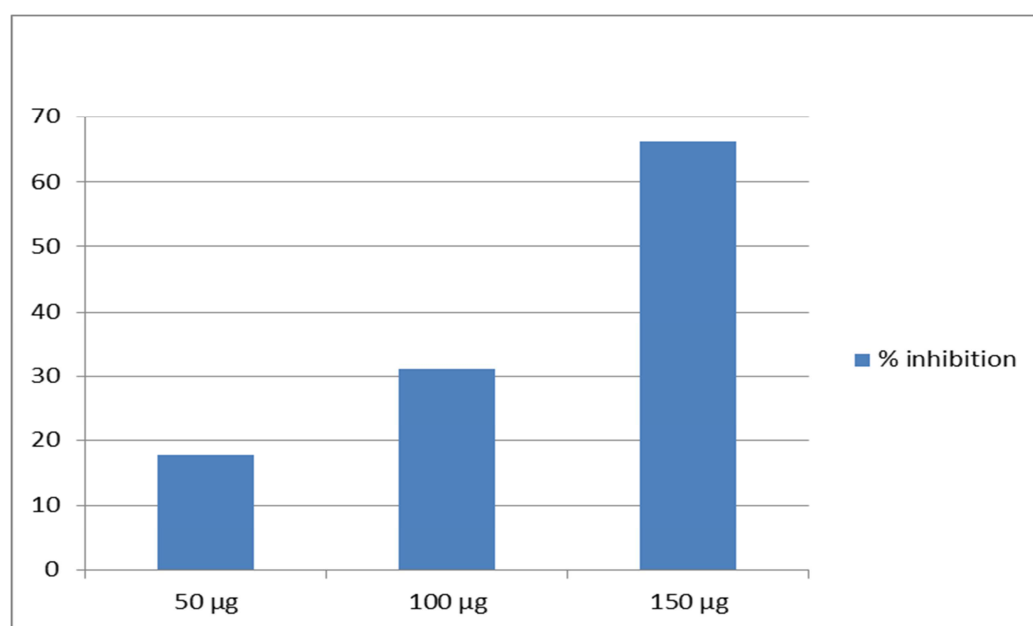


Figure 4. Antioxidant activity hexane extract of *Bauhinia racemosa*.

Concentration µg/ml
X-axis – concentration of sample
Y-axis – percentage of inhibition

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