

## Pharmacology & Toxicology Research

### Research Article

# Phytochemical screening and bioevaluation of medicinal plant *Stachytarpheta indica*(L.)Vahl.

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### Abstract

Leaf and stem solvent extracts of *Stachytarpheta indica* were subjected to phytochemical analysis, cytotoxic activity and their antioxidant potential. Both the extracts were rich in phytochemicals like alkaloid, saponins, tannins and phlobotanins. Besides this both the samples were moderate in carbohydrates but rich in protein content. Extracts depicted mild cytotoxic activity against brine shrimp mortality assay and good antioxidant activity in DPPH assay.

**Key words:** *Stachytarpheta indica*, antioxidant, cytotoxic, alkaloid, saponins, tannins and phlobotanins

### Introduction

Phytochemical screening of the extracts provides a fair amount of idea of the medicinal potential of the plants. Since ancient times a number of phytochemicals like alkaloids, flavonoids etc are considered to be medicinally important; especially those who combine with reactive oxygen species like NO, OH<sup>-</sup> and other harmful secondary metabolites to render them inactive. *Stachytarpheta jamaicensis* ethyl acetate and hexane extract of leaves have shown antioxidant potential[1]. Besides that *Stachytarpheta* genus has a number of species

with proven medicinal potential [2]. The leaf decoction of *Stachytarpheta angustifolia* is used as a vermifuge and laxative [3]. *Stachytarpheta caynnensis* leaves extracts have been reported for their hypoglycemic activity[4], Keeping the medicinal property of *Stachytarpheta* genus in view, *Stachytarpheta indica* was explored for the presence of important class of phytochemicals along with its cytotoxic as well as antioxidant activity.

## Materials and Methods

### *Collection and processing of planting material*

Stems and leaves of *S. indica* were collected from the medicinal germplasm garden of Regional Plant Resource Centre, Bhubaneswar. After drying both the samples were made into fine powder using a mechanical grinder.

### *Solvent extract preparations*

Accurately weighed 25 gms of powdered samples of both leaf and stem were macerated separately with 250 ml methanol and kept for percolation overnight, After 12 hours it was filtered, filtrate was stored in conical flask and process was repeated twice for the next two days. Combined filtrates were concentrated to semi solid mass using bucci rotavapor. Samples were stored in refrigerator for future use. Same were used for all the tests.

### *Phytochemical analysis*

Stem and leaf extracts were tested for the presence of saponins, alkaloids, tannins, glycosides as per the standard protocols [5]. Biochemical estimation of proteins, carbohydrates and starch detection was done using the methods of Lowry[6], Anthrone reagent method[7] and aleurone grain presence[8]respectively.

### *Cytotoxic activity*

Brine shrimp motility assay was conducted for assessing the cytotoxic activity as per the protocols of Bhatnagar and Pattanaik [9].

### *Antioxidant activity*

Thin layered chromatography based DPPH assay(Qualitative) was used for detecting the antioxidant profile of the extracts[10]. Quantitative DPPH radical scavenging assay was also conducted using the protocols of Bhatnagar *et al*[11].

## Results and discussions

**Phytochemical analysis:** As can be observed in Table 1 profile of stem and leaf methanolic

extracts of was similar but for the presence of phlobotannin in leaf while absent in stem extract. On pH analysis both the extracts were slightly acidic in nature. Carbohydrate in fresh sample of leaf was found to be 3.2%, dried sample of leaf was 3.1%, fresh stem was 2.96% and dried sample of stem was 2.42%. Regarding proteins fresh samples of stem and bark showed 8.7 and 6.2% while dried samples showed 14.2 and 8.3% proteins respectively. Saponins, alkaloids, phlobotannin and tannins presence indicates towards antioxidant potential of the *Stachytarpheta indica* as in a number of reports authors have shown a correlation of the above phytochemicals with the activity [12]. However presence of carbohydrates and proteins shows the nutritional status of the plants [13], thus the species is good for medicinal activity as well as fodder usage by grazing animals.

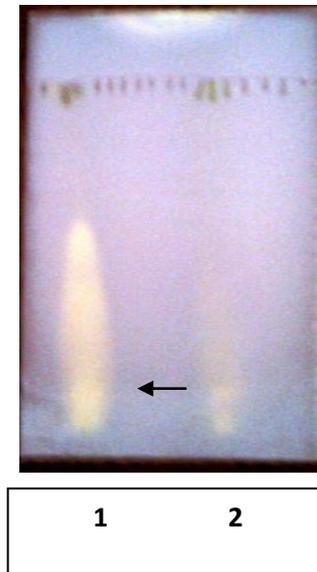
**Cytotoxic activity:** As can be seen from Table 2, leaf extract was slightly more active than stem extract. However, the activities of both the extracts were not very significant. Brine shrimp assay is also done to ascertain the toxic nature of samples[14], results of both the extracts showed that both are not toxic.

### **Antioxidant activity of *Stachytarpheta indica***

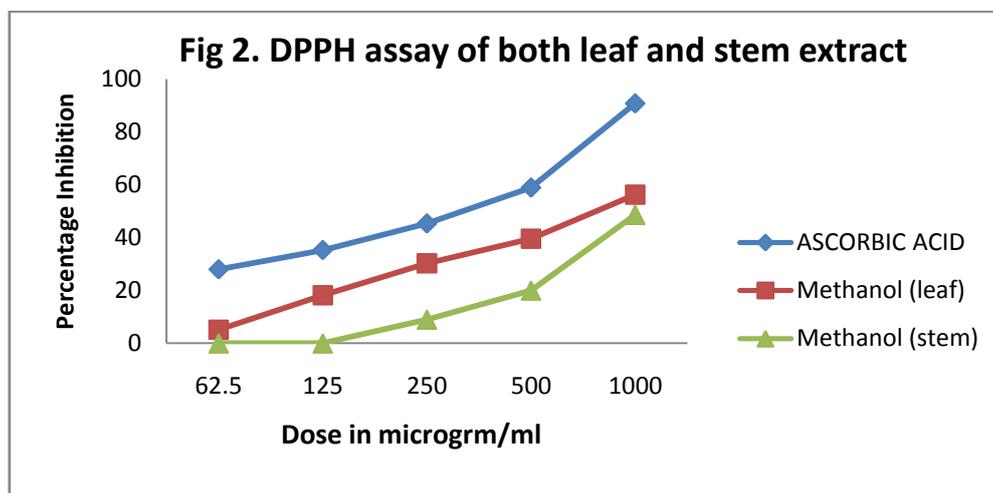
As per the DPPH assay, both the solvents showed yellow bands against purple background showing the presence of antioxidant molecules in the extract (Fig. 1). Quantitative radical scavenging assay of the extracts showed dose dependant results. Leaf extract showed better antioxidant activity as compared to the stem extract (Fig. 2). Thus, results of qualitative as well as quantitative assays showed better results of leaf extracts. Leaf extracts of another species *S. Jamaicansis* also showed radical scavenging activity [15], Another species namely *S. Augustifolia* has also reported for anti-inflammatory activities along with radical scavenging [16] thus the results are in accordance with the previous reports. Streak obtained in the leaf extract showed the presence of a number of molecules situated close enough could be the reason for antioxidant effect of leaf extract. Thus,

the plant has shown medicinal potential and is a good candidate for exploratory work.

Fig. 1. Antioxidant chromatogram of leaf and stem extract of *Stachytarpheta indica*



1. Leaf extract showing antioxidant streak.
2. Stem extract showing a band at lower RF.



**Table 1: Phytochemical analysis of stem and leaf methanolic extract of *Stachytarpheta indica*.**

Phytochemical	Leaf extract	Stem Extract
Amino acids	-ve	-ve
Phlobotanin	+ve	-ve
Flavonoids	-ve	-ve
Starch	-ve	-ve
Anthraquinone	-ve	-ve
Saponin	+ve	+ve
Tannins	+ve	+ve
Proteins	+ve	+ve
Carbohydrates	+ve	+ve
Alkaloids	+ve	+ve

**Table 2. Brine shrimp motility assay of *Stachytarpheta indica* stem and leaf extracts.**

Extract	Dose (microgram/ml)	1hr	2hr	3hr	4 hr	Percentage Inhibition
Leaf Extract	50	4+	4+	4+	4+	17.8 ± 3.8
	100	4+	4+	4+	4+	27.7 ± 4.8
	200	4+	4+	4+	4+	66.7 ± 7.2
Stem Extract	50	4+	4+	4+	4+	19.9 ± 6.7
	100	4+	4+	4+	4+	24.9 ± 8.2
	200	4+	4+	4+	4+	41.7 ± 7.2

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