



Research Article

## ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY OF *Coleus amboinicus* LEAF EXTRACT

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### Abstract

This present study investigated the antioxidant and antimicrobial activity of *Coleus amboinicus* leaf extract. Fresh and healthy leaves of *Coleus amboinicus* leaves were collected and extracted using ethanol. Assessment of antioxidant activity of the ethanolic leaf extract was carried out for DPPH radical scavenging activity. *Coleus amboinicus* showed 40.41 % DPPH radical scavenging activity compared to the standard ascorbic acid. *Coleus amboinicus* leaf extract exhibited antibacterial activity against clinical isolates like *Streptococcus pyogenes*, *Staphylococcus aureus*, *Escherichia coli*, *Proteus mirabilis* and *Pseudomonas aeruginosa*. The ethanolic leaf extract of *Coleus amboinicus* can be explored further for its biological activities.

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### 1. Introduction

*Coleus amboinicus*, also known as *Plectranthus amboinicus*, is a semi-succulent plant and perennial plant in the family of Lamiaceae. Still the origin of *Coleus amboinicus* plant is unknown, but some botanist says that it may be native of Africa and there is some possibilities that the plant also comes from India. The plant used as a spice and ornamental plant all over the world. *Coleus amboinicus* commonly called as Indian borage, French thyme, Cuban oregano, Indian mint, Mexican mint, country borage, Spanish thyme and soup mint (Paton *et al.*, 2019). Southern and Eastern Africa is native of *Coleus amboinicus*.

In South Africa grows in woodland or coastal bush, on rocky slopes and loamy or sandy flats at low elevations. Spanish thyme is the name of *Coleus amboinicus* plant in Europe, Spain and Americas. Baslas *et al.* (1981) found thymol (41 %) to be the main compound of the species growing in India. Studies in Pakistan identified thymol to be a major constituent similar to our study though its percentage was different: Haque and co-workers observed nearly (80 %) of thymol, but Malik and colleagues obtained only (40 %) of thymol (Haque *et al.*, 1998). Ashwini and Girish (2014) reported that, the ethanol extracts of *Coleus amboinicus* have antibacterial properties, with a concentration of 50 g/mL against *Streptococcus mutans*. Leaves of *Coleus amboinicus* were used in the traditional system for the treatment of nasal

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congestion, bronchitis, asthma, cold, and cough. *Coleus amboinicus* is widely cultivated in India, so parts of the plants are easily available and they are also low-priced (Koti *et al.*, 2011). Hence the present study was aimed to evaluate the antioxidant and antimicrobial activity of *Coleus amboinicus* leaf extract.

## 2. Materials and Methods

### Collection and Extraction of Plant materials

Good and healthy *Coleus amboinicus* plants were collected from local agricultural form in Dharmapuri, Tamil Nadu, India (Figure - 1). Leafs were washed in distilled water and dried in the shadow. The fully dried samples were converted into fine powder and exhaustively extracted by Soxhlet apparatus with using ethanol as solvent. The extracts were stored at 4 °C until further use.



**Figure – 1: *Coleus amboinicus* in its natural habitat**

### Anti-oxidant (DPPH) assay

Assessment of antioxidant activity was carried out using 2,2-diphenyl-1-picryl-hydrazyl (DPPH) radical scavenging activity. The ability of the extract to scavenge DPPH radicals were determined by the method of Lee *et al.* (2005) with minor modifications. A blank was prepared with 3.8 mL of methanol without adding extract and 200 µL of DPPH. About 3.7 mL of methanol was added and then 100 µL of Ascorbic acid standard solution was added without the sample extract and 200 µL solution of DPPH. About 3.7 mL of methanol and 200 µL of DPPH solution were added to 100 µL of the extract solution. All

the test tubes were made up to 4.1 mL and incubated for 30 minutes in darkness and at ambient temperature. The resultant absorbance was measured at 517 nm. The lower the absorbance of the sample or the reaction mixture indicates high free radical scavenging activity. The capability to scavenge the DPPH radical was calculated using the following equation. % DPPH radical scavenging = [(Abs. of control – Abs. of test Sample)/(Abs. of control)] × 100

### Antibacterial activity of *Coleus amboinicus* extract

Extraction of *Coleus amboinicus* samples were used to analyze its antibacterial activity against human pathogens. *Streptococcus pyogenes* and *Staphylococcus aureus* are gram positive bacteria which cause urinary tract infection and wound infection. There are three Gram negative bacteria used in this study namely *Escherichia coli*, *Proteus mirabilis* and *Pseudomonas aeruginosa*.

### Disc diffusion method

The paper disc (No.1 Whatmann) was cut down into small discs (6 mm diameter) and sterilized at 180 °C for 30 min in hot air oven. After sterilization, the discs were impregnated with the extracts of *Coleus amboinicus*. The disc was left without any disturbance for 1 - 4 hrs at room temperature for drying. The dried discs were placed on the surface of MHA medium which was inoculated with the bacterial pathogens. Subsequently, the inoculated plates were incubated for 18 - 24 hrs at 37 °C. After the incubation period, the diameter of the circular zones of inhibition was measured (Prescott *et al.*, 2005).

## 3. Results and Discussion

The DPPH radical scavenging assay is an easy rapid and sensitive method for the antioxidant screening of plant extracts. A number of methods are available for the determination of free radical scavenging activity but the assay employing the stable 2,2-diphenyl-1-picryl-hydrazyl radical (DPPH) has received the

maximum attention owing to its ease of use and its convenience. In the antioxidant analysis, stable free radical DPPH (dark violet color) react and convert into 1,1-diphenyl-2-picryl hydrazine and the colored component changed into discoloration.

*Coleus amboinicus* showed 40.41 % DPPH radical scavenging activity compared to standard ascorbic acid (Table - 1). The findings of the study reported the inhibition based on the concentration of samples. Inhibition percentage increased as the

concentration of the extracts increased. *Coleus amboinicus* leaf extract exhibited antibacterial activity against clinical isolates namely *Streptococcus pyogenes*, *Staphylococcus aureus*, *Escherichia coli*, *Proteus mirabilis* and *Pseudomonas aeruginosa* (Table - 2). The maximum zone of inhibition was recorded against *Escherichia coli*.

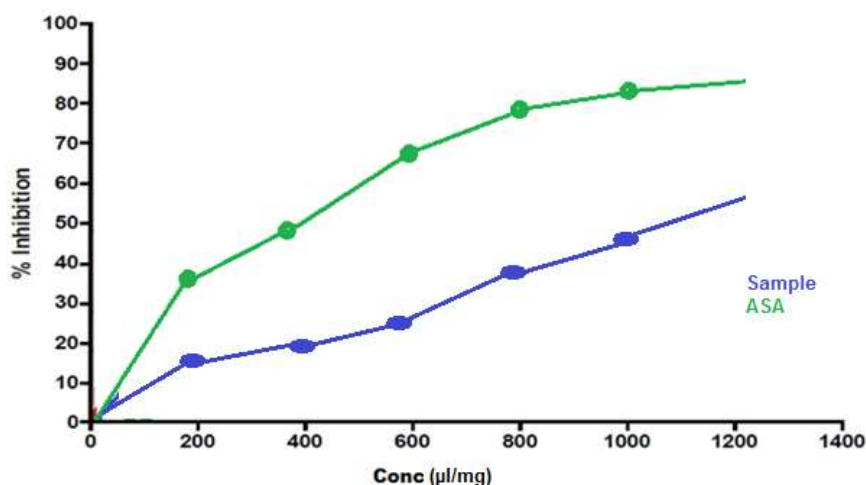


Figure – 2: DPPH radical scavenging activity of *Coleus amboinicus*

Table - 1: DPPH radical scavenging activity of *Coleus amboinicus*

Sample concentration (µL/mg)	Percentage of inhibition	
	<i>Coleus amboinicus</i>	Ascorbic acid
20	16.31	35.48
40	18.11	48.13
60	22.49	68.19
80	33.22	73.32
100	40.41	79.16

Table - 2: Zone of inhibition of *Coleus amboinicus* leaf extract against clinical isolates

Name of the pathogen	Zone of inhibition
<i>Staphylococcus aureus</i>	19 mm in dm
<i>Streptococcus pyogenes</i>	21 mm in dm
<i>Escherichia coli</i>	20 mm in dm
<i>Proteus mirabilis</i>	19 mm in dm
<i>Pseudomonas aeruginosa</i>	18 mm in dm

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