



Studies of Antioxidant Activity in *Caralluma Fimbriata* Wall

Dandekar S. D.¹, Dr. Bagal J. G.², Dr. Ahire Y. R.³ & Dr. Waghire H. B.⁴

¹Tuljaram Chaturchand College of Arts, Science and Commerce Baramati, Pune.

²Eknath Sitaram Divekar College Varvand, Pune.

³Shri Chhatrapati Shivaji Mahavidyalaya Shrigonda, Ahilyanagar.

⁴Maharaja Jivajirao Shinde Mahavidyalaya Shrigonda, Ahilyanagar

Corresponding Author – Dandekar S. D.

DOI - 10.5281/zenodo.19511192

Abstract:

Caralluma fimbriata Wall is belonging to plant family Apocynaceae. It is also known as *Shindula Makadi*, *Makad Shenguli*, *Kullimudayan*, and *Ranshabar* in India. In the Kolli Hills of South India, the indigenous population habitually eats *C. fimbriata* as a vegetable on a daily basis. It is a valuable botanical resource that is utilised in pickles and chutney in Andhra Pradesh's dry regions. It has historically been used as a famine food and an appetite suppressor. A wide range of secondary metabolites, such as flavonoids, glycosides, saponins, and triterpenes, are present in the plant. The DPPH assay was used to assess the antioxidant properties. This indicates a stronger free radical scavenging potential than root displayed higher antioxidant activity than the stem extract, particularly at higher concentrations.

Keywords: *Caralluma fimbriata*, *Apocynaceae*, *Antioxidant*

Introduction:

The succulent herb *Caralluma fimbriata* Wall. is a member of the family Apocynaceae and is used extensively in traditional Indian medicine and cooking. Yungmaphal Iottama (Sanskrit), Kaarallamu (Telugu), Kulleemooliyan and Kallimudayan (Tamil), and Ranshabar or Makadshenguli (Marathi) are some of its vernacular names. (Shaik and Zeenath 2025). Plant that is extensively found in arid and semi-arid areas of Asian, southwest Asia, western Africa, Pakistan, India, the Indian subcontinent and other countries. (Periyasami 2025; Asmi *et al.*, 2017). acts as a cheap, readily accessible famine food with thirst-quenching and appetite-suppressive qualities. (Tariq *et al.*, 2024). Medicinal herbs and their extracts are always considered the greatest alternative remedies for treating illnesses because of their high antioxidant content, which allows them to scavenge free radicals and repair damaged cells, thereby

reducing oxidative stress in the body. (Vyshali *et al.*, 2023). Pregnane glycosides, flavonoids, tannins, saponins, and steroids are among the many bioactive substances found in *caralluma* that support its pharmacological actions. (Chandra *et al.*, 2025). More than a hundred human diseases, such as atherosclerosis, arthritis, ischaemia and reperfusion damage to several tissues, damage to the central nervous system, gastritis, cancer, and AIDS, are caused by free radicals. One of the main ways that food, medications, and even living systems produce free radicals is through the oxidation process. The enzymes catalase and hydroperoxidase serve as the body's natural antioxidants by converting hydrogen peroxide and hydroperoxides into nonradical forms. Consuming antioxidants as free radical scavengers may be required due to the immune system's natural antioxidants being depleted in various diseases. *Caralluma fimbriata* Wall. methanolic extract. shown antioxidant

activity by scavenging hydrogen peroxide, superoxide, and DPPH. Additionally, it demonstrated the ferric reduction model's capacity to reduce electricity. *Caralluma fimbriata* Wall. methanolic extract exhibits strong antioxidant activity. was discovered, which may have resulted from the presence of phenolic chemicals. The plant contains flavonoids, phenols, saponins, and glycosides. (Dhayalan *et al.*, 2012). 1, 1 Diphenyl 2-Picryl Hydrazyl is a red, stable free radical in powder form that turns yellow when scavenged. This feature is used by the DPPH assay to demonstrate free radical scavenging activity. The scavenging interaction between (DPPH) and an antioxidant (HA) can be expressed as $\text{DPPH-H} + (\text{A}) (\text{DPPH}) + (\text{H-A})$. Antioxidants react with DPPH and reduce it to DPPH-H, which results in a drop in absorbance. The degree of discolouration reveals the antioxidant chemicals' or extracts' capacity to scavenge hydrogen. (Gaikwad *et al.*, 2024). Due to its appetite-suppressive, anti-inflammatory, antidiabetic, and antioxidant properties, it is frequently utilised in traditional Indian medicine. (Gaikwad R. *et al.*, 2025). In generally, a variety of cellular processes, including phagocyte death, bacterial ingestion, and redox regulation of signal transduction, may depend on the creation of suitable reactive oxygen species (ROS), which is regulated by the antioxidant system in living organisms. However, excessive ROS production in living things can attract proteins, DNA, cell membranes, and other cellular components, which can lead to the toxicity, degeneration, and loss of

several molecules that are vital to life's metabolism. (Vellingiri *et al.*, 2014).

Material and Methods:

Preparation of Extract:

Aerial portions of *C. fimbriata* were gathered from Shrigonda Tehsil, Ahilyanagar district, Maharashtra, India, for the production of plant material extract. BSI Pune located and identified and authenticated the plant. The recently gathered plant materials were properly cleaned with tap water, let to dry in the shade at room temperature, and then ground into a powder. Methanol solvents were used to make the extracts. 250 millilitres of methanol were used to extract 50 grams of powdered plant material. As a result, the solvent extracts were dried out in a rotary evaporator at 40 °C. Before being used, the yield of each extract component was determined and kept at 4 °C in the dark. The antioxidant properties of the extracts were evaluated. (Vellingiri *et al.*, 2014).

Determination of Antioxidant Activity:

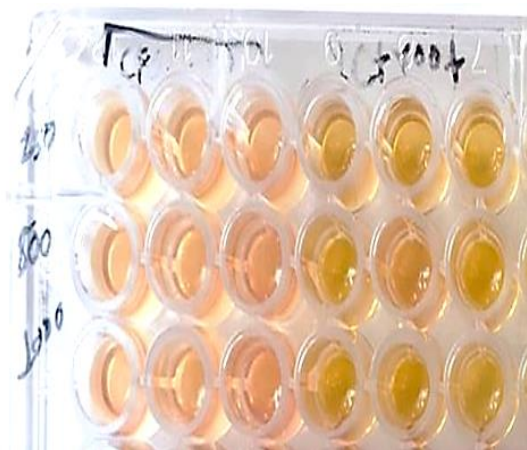
DPPH Radical Scavenging Activity Assay: The extract's capacity to scavenge free radicals is assessed using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay. A 0.004% DPPH solution is made in 100 millilitres of methanol. Following a 15-minute dark incubation period at room temperature, 200 µL of the sample and the standard are combined at varying concentrations. Every measurement is carried out three times. (Vyshali *et al.*, 2023).

Result:

Table no. 1 Effect of samples by using Antioxidant activity by DPPH (96 well method)

Antioxidant activity by DPPH (96 well method)						
Sample code	Concentration	Absorbance			Mean	%Inhibition
Control		0.985	0.988	0.989	0.987	
Standard	250	0.235	0.224	0.228	0.229	76.80 %
Ascorbic	500	0.189	0.178	0.175	0.180	81.70 %

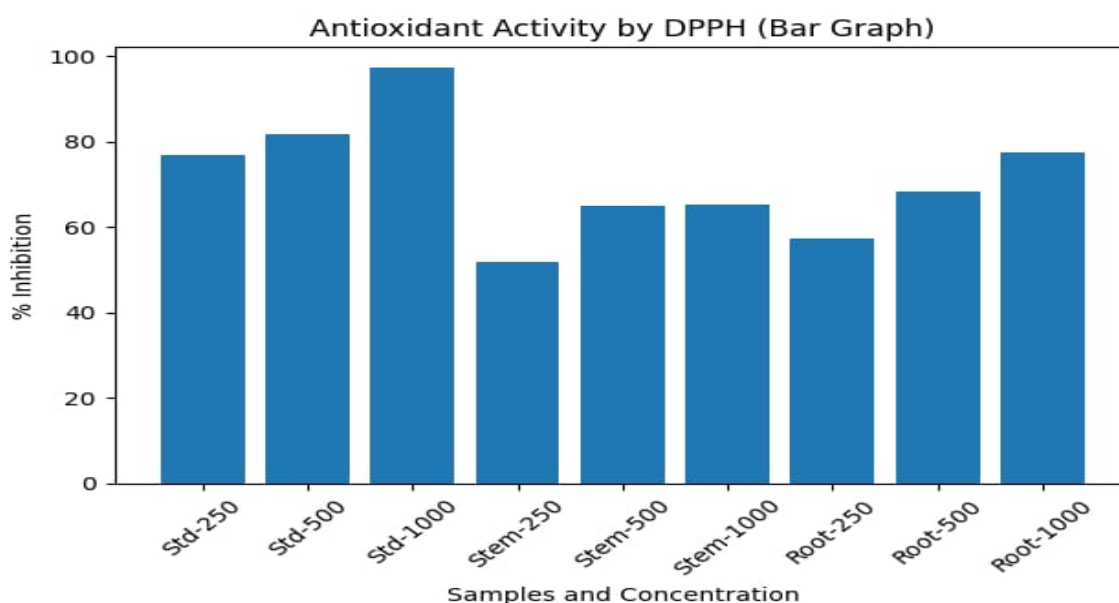
acid	1000	0.025	0.028	0.029	0.027	97.23 %
Sample - <i>C. fimbriata</i> stem	250	0.475	0.474	0.477	0.475	51.85 %
	500	0.345	0.347	0.342	0.344	65.09 %
	1000	0.348	0.342	0.339	0.343	65.25 %
Sample - <i>C. fimbriata</i> root	250	0.432	0.421	0.411	0.421	57.32 %
	500	0.316	0.312	0.311	0.313	68.29 %
	1000	0.225	0.222	0.221	0.222	77.44 %



Antioxidant activity by DPPH (96 well method)



Standard Ascorbic acid



Antioxidant activity graph

Assessment of antioxidant activity Using DPPH (1, 1-Diphenyl-2, Picryl-Hydrazyl) free radicals, the samples' antioxidant activity was calculated for their capacity to scavenge free radicals. The micro titer plate was filled with 100 μ L of test chemical water. The samples were covered with 100 μ L of 0.1% methanolic DPPH

and left in the dark for 30 minutes. After that, the samples were examined for discolouration; purple, yellow, and pale pink were regarded as strong and weak positive, respectively, and the plate was read at 490 nm using an Elisa plate reader. The following formula was used to determine radical scavenging activity: DPPH

radical scavenging activity (%) is calculated as $[(\text{Absorbance of control} - \text{Absorbance of test sample}) / (\text{Absorbance of control})] \times 100$.

The antioxidant activity of Sample *Caralluma fimbriata* (Stem and Root extracts) was evaluated using the DPPH assay in a 96-well plate format, with ascorbic acid as the standard.

- Ascorbic acid (standard) showed the highest antioxidant activity, with % inhibition values increasing from 76.80% (250 µg/mL) to 97.23% (1000 µg/mL), demonstrating its strong free radical scavenging ability.
- Sample- *Caralluma fimbriata* Stem exhibited moderate antioxidant activity, with % inhibition values of 51.85% (250 µg/mL), 65.09% (500 µg/mL), and 65.25% (1000 µg/mL). The inhibition at 500 µg/mL and 1000 µg/mL was very similar, suggesting a possible saturation point.
- Sample- *Caralluma fimbriata* Root displayed higher antioxidant activity than the Stem extract, with inhibition values of 57.32% (250 µg/mL), 68.29% (500 µg/mL), and 77.44% (1000 µg/mL). This indicates a stronger free radical scavenging potential than the Stem extract, particularly at higher concentrations.

Discussion:

The findings showed that all of the extracts contained different amounts of the phytochemical components that were evaluated, which corresponded to variations in their antibacterial, antidiabetic, antioxidant, and free radical scavenging properties with high nutritional value. As a result, it is possible to draw the conclusion that *C. fimbriata*'s activities and phytochemicals are significantly correlated. (Vyshali *et al.*, 2023).

Extracts from *Caralluma fimbriata* show hepatoprotective, anti-inflammatory, antioxidant, anti-atherosclerotic, and appetite-suppressive properties. (Shaik and Zeenath 2025).

In a study on the antioxidant capacity and amino acid analysis of *Caralluma fimbriata*, the extracts' amounts of total phenolics and flavonoids were assessed. According to the study, methanol and water extracts had strong antioxidant and free radical scavenging properties and had good total phenolic and flavonoid levels. There was a strong correlation between the extracts' total phenolic content and antioxidant activity. The extracts and their constituents can be added to food preparations and nutraceuticals. (Asmi *et al.*, 2017)

In this study, various in vitro testing techniques were used to assess the antioxidant activity of extracts from the aerial portions of *C. adscendens* var. *fimbriata*. A variety of artificial and natural free radicals can be scavenged by the extracts of aerial components. Since the related extract had the largest concentration of phenolic compounds and the strongest antioxidant ability in every test, methanol and water turned out to be the most effective solvent for removing antioxidants from aerial parts. (Vellingiri *et al.*, 2014).

Caralluma fimbriata Wall. methanolic extract. shown antioxidant activity by scavenging hydrogen peroxide, superoxide, and DPPH. Additionally, it demonstrated the ferric reduction model's capacity to reduce electricity. *Caralluma fimbriata* Wall. methanolic extract exhibits strong antioxidant activity. was discovered, which may have resulted from the presence of phenolic chemicals. (Dhayalan *et al.*, 2012)

Conclusion:

Caralluma fimbriata present antioxidant potential, that is indicates a stronger free radical scavenging potential root displayed higher antioxidant activity than the stem than extract, particularly at higher concentrations.

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