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Evaluation Of In Vitro Antioxidant Activity Of *Blumea Fistulosa Kurz*

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Abstract:

Blumea fistulosa Kurz of family Asteraceae is used traditionally as antispasmodic, antipyretic, antioxidant, anti-diarrheal, liver tonic, expectorant, diuretic, astringent and stimulant as well as to treat bronchitis, fevers and burning sensation. The objective of the present study is to screen antioxidant activity with various extracts of *Blumea fistulosa*. Five different solvents were used to extract the bioactive compounds. Antioxidant property was evaluated using 1,1-diphenyl,2-picryl hydrazine (DPPH) radical scavenging activity. The results indicated that plant exhibited good antioxidant activity.

Key Words: *Blumea fistulosa*, Free radicals, DPPH, Antioxidant activity

Introduction

Blumea fistulosa Kurz is an annual aromatic herb belonging to the family Asteraceae (Cook, 1967) that grows as a winter weed in India and is also found elsewhere in South and Southeast Asia. This herb is used as a folk medicine to treat a range of ailments, including respiratory and blood diseases, fevers, ulcers, and burning sensations. Free radicals are capable of attacking the healthy cells of the body, causing them to lose their structure and function (Percival, 1998). Therefore, there is an increase in interest worldwide in identification of pharmacologically potent antioxidant compounds and with no side effect. Antioxidant compounds like phenolic acids, polyphenols and flavonoids scavenge free radicals such as peroxide; hydroperoxide or lipid peroxyl which are thereby involved in reducing the risk of diseases associated with oxidative stress (Pednekar *et al*., 2013). The present work, evaluated the antioxidant activity of *B.fistulosa Kurz* using DPPH assay.

Material and methods

Plant material

B.fistulosa leaves were collected from different localities of Amravati, Maharashtra, India between the month of January to March. Material was washed thoroughly with running tap water to remove dirt and dried at room temperature. Dried material was cut into small pieces and pulverized mechanically into powder. The powdered samples were prepared for further analysis.

Preparation of *B*extract

About 25 gm powdered sample of *Blumea fistulosa* were added with 200ml of five different solvents i.e., ethanol, methanol, chloroform, ethyl acetate and acetone maintained at room temperature for 30 minutes. The contents were shaken at 24-hour intervals for the next seven days. Following filtration of suspension through Whatman paper and the crude extracts of *Blumea fistulosa* were evaporated at room temperature about 8 days over near dryness to yield plant extract.

Determination of antioxidant activity:

The free-radical scavenging activity was estimated by DPPH assay (Shimada *et. al*., 1992). The reaction mixture contained 10 µl of test sample and positive control ascorbic acid with 10 mg concentration and 190 µl of methanolic solution of 0.1 mM DPPH radical. The mixture was shaken vigorously and incubated at 37° C for 5 min. The absorbance was measured at 517 nm on ELISA plate reader indicated higher free radical scavenging activity, which was calculated using the following equation:

$$(\%)\text{Free radical scavenging effect} = \frac{[\text{Absorbance of control (Ac)} - \text{Absorbance of sample(As)}]}{\text{Absorbance of control (Ac)}} \times 100$$

Result and Discussion

The antioxidant activity was successfully performed by DPPH (2, 2 diphenyl-1-picryl hydrazyl) free radical scavenging assay. The results are shown in the table and figures.

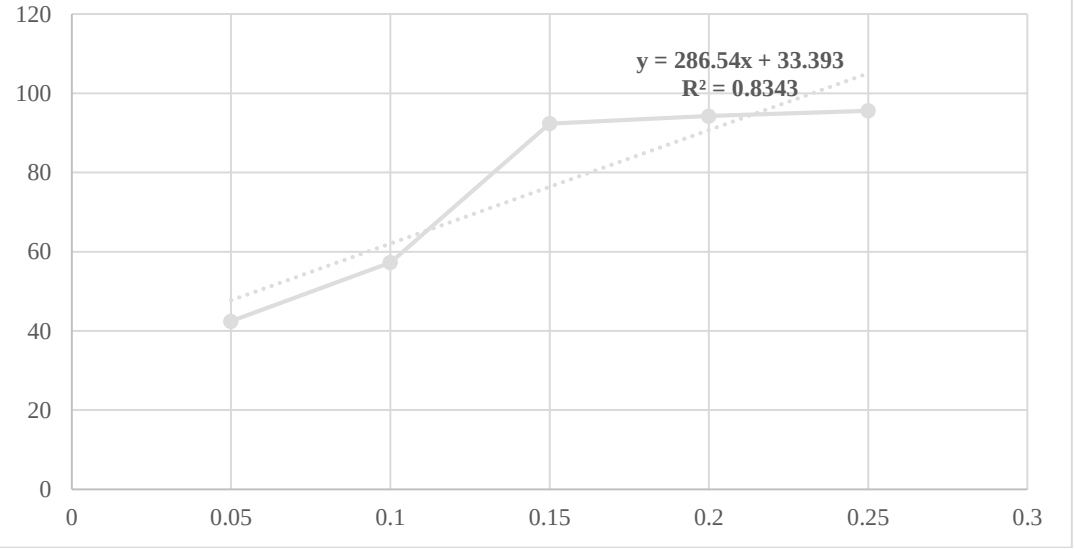
Table 1. % Antioxidant Potential of *Blumea fistulosa* using DPPH Assay (Conc. used 1 mg/ml)

Sr. No.	Extraction Solvent	% Antioxidant potential
1	Acetone	0
2	Chloroform	0
3	Ethyl Acetate	8.06±2.11
4	Ethanol	6.113±0.55
5	Methanol	66.546±1.22

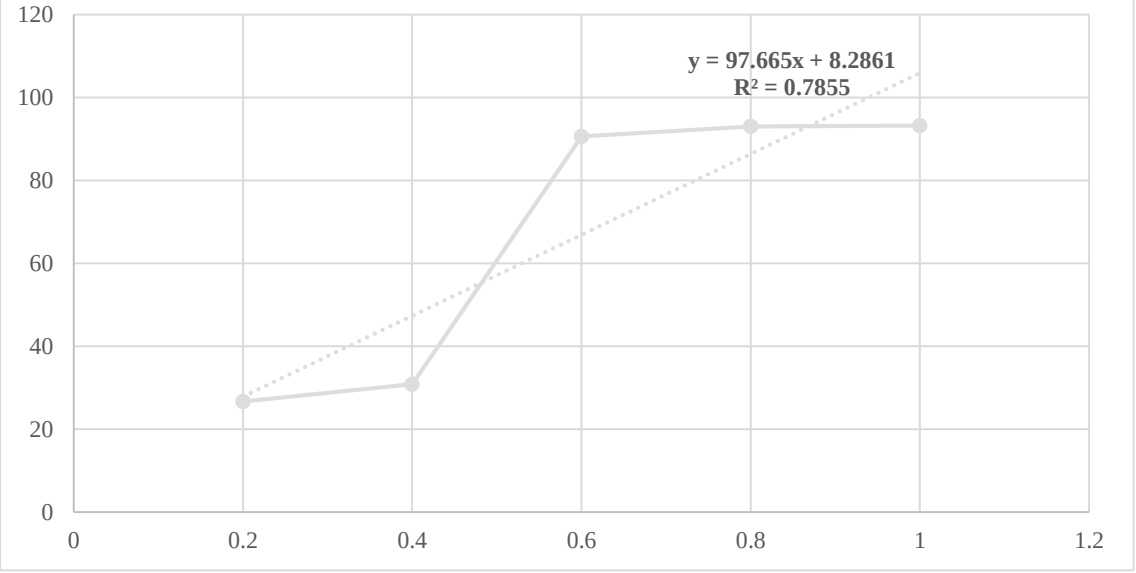
Table 2. DPPH free radical scavenging activity and IC_{50} of *Blumea fistulosa* methanolic extract.

S. No.	**Conc (in mg)**	**% free radical scavenging activity**	**Y equation**	**R^2 value**	**IC_{50} (in mg)**
1	**0.2**	26.67660209±2.5447	y = 97.665x + 8.2861	R2 = 0.7855	0.4271
2	**0.4**	30.84947839±1.552			
3	**0.6**	90.61102832±3.699			
4	**0.8**	93.04520616±2.225			
5	**1.0**	93.24391456±1.895			

Figure -1 % free radical scavenging activity of Ascorbic acid



Figur -2 IC50 Values for methanolic extract of *Blumea fistulosa*



The antioxidant activity of *Blumea fistulosa* extract in five different solvents, namely acetone, chloroform, ethyl acetate, ethanol and methanol to scavenge DPPH radical presented in Table 1. The result indicated that the percentage of antioxidant potential varied from 0 to 66.546±1.22 across different solvents. The highest antioxidant potential was observed in methanol solvent whereas in previous studies in *Blumea balsamifera* n-hexane extract exhibited pronounced results (Nur *et al*., 2023) and ethanol in *Blumea mollis* (Sreedevi and Aneesa, 2012 and Zhou, 2020) displayed an ability to inhibit DPPH free radical by 50% at 100 ppm concentration. Among the four solvents used in present study it was observed that methanol showed the best results, it is in support of Rudi, (2024) and Gede, (2021). It was noted that methanol as the superior solvent among those tested, furthermore five different concentration of methanolic extract (0.2, 0.4, 0.6, 0.8 and 1.0mg/ml) were employed to IC50 value of *B.fistulosa* extract.

Table 2 presented the results, indicating that *B.fistulosa* plant extract had a source to inhibit free radical DPPH. The percentage inhibition of DPPH free radical scavenging increased with increased in concentration. The highest inhibition of DPPH radicals was observed (93.24%) at concentration 1.0 mg/ml. Scavenging activities of the methanolic extract of *Blumea fistulosa* on DPPH radicals ranged from 26.67% to 93.24% Similarly, the standard ascorbic acid exhibited percentage inhibition of DPPH free radicals from 42.42%, 52.27%, 92.34%, 94.23%, and 95.57% in increased manner (Figure 1).

The IC50 value of methanolic extract (Fig.2) of *Blumea fisulosa* (0.4271) demonstrated significant scavenging activity in comparison IC50 value of standard ascorbic acid 0.0579 showed excellent free radical scavenging activity similar finding is noted by Rokibul and Jaman, (S2022).

Conclusion

The result stated that methanolic extract of plant showed good antioxidant properties by extreme good category of IC50.

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