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Evaluation of In-vitro Antioxidant Activity of *Wodyetia bifurcata* Leaf Extract by Using DPPH Assay

Rashmi Kumari, Abhiram Raut*

Department of Pharmaceutical Sciences, Usha Martin University, Purulia Raod, Angara, Ranchi, Jharkhand, 835103, India.

Correspondence:

Department of Pharmaceutical Sciences, Usha Martin University, Purulia Raod, Angara, Ranchi, Jharkhand, 835103, India.

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KEYWORDS

Wodyetia bifurcata, Antioxidant, Ascorbic acid, 2,2-Diphenyl-1-picrylhydrazyl assay

ABSTRACT:

Purpose: The aim of the present study was to in vitro evaluation of the antioxidant activity of ethanolic extract of leaves of Wodyetia bifurcata by using ascorbic acid as reference standard with 2,2-Diphenyl-1-picrylhydrazyl (DPPH) assay.

Methods: The ethanolic extract of the leaves of Wodyetia bifurcata exhibited significant antioxidant activity which shows highly potent as compared to standard drug, ascorbic acid by DPPH radical scavenging activity.

Result: The results thus support the use of Wodyetia bifurcata as an antioxidant agent, which have less side effect compare to synthetic drugs.

Conclusion: Therefore antioxidant content of leaf extract can be effective against the negative effects of free radicals.

INTRODUCTION

Wodyetia bifurcata**,** commonly known as the foxtail palm and belonging to the Arecaceae family, has attracted attention due to its rapid growth, adaptability, and significant economic value.[1, 2] Wodyetia bifurcata is an elegant, single-stemmed palm characterized by a crown of eight to ten leaves. Its densely arranged leaflets surround the rachis, giving it a bushy, fox tail-like appearance. While Foxtail palm is primarily cultivated for ornamental use, recent research has identified the presence of phenolic compounds in the aerial parts of *Wodyetia bifurcata*. Phenolic compounds possess a range of physiological properties, including anticancer[4], antimicrobial[5], anti-inflammatory[3] and antioxidant[6] activities.

Antioxidants are substances that help neutralize harmful free radicals in the body, which are linked to various diseases and the aging process.[7] By evaluating the antioxidant properties of the leaf extract, researchers seek to explore its potential in reducing oxidative stress and related health disorders. The research findings may contribute to the development of natural antioxidant-based supplements or pharmaceutical products. Therefore, the purpose of this study was to investigate the in-vitro antioxidant activity of *Wodyetia bifurcata* by using DPPH (2,2-Diphenyl-1-picrylhydrazyl) assays determination of radical scavenging activity.

MATERIALS AND METHODS

Plant Material

The plant was collected from Namkum, Ranchi, Jharkhand, India and authenticated by a qualified botanist at department of botany, Y.B.N. University Ranchi, Jharkhand.

Preparation of Plant Extracts

The fresh plant leaves were collected, cleaned and shade-dried for 10-15 days, ground into a fine powder

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using a mixer grinder, and subjected to ethanol extraction using a Soxhlet apparatus.[8]

Evaluation of Antioxidant activity

5µl of different stock of the test compound was added to 0.1 ml of 0.1mM DPPH solution in a 96 well plate. The reaction was set in triplicate form and duplicates of blank was prepared containing 0.2 ml DMSO/Methanol and 5µl compound of different concentrations. The wells without treatment were considered as control. The plate was incubated for 30 min in dark. At the end of the incubation, the decolourization was read 517 nm using a micro plate reader (iMark, BioRad). Reaction mixture containing 20µl of deionized water was served as Control. The scavenging activity was presented as '% inhibition' with respect to control. IC_{50} was calculated using Software Graph Pad Prism 6. Graph was prepared between X axis (Sample Concentration) Vs. Y axis (% inhibition with respect to control).

Statistical Analysis

Data were analyzed using one-way ANOVA followed by Dunnett's multiple comparison test with Instat III software. Results are presented as mean ± SEM, with statistical significance considered at $P < 0.05$ and $P < 0.01$."

RESULT

Anti-oxidant activity

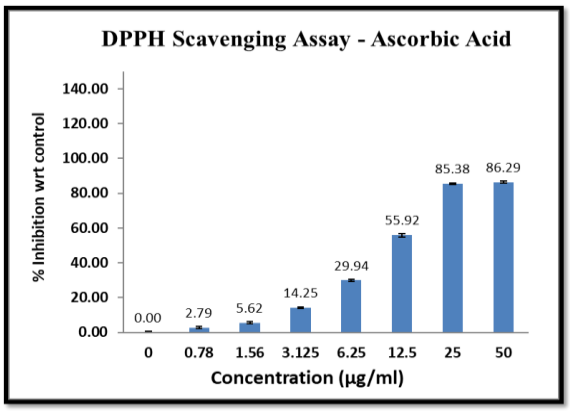

Figure 1

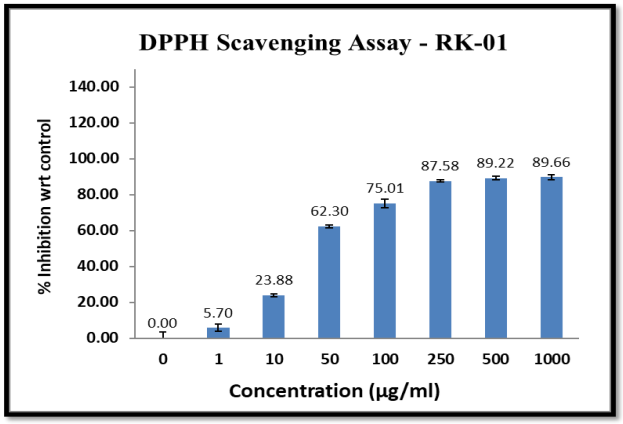

Figure 2

Figure 1 and 2. Antioxidant activity of *Wodyetia bifurcata* when compared to standard drug (ascorbic acid)

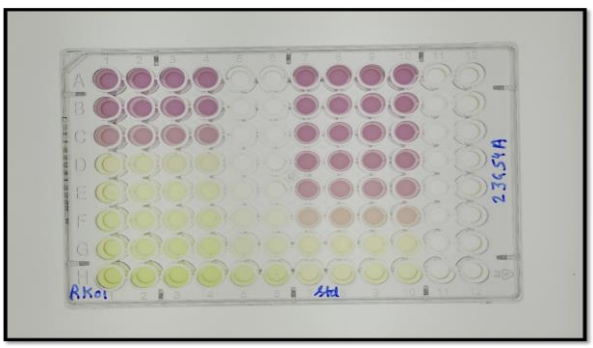

Figure 3

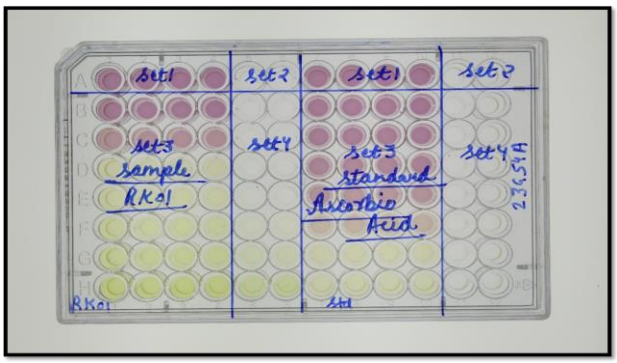

Figure 4

Figure 3 and 4. Sample testing for antioxidant activity (DPPH Scavenging activity)

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Table 1

Sample code	***IC*$_{50}$ value (µg/ml)**
Ascorbic Acid	10.35 ± 0.026
RK-01 (*Wodyetia bifurcata* leaf extract)	31.32 ± 0.046

Based on the results obtained from the experimental work, Antioxidant activity (DPPH Assay) was estimated in samples and 50% inhibitory concentrations were mentioned in table 1. Sample- RK-01 were found to be highly active. 31.32 µg of sample- RK-01 respectively were found equivalent to 10.35 µg of standard Ascorbic acid.

The antioxidant activity of the tested plant extracts was evaluated using the DPPH assay, which measures the ability to scavenge free radicals. The results showed a significant reduction in DPPH absorbance, indicating strong free radical scavenging activity. The IC_{50} values, representing the concentration needed to inhibit 50% of the DPPH radicals, were determined to be 31.32 ± 0.046 µg/ml for each extract. These values were compared with standard antioxidants such as ascorbic acid to gauge relative efficacy. The IC_{50} values were calculated using GraphPad Prism 9 software, where a graph plotting sample concentration (X-axis) against % inhibition relative to control (Y-axis) was prepared. This comparison highlights the potent antioxidant capabilities of the plant extracts.

DISCUSSION

Based on the results obtained from the experimental work, Antioxidant activity (DPPH Assay) was estimated for extract and plant extract were found to be highly active. 31.32 µg of sample- respectively were found equivalent to 10.35 µg of standard Ascorbic acid. Flavonoids and phenolic compounds can donate hydrogen atoms or electrons to free radicals, stabilizing them and preventing oxidative stress. This mechanism likely underlies the high antioxidant activity observed in extract. The findings of this study provide a foundation for further research aimed at isolating and characterizing the individual antioxidant compounds within the extracts. Future studies should focus on:

Bioassay-Guided Fractionation: To isolate the most active antioxidant compounds and determine their individual contributions.

Mechanistic Studies: To understand the molecular mechanisms by which these compounds exert their antioxidant effects.

CONCLUSION

The present study enables us to conclude that ethanolic extract of leaves of *Wodyetia bifurcata* has significant antioxidant activity but highly potent than the standard drug, ascorbic acid. Phytochemicals like flavonoids and Phenolic compounds present in *Wodyetia bifurcata* could be responsible for the antioxidant activity. However further studies are required to focus on to isolate the most active antioxidant compounds and determine their individual contributions and to understand the molecular mechanisms by which these compounds exert their antioxidant effects.

FINANCIAL SUPPORT AND SPONSORSHIP

Nil.

CONFLICTS OF INTERESTS

There are no conflicts of interest.

REFERENCES

1. Perez, K., Kobayashi, K., & Sako, G. 2009. Foxtail palm, *Wodyetia bifurcata*. Ornamentals and flower, 8-11.
2. Naderali, N., Nejat, N., Vadamalai, G., Davis, R. E., Wei, W., Harrison, N. A., & Zhao, Y. 2017. '*Candidatus* phytoplasma wodyetiae', a new taxon associated with yellow decline disease of foxtail palm (*Wodyetia bifurcata*) in Malaysia. International journal of systematic and evolutionary microbiology
3. Sengab, A.E.B, El Dina, M. Y., Elgindi, M. R., & Elsaid, M. B. 2015. Biological studies of isolated triterpenoids and phenolic compounds identified from *Wodyetia bifurcata* family *Arecaceae*. Journal of Pharmacognosy and Phytochemistry, 3(6), 67-73.

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4. Kim, H., Moon, J. Y., Kim, H., Lee, D. S., Cho, M., Choi, H. K., & Cho, S. K. 2010. Antioxidant and antiproliferative activities of mango (*Mangifera indica* L.) flesh and peel. Food Chemistry, 121(2), 429-436.
5. Alshwyeh, H. A. 2020. Phenolic profiling and antibacterial potential of Saudi Arabian native date palm (*Phoenix dactylifera*) cultivars. International Journal of Food Properties, 23(1), 627-638.
6. Hanula, M., Wyrwisz, J., Moczkowska, M., Horbańczuk, O. K., Maejo International Journal of Energy and Environmental Communication Pogorzelska-Nowicka, E., & Wierzbicka, A. 2020. Optimization of microwave and ultrasound extraction methods of açai berries in terms of highest content of phenolic compounds and antioxidant activity. Applied Sciences, 10(23), 8325.
7. Oyaizu M. Studies on products of browning reactions: Antioxidative activities of products of browning reaction prepared from glucosamine. Jpn J Nutr 1986;44:307-15.
8. De Castro ML, Ayuso LE. Soxhlet extraction. Environmental Applications. 2000;2000:2701-5.