International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435 (Online) Volume 15, Issue 03, March 2026)

Antioxidant Evaluation of *Olax Psittacorum* (Willd.) Vahl (Olacaceae): A Wild Edible Climber from Maharashtra Tribal Diets

Shyamalkant Biswas
Assistant Professor Department of Chemistry, Raje Dharamarao College of Science, Aheri.(M.S.).

Abstract**-- Underutilized wild edible plants represent an important yet insufficiently characterized reservoir of bioactive compounds with potential health benefits. *Olax psittacorum* (Willd.) Vahl (Olacaceae), a perennial climbing shrub consumed by tribal communities in the Gadchiroli region of Maharashtra, India, was evaluated for its antioxidant properties. Methanolic extracts of tender leaves and shoots were prepared and analyzed using the DPPH radical scavenging assay, employing ascorbic acid as a reference antioxidant. The extract demonstrated concentration-dependent radical inhibition ranging from 1.49% to 15.52% at concentrations of 5–320 µg/ml. The IC_{50} value was found to be greater than 320 µg/ml, indicating comparatively low in vitro antioxidant potency. The activity observed may be attributed to the presence of moderate levels of phenolics, tannins, and other secondary metabolites capable of hydrogen atom donation. Although the free radical scavenging capacity was modest, the plant's regular dietary inclusion may contribute to overall antioxidant intake within traditional diets. These findings provide preliminary scientific evidence supporting the ethnobotanical significance of *O. psittacorum* and encourage further advanced phytochemical characterization and in vivo evaluation to determine its broader therapeutic relevance.**

Keywords**-- Olax psittacorum*;* Olacaceae; DPPH assay; Wild edible climber; Oxidative stress; Phytochemicals; Tribal nutrition.**

I. Introduction

1.1 Oxidative Stress and the Importance of Dietary Diversity

Chronic oxidative damage resulting from ROS imbalance contributes significantly to degenerative diseases and aging (Pham-Huy et al., 2008). Increasing dietary diversity, particularly through inclusion of wild edible plants, enhances micronutrient intake and antioxidant exposure (Prior & Cao, 2000).

Wild plant species often represent untapped reservoirs of bioactive compounds that may contribute to preventive healthcare, especially in resource-limited settings.

1.2 Wild Climbers and Ethnomedicinal Significance

Climbing shrubs and woody wild plants frequently synthesize diverse secondary metabolites such as lignans, tannins, and phenolic glycosides as protective adaptations (Okuda et al., 1983). These compounds may exhibit antioxidant, antimicrobial, and anti-inflammatory activities.

Despite this biochemical potential, many wild climbers used in tribal diets remain scientifically undocumented.

1.3 Botanical and Ethnobotanical Overview

Olax psittacorum (Willd.) Vahl belongs to the family Olacaceae and is a perennial climbing shrub found in forested ecosystems. In tribal regions of Gadchiroli, tender leaves and shoots are consumed as seasonal vegetables. Limited phytochemical studies have been conducted on members of Olacaceae, though some reports suggest the presence of lignans, saponins, and phenolic compounds with potential antioxidant activity.

1.4 Research Gap and Study Objective

Unlike common leafy vegetables, *O. psittacorum* has not been extensively evaluated for its antioxidant properties. Scientific validation of its free radical scavenging capacity is essential to support traditional dietary knowledge and explore possible nutraceutical applications. Therefore, the present study aims to evaluate the antioxidant potential of methanolic extracts of *Olax psittacorum* using the DPPH assay and to interpret its activity in the context of phytochemical composition and tribal nutrition.

II. Materials And Methods

Tender leaves and young shoots of *Olax psittacorum* (Willd.) Vahl were collected during the early monsoon season (June–August), when vegetative growth is abundant and the plant is traditionally harvested for consumption by tribal communities. The specimens were gathered from forest margins and climbing shrub habitats in the vicinity of Kamlapur village, located in the Gadchiroli district of Maharashtra, India.

Care was taken to collect healthy plant material free from fungal infection or mechanical damage. The collected samples were washed thoroughly with running water followed by distilled water to eliminate extraneous matter. The plant material was then shade-dried in a well-ventilated environment to maintain phytochemical stability before further processing. Taxonomic authentication was performed by a qualified botanist using morphological descriptors such as leaf shape, venation pattern, stem characteristics, and climbing habit, in accordance with regional floras. The species was confirmed as *Olax psittacorum* (Willd.) Vahl (Family: Olacaceae). A voucher specimen, bearing complete collection data, was prepared and preserved in the Departmental Herbarium of Raje Dharamarao College of Science, Aheri, Maharashtra, ensuring traceability and reproducibility of the research.

2.1 Extraction of Plant Material

Tender leaves and shoots of *Olax psittacorum* were shade-dried and ground into coarse powder. Approximately 25 g of powdered material was extracted with methanol in a Soxhlet apparatus for 6–8 hours. The extract was filtered and evaporated to dryness under reduced pressure. The dried extract was preserved at 4°C in airtight containers until further use.

2.2 Determination of Antioxidant Activity by DPPH Assay

The free radical scavenging capacity of the methanolic extracts was assessed using the DPPH assay method as reported by Perumal and Saravanabhavan (2018). A 0.135 mM DPPH solution was freshly prepared in methanol prior to experimentation. For analysis, 1 ml of plant extract at varying concentrations ranging from 20 to 320 µg/ml was mixed with 2.5 ml of the DPPH solution.

Each mixture was vortex-mixed to achieve uniform distribution and kept at ambient temperature in dark conditions for 30 minutes to allow complete reaction between antioxidants and DPPH radicals. The reduction in absorbance was measured spectrophotometrically at 517 nm against a methanol blank. Ascorbic acid was employed as a reference standard for comparison of antioxidant activity.

The percentage of radical scavenging activity was determined using the equation:

The percentage inhibition was calculated as:

% DPPH inhibition = [(OD of control - OD of test)/ (OD of control)] x 100

(Perumal, P. And Saravanabhavan, K., 2018)

The IC_{50} value (the concentration required to scavenge 50% of DPPH radicals) was obtained from the inhibition curve plotted against extract concentration.

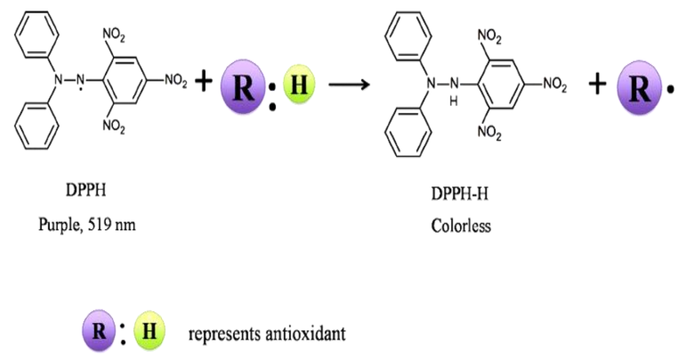
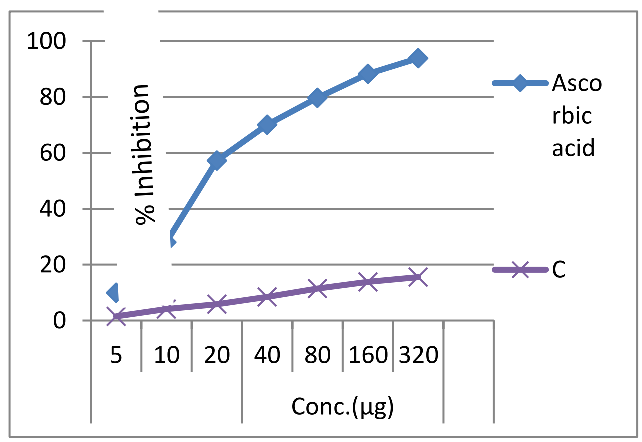


Figure 1 : Mechanism of action of antioxidant vs DPPH . R: R is an antioxidant radical; H is an antioxidant radical scavenger. David D. Kitts, 2014. Courtesy

Table 1:
Concentration Vs Mean Values of % inhibition

Conc.(µg)	Ascorbic acid	C (*O. psittacorum*)
5	9.972	1.491
10	28.006	4.054
20	57.223	5.871
40	70.037	8.434
80	79.730	11.417
160	88.257	13.886
320	93.849	15.517



Graph 1: The IC50 values in µg/ml: C(>320) and Ascorbic acid = 23.27 µg/ml.

III. Results And Discussion

3.1 DPPH Radical Scavenging Capacity

All tested extracts demonstrated concentration-dependent increases in free radical scavenging activity (Table 1).

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435 (Online) Volume 15, Issue 03, March 2026)

Concentration (µg/ml)	Ascorbic Acid	O. psittacorum
5	9.97	1.49
10	28.01	4.05
20	57.22	5.87
40	70.04	8.43
80	79.73	11.42
160	88.26	13.89
320	93.85	15.52

The IC_{50} values were calculated as follows: *O. psittacorum* >320 µg/ml and ascorbic acid 23.27 µg/ml.

3.2 Mechanistic Insight and Phytochemical Correlation

The relatively low DPPH radical scavenging activity observed in *Olax psittacorum* suggests a limited concentration of highly active phenolic antioxidants in the methanolic extract. However, the presence of mild activity indicates that the plant contains certain secondary metabolites capable of hydrogen atom donation. Climbing shrubs often synthesize lignans, tannins, and glycosides, compounds that may exhibit moderate antioxidant properties. The lower activity may also reflect solvent selectivity, as some bioactive compounds in woody climbers may be better extracted using aqueous or semi-polar solvents.

3.3 Comparative Discussion with Literature

Scientific data on the antioxidant properties of Olacaceae members remain limited. Compared to widely studied leafy vegetables, *O. psittacorum* appears to possess weaker in vitro radical scavenging capacity. However, antioxidant activity alone does not fully determine therapeutic value; other pharmacological properties may contribute to its ethnobotanical significance. The findings emphasize the importance of systematic scientific evaluation of lesser-known wild edible plants to accurately assess their nutritional and medicinal potential.

3.4 Potential Applications and Future Prospects

Although its antioxidant capacity is modest, *O. psittacorum* may contribute to dietary micronutrient diversity. Further research involving alternative extraction methods, detailed phytochemical analysis, and in vivo antioxidant assays is necessary to fully evaluate its bioefficacy. Given the global interest in biodiversity-based nutrition, even moderately active species may hold value when integrated into balanced diets or explored for synergistic formulations with other antioxidant-rich plants.

IV. CONCLUSION

Olax psittacorum exhibits low to moderate in vitro antioxidant activity, indicating the presence of certain bioactive compounds. Further phytochemical and pharmacological investigations are required to establish its complete therapeutic potential.

Acknowledgements

The author express sincere gratitude to the Department of Chemistry, Raje Dharmarao College of Science, Aheri, for laboratory facilities, and to Dr. Ambedkar College, Chandrapur, for instrumental and technical support.

REFERENCES

[1] Halliwell, B., & Gutteridge, J. M. C. (2015). Free Radicals in Biology and Medicine (5th ed.). Oxford University Press.
[2] Valko, M., Leibfritz, D., Moncol, J., Cronin, M. T., Mazur, M., & Telser, J. (2007). Free radicals and antioxidants in normal physiological functions and human disease. International Journal of Biochemistry & Cell Biology, 39, 44–84.
[3] Pham-Huy, L. A., He, H., & Pham-Huy, C. (2008). Free radicals, antioxidants in disease and health. International Journal of Biomedical Science, 4, 89–96.
[4] Sies, H. (1997). Oxidative stress: Oxidants and antioxidants. Experimental Physiology, 82, 291–295.
[5] Lobo, V., Patil, A., Phatak, A., & Chandra, N. (2010). Free radicals, antioxidants and functional foods. Pharmacognosy Reviews, 4, 118–126.
[6] Prior, R. L., & Cao, G. (2000). Antioxidant phytochemicals in fruits and vegetables. Journal of Agricultural and Food Chemistry, 48, 1141–1146.
[7] Pandey, K. B., & Rizvi, S. I. (2009). Plant polyphenols as dietary antioxidants. Oxidative Medicine and Cellular Longevity, 2, 270–278.
[8] Shahidi, F., & Ambigaipalan, P. (2015). Phenolics and polyphenolics in foods. Journal of Functional Foods, 18, 820–897.
[9] Blois, M. S. (1958). Antioxidant determinations by the use of a stable free radical. Nature, 181, 1199–1200.
[10] Brand-Williams, W., Cuvelier, M. E., & Berset, C. (1995). Use of free radical method to evaluate antioxidant activity. LWT–Food Science and Technology, 28, 25–30.
[11] Kedare, S. B., & Singh, R. P. (2011). Genesis and development of DPPH method. Journal of Food Science and Technology, 48, 412–422.
[12] Mensor, L. L., et al. (2001). Screening of plant extracts for antioxidant activity by DPPH. Phytotherapy Research, 15, 127–130.
[13] Thaipong, K., et al. (2006). Comparison of antioxidant assays (DPPH, ABTS, FRAP, ORAC). Journal of Food Composition and Analysis, 19, 669–675.
[14] Re, R., et al. (1999). ABTS radical cation decolorization assay. Free Radical Biology & Medicine, 26, 1231–1237.
[15] Benzie, I. F. F., & Strain, J. J. (1996). Ferric reducing antioxidant power assay. Analytical Biochemistry, 239, 70–76.
[16] Sarker, S. D., Nahar, L., & Kumarasamy, Y. (2007). Microtitre plate-based antioxidant assay. Methods, 42, 321–324.

[17] Kitts, D. D. (2014). Antioxidant properties of phytochemicals. Canadian Journal of Physiology and Pharmacology, 92, 915–925.

[18] Gupta, S., Lakshmi, A. J., & Prakash, J. (2005). Nutritional and antioxidant potential of green leafy vegetables. Plant Foods for Human Nutrition, 60, 21–28.

[19] Uusiku, N. P., Oelofse, A., Duodu, K. G., Bester, M. J., & Faber, M. (2010). Nutritional value of leafy vegetables of sub-Saharan Africa. Journal of Food Composition and Analysis, 23, 499–509.

[20] Ignacimuthu, S., et al. (2006). Ethnobotanical investigations among tribal communities. Journal of Ethnopharmacology, 102, 246–255.

[21] Kaur, C., & Kapoor, H. C. (2001). Antioxidants in fruits and vegetables. Journal of Food Science and Technology, 38, 703–708.

[22] Roberfroid, M. (2002). Functional foods: Concept and application. American Journal of Clinical Nutrition, 71, 1682S–1687S.

[23] Granato, D., et al. (2010). Functional foods and nutraceutical evaluation. Comprehensive Reviews in Food Science and Food Safety, 9, 292–302.

[24] Okuda, T., Yoshida, T., & Hatano, T. (1983). Hydrolyzable tannins and related polyphenols. Phytochemistry, 22, 2201–2204.

[25] Haslam, E. (1996). Natural polyphenols (vegetable tannins) as drugs. Journal of Natural Products, 59, 205–215.

[26] Dixon, R. A., & Paiva, N. L. (1995). Stress-induced phenylpropanoid metabolism. Plant Cell, 7, 1085–1097.

[27] Pietta, P. G. (2000). Flavonoids as antioxidants. Journal of Natural Products, 63, 1035–1042.

[28] Li, A. N., et al. (2014). Structural characteristics and antioxidant activity of phenolics. Molecules, 19, 130–158.

[29] Heim, K. E., Tagliaferro, A. R., & Bobilya, D. J. (2002). Flavonoid antioxidants: Chemistry and metabolism. Journal of Nutritional Biochemistry, 13, 572–584.

[30] Burkill, H. M. (1997). The Useful Plants of West Tropical Africa (Vol. 4). Royal Botanic Gardens, Kew.

[31] Warrier, P. K., Nambiar, V. P. K., & Ramankutty, C. (1996). Indian Medicinal Plants. Orient Longman.

[32] Kirtikar, K. R., & Basu, B. D. (1935). Indian Medicinal Plants. Lalit Mohan Basu.

[33] Nadkarni, K. M. (2001). Indian Materia Medica. Popular Prakashan.

[34] Singh, B., et al. (2012). Phytochemical investigations of Olacaceae species. Natural Product Research, 26, 1805–1810.

[35] Ajaiyeoba, E. O., et al. (2003). Antimicrobial and phytochemical properties of Olacaceae plants. African Journal of Medicine and Medical Sciences, 32, 293–296.

[36] Singleton, V. L., & Rossi, J. A. (1965). Determination of total phenolics. American Journal of Enology and Viticulture, 16, 144–158.

[37] Zhishen, J., Mengcheng, T., & Jianming, W. (1999). Determination of flavonoid content. Food Chemistry, 64, 555–559.

[38] Harborne, J. B. (1998). Phytochemical Methods (3rd ed.). Chapman & Hall.

[39] Sofowora, A. (1993). Medicinal Plants and Traditional Medicine in Africa. Spectrum Books.

[40] AOAC. (2012). Official Methods of Analysis (19th ed.). AOAC International.

[41] Johns, T., & Sthapit, B. R. (2004). Biocultural diversity in the sustainability of developing-country food systems. Food and Nutrition Bulletin, 25, 143–155.

[42] FAO. (2010). The Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture. FAO.

[43] Bharucha, Z., & Pretty, J. (2010). The roles and values of wild foods in agricultural systems. Philosophical Transactions of the Royal Society B, 365, 2913–2926.

[44] Tilman, D., et al. (2002). Agricultural sustainability and biodiversity. Nature, 418, 671–677.

[45] Slavin, J. L., & Lloyd, B. (2012). Health benefits of fruits and vegetables. Advances in Nutrition, 3, 506–516.