



EVALUATION OF SEASONAL AND ALTITUDINAL VARIATION IN ANTIOXIDANT ACTIVITY OF *FICUS AURICULATA* LEAVES FROM CHAMOLI GARHWAL, UTTARAKHAND

Ankita Sharma^{1,2*}, Sushil Chandra Sati³ and O. P. Sati⁴

¹Department of Chemistry, Dolphin Institute of Biomedical and Natural Sciences, Dehradun, Uttarakhand, India.

²Uttarakhand Technical University, Dehradun, Uttarakhand, India.

³Department of Chemistry, Dr. S.N. Nautiyal Government P.G. College Karanprayag, Uttarakhand, India.

⁴Department of Chemistry, H.N.B. Garhwal University, Srinagar Garhwal, Uttarakhand, India.

***Corresponding Author: Ankita Sharma**

Department of Chemistry, Dolphin Institute of Biomedical and Natural Sciences, Dehradun, Uttarakhand, India.

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ABSTRACT

The antioxidant activity of leaves of *Ficus auriculata* collected in rainy, winter and summer seasons from different altitudes of Chamoli Garhwal was studied by DPPH method. The methanolic extract of *Ficus auriculata* of Adibadri and Kunjasu showed best antioxidant activity of 97.2% and 96.44% respectively in winter season at 1000µg/ml as compared to 92.4% and 89% activity respectively shown by the same concentration of extract in rainy season plant material. The summer season plant extract showed only 96.85% and 88.09% from Adibadri and Kunjasu regions respectively. Whereas the extract from Devsthan region possessed maximum antioxidant activity of 90.25% at concentration of 1000µg/ml in rainy season as compared to winter season activity of only 24.04% and summer season activity of 22.65% with the same concentration of extract. Although all the plant extracts were found to possess good antioxidant potential as compared to standard ascorbic acid with 99% activity at 1000µg/ml.

KEYWORDS: DPPH, *Ficus auriculata*, antioxidant.

INTRODUCTION

Antioxidant is an inhibitor of the process of oxidation, even at relatively small concentration and thus have diverse physiological role in the body.^[1] Antioxidant constituents of plant materials act as radical scavengers, and convert the radicals to less reactive species. The intake of antioxidant compounds present in food is an important health-protecting factor. The increasing interest in the search for natural replacements for synthetic antioxidants has led to the antioxidant evaluation of a number of plant foods. The antioxidants act as an inhibitor of the process of oxidation, even at relatively small concentration and thus have diverse physiological role in the body. The molecule of 1,1-diphenyl-2-picrylhydrazyl (α, α -diphenyl- β -picrylhydrazyl; DPPH) is characterized as a stable free radical by virtue of the delocalization of the spare electron over the molecule as a whole, so that the molecules do not dimerise, as would be the case with most other free radicals.^[2] Therefore DPPH method can be used to evaluate antioxidant activity of plants. The methanolic extract of *Ficus auriculata* showed significant antidiabetic and antiviral properties.^[3] The fruit extract possessed hypoglycemic, diuretic, antioxidant, immunity, hepatoprotective activities, latex has anthelmintic and anticarcinogenic activities.^[4] The

juice of this plant was used in diarrhea followed by warm saline water.^[5] This plant is conserved for its religious significance and utilization.^[6] In India, the fresh latex was used to treat dental caries.^[7] The antipyretic and analgesic action of *Ficus microcarpa* is due to its antioxidant activity.^[8] Thus there arises a need to screen the antioxidant activity of *Ficus auriculata* leaves also in various seasons from different altitudes of Uttarakhand.

MATERIALS AND METHODS

Collection and Identification of leaves of *Ficus auriculata*

Leaves of *Ficus auriculata* were collected from different altitudes of Chamoli Garhwal viz: Adibadri, Kunjasu and Devsthan region, Uttarakhand (India). Plant material was authenticated in Department of Botany, HNBGU.

Extraction of leaves of *Ficus auriculata* in solvent methanol

The collected plant material was washed with water to remove other undesirable materials and dried under shade. The air-dried leaves (500 gm) of *Ficus auriculata* were crushed and extracted with methanol by hot percolation method using Soxhlet apparatus. The extract was evaporated till dryness to obtain residue. These extracts were stored at 4° C until analysis.

Preparation of DPPH: DPPH is a highly oxidisable compound. It is oxidized in light, so DPPH was prepared in dark. 0.0019 g of DPPH was weighed accurately and made up to 50ml in methanol as solvent making 0.1mM of solution.

Preparation of standard Ascorbic acid solution:- Ascorbic acid is a strong antioxidizing agent. It was taken as standard. Standard solution of ascorbic acid was prepared. viz. 400 µg/ml, 600 µg/ml, 800 µg/ml, 1000 µg/ml.

Preparation of different concentration of test sample: Different concentration of the test sample *Ficus auriculata* leaves extract which was to be examined for antioxidant activity were prepared. Viz. 400 µg/ml, 600 µg/ml, 800 µg/ml, 1000 µg/ml. Then 1 ml of different concentrations of test sample of extract were mixed with 3 ml of DPPH solution in dark.

Measurement of absorbance: Absorbance was taken with the help of U.V. Spectrophotometer (Thermoscientific Evolution 201) at 517 nm.

Calculation: The % activity of different concentrations of test sample was calculated from the following formula.^[9]

% Antioxidant activity=

$$100 \frac{(\text{Absorbance of Control} - \text{Absorbance of Sample})}{\text{Absorbance of control}}$$

RESULTS AND DISCUSSION

Methanol extract of *Ficus auriculata* leaves collected from Adibadri altitude showed maximum antioxidant activity in comparison to all extracts. The concentration of 1000 µg/ml of methanol extract showed 97.20% antioxidant activity in comparison to all extracts, which is also quite good as compared to standard ascorbic acid showing 99% activity at the same concentration. It was found that leaves collected in winter season (Jan-Feb) have more potential as antioxidant agent in comparison to other seasons viz. (Rainy and Summer). This shows that the plant sample, for traditional or therapeutic medicinal use can be collected in the season showing best antioxidant results. Further, the altitude giving best antioxidant potential, can be used as a reference or important data for collection of plant material. However, there are some exceptions, like leaves from Devsthan altitude showed best results in rainy season (Aug-Sept). Ascorbic acid was used as a standard for comparison to all extracts.

Table 1: DPPH Scavenging activity in percentage.

Sno.	Conc (µg/ml)	Rainy season(% activity) Aug-Sept			Winter season(% activity) Jan-Feb			Summer season(% activity) May-June			ascorbic acid (% activity)
		Adibadri	Kunjasu	Devsthan	Adibadri	Kunjasu	Devsthan	Adibadri	Kunjasu	Devsthan	
1.	400	53.47	14.40	56.53	72.05	32.91	5.20	58.14	19.00	3.82	98.99
2.	600	54.92	48.94	74.05	92.61	59.41	13.00	91.22	45.00	11.62	99.09
3.	800	86.88	75.48	82.17	97.17	77.50	21.00	95.78	63.50	18.28	99.25
4.	1000	92.40	89.00	90.25	97.20	96.44	24.04	96.81	88.09	22.65	99.87

CONCLUSION

The present study reveals that best antioxidant activity is shown by the leaves sample from Adibadri altitude in winter season as compared to extracts from other altitudes of Chamoli Garhwal, Uttarakhand, under study. This study uncovers important aspects of seasonal and altitudinal variation in free radical scavenging activity of leaves of *Ficus auriculata*. And it gives valuable information and idea to the researchers and drug manufacturers regarding suitable season and altitude for collection of plant material to give best optimum results with high potency.

REFERENCES

- Sharma A., Sati S.C., Rawat S., Singh D., World J. Of Pharmacy and Pharmaceutical Sciences, 2014; 3(2): 2044-48.
- Molyneux P., J Sci. Tech, 2004; 211-19.
- Ahlam El-Fishawy, Rawia Zayed, Sherif Afifi, Journal of Natural Products, 2011; 4: 184-195.
- Saeed Ahmad, Farriha Rashid Bhatti, Farhan Hameed Khaliq, Sajid Irshad and Asadullah Madni, International Journal Of Bioassays, 2013;

2(5): 843-849.

- Bhattarai, N. K., Folk Herbal Medicines of Dolkha District, Nepal. Fitoterapia, 1993; 64(5): 387-395.
- Gaur RD. 1999 d. *Flora of the District Garhwal North West Himalaya*. (p. 89). Srinagar Garhwal, India: Trans Media, Media House.
- Jain, S.P. and Puri, H.S., Journal of Ethnopharmacology, 1984; 12: 213-222.
- N. Sirisha, M. Sreenivasulu, K. Sangeeta, C. Madhusudhana Chetty, International Journal of Pharm Tech Research, 2010; 2(4): 2174-2182.
- Sikder A.Md, Rahman A.Md, Islam R. Md, Kaisar A. Md, Mohmad S., Bangla. Pharma. J., 2010; 13(2): 414-19.