



UNIQUE JOURNAL OF AYURVEDIC AND HERBAL MEDICINES

Available online: www.ujconline.net

Research Article

ANTIOXIDANT EFFECT OF THE STEM AND LEAVES OF *SOLANUM XANTHOCARPUM*

Dinanath D Patil*

Head department of chemistry, R.B.N.B. College, Shirampur- 414 709(MS)

Received 03-09-2013; Revised 02-10-2013; Accepted 01-11-2013

*Corresponding Author: **Dinanath D Patil**, E-mail: dinanath.patil@gmail.com Mobile: 9420638003, 9766190686

ABSTRACT

Solanum xanthocarpum L is used in the traditional medicine as diuretic. In the present study, the antioxidant activity of ethanol, chloroform and ethyl acetate extract of leaves and stem of *Solanum xanthocarpum* Lam was studied and the activity was compared with DPPH and BHT as standard. By employing DPPH (2,2-diphenyl-1-picrylhydrazyl radical) scavenging assays, it was shown that all the ethanol extracts of leaves and stem show antioxidant activity.

Keywords: Antioxidant, *Solanum Xanthocarpum*, Stem, Leaves, Papilionaceae.

INTRODUCTION

Yellow Berried Nightshade is an extremely vital herb in Hindu medicinal practice. Revered for its therapeutic properties, the herb is found in many parts of India¹.

Yellow Berried Nightshade is one of the chief ingredients in *Dashamoola Rasayanam*, an Ayurvedic preparation for the treatment of respiratory ailments. The herb is also a digestive and a carminative, which facilitates the treatment of gastrointestinal problems. The leaf has been reported to contain methyl piper betlol, peperol-A, piperol-B²⁻⁵.

The glycol alkaloid and fatty acid fractions of the plants extract cause a release of histamine from chopped lung tissue. The beneficial effect of the drug for bronchial asthma may be attributed to the depletion of histamine from bronchial and lung tissue. The herb is helpful in treating respiratory disorders like bronchial asthma, cough and bronchitis⁶.

Yellow Berried Nightshade facilitates the treatment of gastrointestinal disorders like constipation and flatulence, because of its laxative and carminative properties linn are recommended to make necessary inclusions in the ayurvedic pharmacopoeia. Damage to cells caused by free radicals is believed to play a central role in the aging process and in disease progression^{7,8}. Antioxidants are our first line of defense against free radical damage, and are critical for maintaining optimum health and wellbeing. The need for antioxidants becomes even more critical with increased exposure to free radicals. Pollution, cigarette smoke, drugs, illness, stress, and even exercise can increase free radical exposure⁹⁻¹³. Because so many factors can contribute to

oxidative stress, individual assessment of susceptibility becomes important. Many experts believe that the Recommended Dietary Allowance (RDA) for specific antioxidants may be inadequate and, in some instances, the need may be several times the RDA. As part of a healthy lifestyle and a well-balanced, wholesome diet, antioxidant supplementation is now being recognized as an important means of improving free radical protection.

Although the antioxidant defense systems includes both endogenously and exogenously derived compounds, dietary plants based antioxidant have recently received a great attention². Hence many studies have been performed to identify antioxidant compounds with pharmacological activity and a limited toxicity from medicinal plants. In this context, ethno pharmacology plays a significant part in the search for interesting and therapeutically useful plants. In order to contribute to the knowledge of plants from India in the present study, *Solanum xanthocarpum* Linn^{14,15}, and plant parts were screened to determine their free radical scavenging and antioxidant activities.

MATERIALS AND METHODS

Plant Material

The plant materials used in this study stem and leaves of *Solanum xanthocarpum* were collected from the field in Khandala, Tal. Shirampur, Dist. Ahmednagar identified by Dr. S.D. Varpe R.B.N.B College Shirampur, India. A voucher specimen of the collected sample was deposited in our institutional herbarium for the reference.

Preparation of plant extracts

100g of dried and powdered plant material (leaves, and stem) were extracted at room temperature with 500 mL of methanol under constant shaking for 24 h. After filtration, the Methanolic (MeOH) solutions were evaporated to dryness in a rotary evaporator for the biological assays and then followed by extraction using ethyl acetate, ethanol, chloroform etc with same procedure.

DPPH scavenging test

Quantitative measurement of radical scavenging properties was carried out in a universal bottle. The reaction mixture contained 50 µL of test samples (or 80% MeOH as blank) and 5 mL of a 0.004% (w/v) solution of DPPH in methanol. Different known antioxidants, vitamin E, and butylated hydroxy toluene (BHT, Sigma) were used for comparison, as a positive control. Discoloration was measured at 517 nm after incubation for 30 min. Measurements was taken at least in triplicate. DPPH radical's concentration was calculated using the following equation:

$$\text{DPPH scavenging effect (\%)} = \frac{A_0 - A_1}{A_0} \times 100$$

Where A_0 was the absorbance of the control and A_1 was the Absorbance in the presence of the sample The actual decrease in absorption induced by the test compounds was compared with the positive controls. The mean OD 517 results of DPPH scavenging activity were recorded.

RESULTS AND DISCUSSION**Table I: Antioxidant activity of different extract of leaves**

Extract Conc. µg/ml	BHT	Ethanol	CHCl ₃	CCl ₄
0.05	45.1	15.11	13.53	16.47
0.1	46.91	24.64	19.53	10
0.2	49.24	22.24	18.50	14
0.3	57.57	20.12	10.00	11.5

Table II: Antioxidant activity of stem

Extract Conc. µg/ml	BHT	Ethanol	CHCl ₃	CCl ₄
0.05	45.1	18	15	12
0.1	46.91	14	14	11
0.2	49.24	12	10	09
0.3	57.57	15	12	18

There is a strong need for effective antioxidants from natural sources as alternatives to synthetic antioxidant in order to prevent the free radical which can have serious effects on the cardiovascular system, either through lipid per oxidation or vasoconstriction. The extracts and essential oils of many plants have been investigated for their antioxidant activity. Secondary metabolites such as polyphenols are not required for plant development and growth, but are involved in plant communication and defense. Polyphenols interact with pathogens, herbivores, and other plants; they protect from ultraviolet radiation and oxidants, repel or poison predators and attract beneficial insects or microbes Therefore, in this study, the antioxidant properties of the methanol extracts of leaves and stems of *Solanum xanthocarpum* DPPH radical scavenging activity according to the method described and the

results of the screening are shown in table 1 to table 2 as comparable with known antioxidant BHT .In terms of antioxidant activity, all the extracts investigated exhibited activity (more than 40%). In particular, leaves (ethanol extract) of *Solanum xanthocarpum* displayed the highest activities as antioxidant activity as removal of the stable radical DPPH and the lowest activity were found in ccl4 extract of stem. As expected, the overall activity of the raw extracts was lower than that of commercial antioxidant BHT, the reference antioxidant.

CONCLUSION

In conclusion, the antioxidant activity of ethanol, chloroform and ethyl acetate extracts of leaves and stems of *Solanum xanthocarpum* Lam was studied and the activity was compared with DPPH and BHT as standard. By employing DPPH (2,2-diphenyl-1picrylhydrazyl radical) scavenging assays, it was shown that all the ethanol extracts of leaves and stem show better antioxidant activity compared to other extracts and this study will be helpful for future researchers to develop some new antioxidant extracts.

ACKNOWLEDGEMENT

We are grateful to the Principal, R.B.N.B. College, Shrirampur for providing the laboratory facilities for the work. (Nikhil analytical & research laboratory, Sangali for their technical assistance)

REFERENCES

- Harborne JB. Phytochemical methods: A guide to modern techniques of plant analysis. 2nd Ed. New York: Chapman and Hall; 1984.85.
- Lipschitz WL, Haddian Z, Kepsar A. Bioassay of diuretics. J Pharmacol Exp Ther 1943; 79:110.
- Vogal. Textbook of quantitative analysis of chemical analysis. 57th ed. England: Addition Wesley Longman Ltd; 1989. p. 801.
- Becket BH, Stenlake JB. Practical pharmaceutical chemistry. Part-1, 8. 1st ed. New Delhi, India: CBS Publishers and Distributors; 1997.197. 9. Kavimani S, Ilango R, Gurubatham J, Jaykar B, Majumber UK, Gupta M. Acetylcholine antagonistic action of aqueous extract of *orthosiphon thymiorus*. Indian J Pharm Sci 1997; 59:271-2.
- Lorenzi H, Matos FJA. Plantas medicinais no Brasil: nativas e exóticas. Instituto Plantarum:São Paulo, 2002; 544-546.
- Coelho LP, Reis, PA, Castro FL, Gayer CRM, Lopes CS, Silva MCC, Sabino KCC, Todeschini AR, Coelho MGP. Antinociceptive properties of ethanolic extract andfractions of *Pterodon pubescens* Benth. seeds. J. Ethnopharmacol. 2005, 98, 109-119.
- Brito, A. R. M. S.; Brito, A. A. S. Forty years of Brazilian medicinal plant research. J. Ethnopharmacol. 1993, 39, 53-67.
- Duarte, I. D. G.; Ferreira-Alves, D. L.; Veloso, D. P.; Nakamura-Craig, M. Evidence of theinvolvement of biogenic amines in the antinociceptive effect of a

- vouacapan extracted from *Pterodon polygalaeflorus* Benth. J. Ethnopharmacol. 1996, 55, 13-18.
9. Finkel T, Holbrook NJ. Oxidants, oxidative stress and the biology of ageing. Nature, 2000; 408: 239-47.
 10. Halliwell B. The antioxidant paradox. The Lancet 2000, 355, 1179- 1180.
 11. Pietta P. Flavonoids as antioxidant. J. Nat. Prod. 2000, 63, 1035- 1042.
 12. Visioli F, Keaney Jr JF, Halliwell B. Antioxidants and cardiovascular disease; panaceas or tonics for tired sheep? Cardiovasc. Res. 2000, 47, 409-418.
 13. Husain SR, Cillard J, Cillard P. Hydroxyl radical scavenging activity of flavonoids. Phytochemistry 1987, 26, 2489-2497.
 14. Parr A, Bolwell GP. Phenols in the plant and in man: The potential for possible nutritional enhancement of the diet by modifying phenols content or profile. J. Sci. Food Agric. 2000, 80,985–1012.
 15. Basile A, Ferrara L, Del Pozzo, M. Mele G, Sorbo S, Bassi P, Montesano, D. Antibacterial and antioxidant activities of ethanol extract from *Paullinia cupana* Mart. J. Ethnopharmacol.2005, 102, 32-36.

Source of support: Nil, Conflict of interest: None Declared