Research Article
ISSN: 0974-6943

JitendraYadavNehete ***et al. / Journal of Pharmacy Research 2009, 2(9),1402-1403***

Available online through
http://jprsolutions.info

In - vitro antioxidant activity of *Achyranthes aspera* L.

JitendraYadavNehete*, Vitthal Nivrutti Deshmukh, Vikas Vasant Shewale, Minal Raghunath Narkhede, Vilas Murlidhar Aurangabadkar.
**Department of Pharmacognosy M.G.V's Pharmacy College Panchavati, Nashik-422 003 M.S. (India)*

Received on: 20-05-2009; Accepted on:15-07-2009

ABSTRACT

In the present study, antioxidant potential of the methanol extract of the leaves and roots of *Achyranthes aspera* Linn. was evaluated by using 1, 1-diphenyl-2-picrylhydrazyl (DPPH) scavenging assay. The extract showed antioxidant activity in dose dependent manner. In DPPH scavenging assay the IC_{50} value of the leaves and root extracts were found to be 241.86µg/ml and 129.91µg/ml respectively, the IC_{50} value of the reference standard ascorbic acid was 7.81 µg/ml. This study revealed that methanolic extract of root possesses potent anti-oxidant activity than methanolic extract of leaves.

Keywords: *Achyranthes aspera*, DPPH, antioxidant.

INTRODUCTION

Antioxidants, free radical scavengers prevent pathological conditions of human body namely ischemia, anaemia, asthama, arthritis, inflammation, neurodegeneration, aging process [1]. Several studies on medicinal plants, foods and beverages rich in phenolic compounds, flavonoids and triterpenoids with antioxidant activity have been described [2-5]. In the past few years, addition of synthetic antioxidants restricted because of their health risks and toxicity [6]. Besides, traditionally well known natural antioxidants from teas, wines, fruits, vegetables and spices, some natural antioxidants like rosemary and sage are already exploited commercially either as antioxidant additives or as nutritional supplements [7, 8].

Achyranthes aspera Linn. (Family Amaranthaceae), commonly known Rough chaff tree in English, is an annual herb that grows throughout India [9]. In indigenous system of medicine, whole plant exploited for the treatment of renal dropsy, bronchial affections and leprosy [10]. Some pharmacological properties as diuretic, anti- inflammatory, antifungal, abortifacient, larvicidal, hypoglycemic, antifertility and anticancer were reported [11-17].Various chemical constituents oleanolic acid, quercetin and ecdysteron were isolated and structure elucidated by spectral studies [18, 19].

Literature survey reveled that chemical constituents like flavonoids, triterpenoids, polyphenolic compounds and steroids are responsible for antioxidant activity and these chemical constituents were reported in the methanolic extract of aerial parts of Achyranthes *aspera* L. [20, 21]. Based on this hypothesis, the aim of this study is to explore *Achyranthea aspera* L for antioxidant activity.

2. MATERIALS AND METHODS

2.1 Plant

Plant material was collected in the month of August from Makhamalabad region of Nashik district, Maharashtra, India. The plant material was taxonomically identified by the Botanical Survey of India, Pune and a voucher specimen VND-1 was retained in herbarium of BSI, Pune for future reference. Roots and leaves were separated and dried in shade and powdered. Dried powder of leaves and roots were extracted exhaustively with methanol in Soxhlet apparatus and extract was obtained and preserved in tightly closed container.

2.2 Chemicals and reagents

DPPH was purchased from Sigma Aldrich Ltd, Mumbai. Ascorbic acid (Loba Chemie Pvt. Ltd., Mumbai, India) and Methanol AR Grade (Qualligens) were purchased from respective vendors.

3. EXPERIMENTAL

DPPH free radical scavenging activity of methanolic root and leaves extracts were measured according to method of Shimada [22]. To 2 ml methanolic extracts in various concentrations (10-500 µg/ml) of *Achyranthes aspera* 1ml DPPH solution (methanolic 0.1 Mm DPPH) was added. The mixture was shaken vigorously, allowed to stand at room temperature for 30 min and absorbance was measured in at 517 nm by UV Spectrophotometer. All experiments were performed in triplicate.

Ascorbic acid in concentration range 10-50 µg/ml was used as standard.

The percent DPPH scavenging effect was calculated using the following equation:

DPPH scavenging effect (%) = $[(A_0-A_1)/A_0] \times 100$

Where A_0 – Absorbance of Blank

A_1 – Absorbance of Standard or Sample

IC_{50} values were determined by plotting curves of response Vs concentration of drug.

4. RESULT AND DISCUSSION

In the past few years, there has been growing interest in the involvement of reactive oxygen species (ROS) in several pathological situations. ROS produced in vivo include superoxide radical ($\bullet O_2^-$), hydrogen peroxide (H_2O_2) and hypochlorous acid (HOCl). H_2O_2 and $\bullet O_2^-$ can interact in the presence of certain transition metal ions to yield a

***Corresponding author.**
Tel.: + 91-9371166110
E-mail: jynehete@yahoo.com

Table 1. IC_{50} Values Comparisons

Sr no	Sample	IC_{50} µg/ml
1	Root extract	129.91
2	Leaves extract	241.86
3	Ascorbic acid	7.81

Fig.1. DPPH radical scavenging activity of extracts.

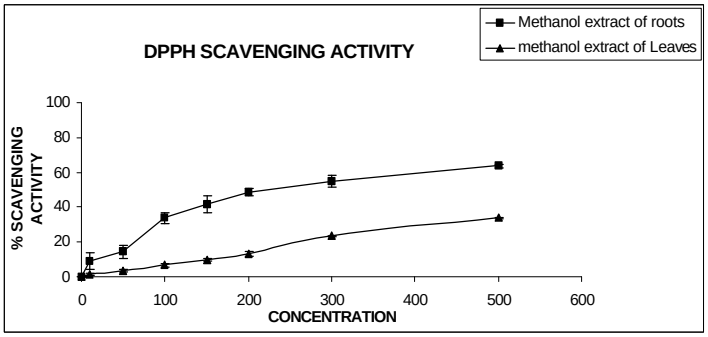
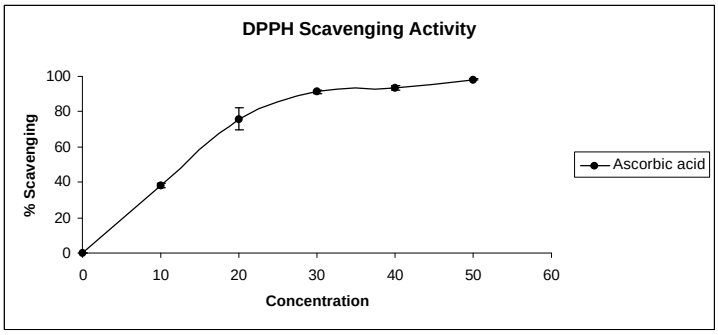


Fig2. DPPH radical scavenging activity of Ascorbic acid.



highly-reactive oxidizing species, the hydroxyl radical [23]. In biological systems, phenolic compounds and flavonoids are associated with antioxidative action due to scavenging of singlet oxygen and free radicals [24-25].

DPPH antioxidant assay is based on the ability of 1, 1-diphenyl-2-picryl-hydrazyl (DPPH), a stable free radical, to decolorize in the presence of antioxidants. The DPPH odd electron radical is responsible for deep purple color absorbance at 517 nm. When DPPH accepts an electron donated by an antioxidant compound, the DPPH is decolorized, which can be quantitatively measured from the changes in absorbance [24]. DPPH radical scavenging activity of methanolic root leaves extracts and ascorbic acid is given in fig 1. and fig 2. This activity was increased by increasing the concentration of the sample extract. IC_{50} values of methanolic leaves, root extracts and ascorbic acid were calculated as 241.86 µg/ml, 129.91 µg/ml and 7.81 µg/ml respectively as shown in table 1. This indicated that the methanolic root extracts showed more DPPH scavenging activity and free radical quenching ability than leaves extract. As shown in Fig 1. The antioxidative effect is mainly due to phenolic components, such as phenolic acids, phenolic diterpenes and flavonoids [26, 27]. The preliminary phytochemical screening of the extracts showed presence of phenolic compounds, flavonoids. These compounds may be responsible for antioxidant activity and root extract of *Achyranthes aspera* may serve as substitute for synthetic antioxidants.

5. REFERENCES

1. Polterait O, Antioxidant and free-radical scavengers of natural origin, Curr. Org chem., 1, 1997, 415-440.
2. Brown JE, Rice-Evans CA, Luteolin rich artichoke extract protects low density lipoprotein from oxidation *in vitr,* Free radic. Res, 29, 1998, 247-255.
3. Krings U, Berger RG, Antioxidant activity of some roasted foods, Food chem., 72, 2001, 223-229.
4. Cipak L, Grausova L, Miadokova E, Novotny L, Rauko P, Dual activity of triterpenoids: apoptotic versus antidifferentiation effects, Arch Toxicol, 80, 2006, 429–435.
5. Somova LO, Nadar A, Rammanan P, Shode FO, Cardiovascular, antihyperlipidemic and antioxidant effects of oleanolic and ursolic acids in experimental hypertension ,Phytomedicine, 10, 2003, 115–121.
6. Buxiang S, Fukuhara M, Toxicology, 122, 1997, 61.
7. Schuler P, Natural antioxidants exploited commercially, In Food Antioxidants, Hudson BJF (ed.), Elsevier, London, 99-170.
8. Suresh Kumar P, Sucheta S, Sudarshana DV, Selvamani P, Latha S, Antioxidant activity in some selected Indian medicinal Plants, Afr.J.Biotechnol, 7,2008,1826-1828.
9. Nadkarni KM, Nadkarni AK, Indian Materia Medica, vol. 1. Popular Prakashan, Bombay, 1976, 21.
10. Kirtikar KR, Basu BD, Indian Medicinal Plants, vol. III. Basu LM, Allahabad, 1935, 2066.
11. Gupta SS, Verma SCL, Ram AK, Tripathi RM, Diuretic effect of the saponin of *Achyranthes aspera* (apamarga), Ind. J. Pharmac, 4 (4),1972, 208-214.
12. Gokhale AB, Damre AS, Kulkarni KR, Saraf MN, Preliminary evaluation of anti-inflammatory and anti-arthritic activity of *S. lappa*, *A. speciosa* and *A. aspera*, Phytomedicine, 9, 2002, 433–437.
13. Misra TN, Singh RS, Pandey HS, Prasad C, Singh BP, Antifungal essential oil and a long chain alcohol from *Achyranthes aspera*, Phytochemistry, 31(5),1992, 1811-1812.
14. Shibeshi W, Makonnen E, Zerihun L, Debella A, Effect of *Achyranthes aspera* L. on fetal abortion, uterine and pituitary weights, serum lipids and hormones, Afr.J.Health.Sci, 6(2), 2006, 108-112.
15. Bagavan A, Rahuman AA, Kamaraj C, Kannappan G, Larvicidal activity of saponin from *Achyranthes aspera* against Aedes aegypti and Culex quinquefasciatus (Diptera: Culicidae), Parasitol Res, 103, 2008, 223–229.
16. Vasudeva N, Sharma SK, Post-coital antifertility activity of *Achyranthes aspera* Linn. Root, J. Ethnopharmacol, 107, 2006, 179–181.
17. Chakraborty A, Brantner A, Mukainakb T, Nobukuni Y, Kuchide M, Konoshima T, Tokuda H, Nishino H, Cancer chemopreventive activity of *Achyranthes aspera* leaves on Epstein–Barr virus activation and two-stage mouse skin carcinogenesis, Cancer Lett, 177, 2002, 1–5.
18. Michl G, Abebe D, Bucar F, Debella A, Kunert O, Martin G, Schmid, Mulatu E, Haslinger E, New Triterpenoid Saponins from *Achyrantes aspera* Linn, Helv. Chim. Acta, 83, 2000, 359-363.
19. Kunert O, Haslinger E, Martin , Schmid, Reiner J, Bucar F, Mulatu E, Abebe D, Debella A, Three Saponins Steroid and a Flavanol Glycoside from *Achyrantes aspera*, Monatsh.Chem, 131, 2000, 195-204.
20. Hawiaran V, Rangaswami S, structure of saponins A and B from the seeds of *Achyranthes aspera,* Phytochemistry, 9, 1970, 409-414.
21. Mishra TN, Singh RS, Pandey HS, Prasad C, Singh BP, Two long chain compounds from *Achyranthes aspera*, phytochemistry, 33(1), 1993, 221-223.
22. Shimada K, Fujikawa K, Yahara K, Nakamura T, Antioxidative properties of xanthone on the auto oxidation of soybean in cylcodextrin emulsion, J Agric Food Chem, 40, 1992, 945 – 948.
23. Aruoma OI, Halliwell B, Superoxide-dependent and ascorbate-dependent formation of hydroxyl radicals from hydrogen peroxide in the presence of iron: Are lactoferrin and transferrin promoters of hydroxyl radical generation, Biochem. J, 241,1987, 273-278.
24. Evans RC, Sampson v, Bramley PM, Holloway DE, Why do we expect carotenoids to be antioxidants in vivo, Free Radical Res, 26, 1997, 381–398.
25. Jorgensen LV, Madsen HL, Thomsen MK, Dragsted LO, Skibsted LH, Regulation of phenolic antioxidants from phenoxyl radicals: An ESR and electrochemical study of antioxidant hierarchy, Free Radical Res, 30, 1999, 207-220.
26. Sahav MR, Hasan SMR, Akter R, Hossain MM, Alam MS, Alam MA, Mazumder MEH, In Vitro Free Radical Scavenging Activity Of Methanol Extract Of The Leaves Of *Mimusops elengi* Linn, Bangl, J. Vet. Med, 6 (2), 2008, 197–202.
27. Shahidi F, Janitha PK, Wanasundara PD, Phenolic antioxidants, CRC Crit Rev. Food Sci Nutr, 32 (1), 1992, 67-103.

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