International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 4 July-Aug 2022, pp: 1259-1264 www.ijprajournal.com ISSN: 2456-4494

Evaluation of invitroantioxidant activity of aqueous extract of leaves of Talinumtriangulare

Sanooja K[1], NajumaAnzar F[2], Nivya Mohan K[3] and Drisya NK[4]

1)Department of pharmacology/ Kerala University of Health Sciences/ KMCT College of pharmaceutical sciences/ Kerala-6763012

2)Department of pharmaceutics / KMCT College of pharmaceutical sciences/ Kerala-676301

3)Department of pharmaceutical chemistry/ KMCT College of pharmaceutical sciences/ Kerala-676301

4)Department of pharmaceutical analysis/ KMCT College of pharmaceutical sciences/ Kerala-676301

Submitted: 01-08-2022 Accepted: 07-08-2022

ABSTRACT

In the present study the antioxidant property of leaves Talinumtriangulare family Portulacaceae, was carried out. The water extract of of leaves of Talinumtriangulare was subjected to preliminary phytochemical investigations and revealed the presence of steroids, flavonoids, Tannins and carbohydrates. The Water extract was then subjected to invitro antioxidant studies by hydroxyl radical scavenging activity. The results of the antioxidant property of the water extract were compared with antioxidant property of Ascorbic acid

Key words: Talinumtriangulare, antioxidant activity, hydroxyl radical scavenging activity.

I. INTRODUCTION

The plant, mineral and animal products are used as source of drug in ancient times. After industrial revolution and development of organic chemistry synthetic products are preferred for therapeutic purpose. But they have lots of side effects [(1)]. Plant derived medicines are relatively safe. The organic molecules which are derived by secondary metabolism have medicinal value. Most of these molecules have antioxidant and anti-inflammatory action.

Inflammation is considered as a process of protection and a critical survival mechanism [(2)]by which tissue eliminate the cause of cell injury. The cell injury has been caused by infectious agents and substances from their metabolism as well as by physical agents or chemicals. Free radicals have an important role in inflammation. An inflammatory or infectious condition developed as a result of oxidative stress in tissue which is created by free radicals, especially reactive oxygen species[(3, 4)]. Under stress our body produces excessive free radicals[(5, 6)]. So the enzymatic and non- enzymatic antioxidant in body become inadequate to neutralize this excessive free radicals. This imbalance facilitates cell damage and leads to the development of degenerative diseases[(7)] such as cardiovascular disease, cancer[(8)], neurodegenerative disease, Alzheimer's disease [(9)] and inflammatory diseases[(10)]. Many synthetic antioxidants are developed to treat oxidative stress, but they have lots of side effects and also have high cost. But natural antioxidants obtained from plant source have low cost and are free from side effects[(11)]. Plant based antioxidants prevent generation of free radicals and are effective to treat disease caused by oxidative stress[(12)].

According to world health organization 80% of the world population used plant medicine for their primary healthcareneeds [(13)]. Several plants are used to prepare ayurvedicmedicines which have been used to treat distinct inflammatory conditions [(14)]. Many studies revealed that phenolic and flavonoid contents are responsible for antioxidant activities of plants [(11, 15, 16)]. Recent researches shows that traces of metals such as Zn, Cu, Mg,Mn and Se also play a beneficial role in antioxidant activity[(17, 18)].

Talinumtriangulare plant popularly known as water leaf because of it high moisture content, is aperineal herb growing to a height of 80-100cm [(19).] It is first introduced in to south india from Srilanka and widely cultivated in Tamil nadu as Cyelon spinach [(20)]. The plant is arich source of crude protein, total lipids, essential fatty oils, cardiac glycosides, polyphenols and flavonoids [(21)]. The palnt also contain omega-3 fatty acids, essential nutrients like minerals, soluble proteins, vitamins and kaempferol[(22, 23)]

II. MATERIALS AND METHODS

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 4 July-Aug 2022, pp: 1259-1264 www.ijprajournal.com ISSN: 2456-4494

2.1 Plant material and preparation of extracts

The fresh leaves of used for the study were collected from natural population located at Kerala on 2019 November. Samples of fresh leaves of T.triangulare plant were collected. They were then rid of and their leaves were removed. The shade dried leaves are powdered. The powder was soaked in boiled distilled water for 12 hrs, after which the resultant mixture was filtered and the filtrate was evaporated to dryness [23].

2.2Solubility of extract

10g of extract was dissolved in 10 mL of following solvents and solubility was determined in distilled water, 10% sodium hydroxide, 10% hydrochloric acid and in 90% Ethanol

2.3 Evaluation of antioxidant activity

Hydrogen peroxide radical scavenging assay

The ability of plant extracts to scavenge hydrogen peroxide can be estimated according to the method of Ruch et al[24]. Hydrogen peroxide is a weak oxidizing agent that inactivates a few enzymes by oxidation of essential thiol (-SH) groups. It can cross cell membranes rapidly; once being inside the cell, it can react with ferric and copper ions to form hydroxyl radicals and this may be the origin of many of its toxic effects. Thus, removing hydrogen peroxide as well as oxide is very important for protection of food systems. A solution of hydrogen peroxide (40 mM) is prepared in phosphate buffer (50 mM pH 7.4). The concentration of hydrogenperoxide is determined by absorption at 230 nm using a spectrophotometer. Extract (20–60 g/mL) in distilled water is added to hydrogen peroxide and absorbance at 230 nm is deter-mined after 10 min against a blank solution containing phosphate buffer without hydrogen peroxide.The percentage of hydrogen peroxide scavenging is calculated as follows ;% scavenged H2O2= (Ai-At/Ai)×100

Where Ai the absorbance of control and At is the absorbance sample

III. RESULT AND DISCUSSION

3.1 Solubility of the extract

Table 1: solubility of extract

Solvent	solubility
Distilled water	Soluble
10% sodium hydroxide	Soluble
10% hydrochloric acid	Insoluble
90% Ethanol	Insoluble

3.2 Evaluation of antioxidant activity of Talinumtriangulare

The percentage inhibition of hydrogen peroxide radical by different concentrations of water extract was compared with ascorbic acid. The percentage scavenging activity of water extract of T. triangulareincreased with concentration. About 500µg/ml extract shows a maximum percentage inhibition of 78.43%. The percentage inhibition of 500 µg/mL of standard (ascorbic acid) was found to be 85.6%.

Table 2: Percentage inhibition of Hydrogen peroxide free radical

Sample	concentration	absorbance	% hydrogen peroxide scavenging activity
Extract	100	0.512	30.32
	200	0.374	41.96
	300	0.256	53.28
	400	0.168	65.24
	500	0.122	78.43
Standard Ascorbic acid	100	0.598	39.55
	200	0.498	55.7
	300	0.401	69.6
	400	0.298	80.12
	500	0.185	85.6

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 4 July-Aug 2022, pp: 1259-1264 www.ijprajournal.com ISSN: 2456-4494

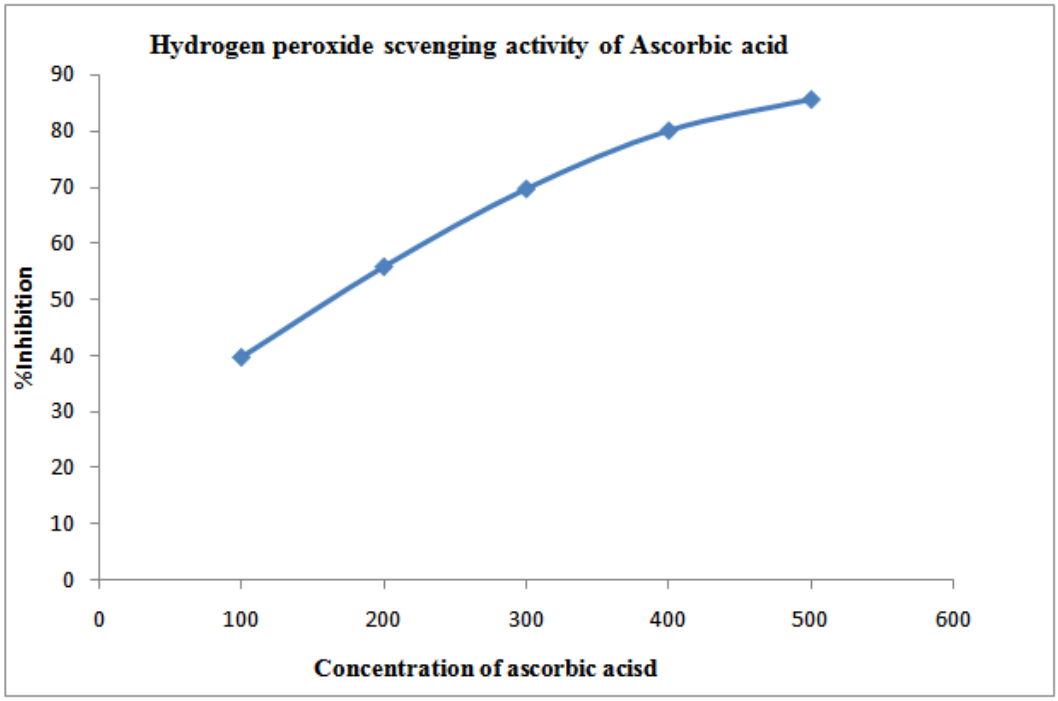

Figure 1 : Hydrogen peroxide scavenging activity of water extract of leaves of Talinumtriangulare

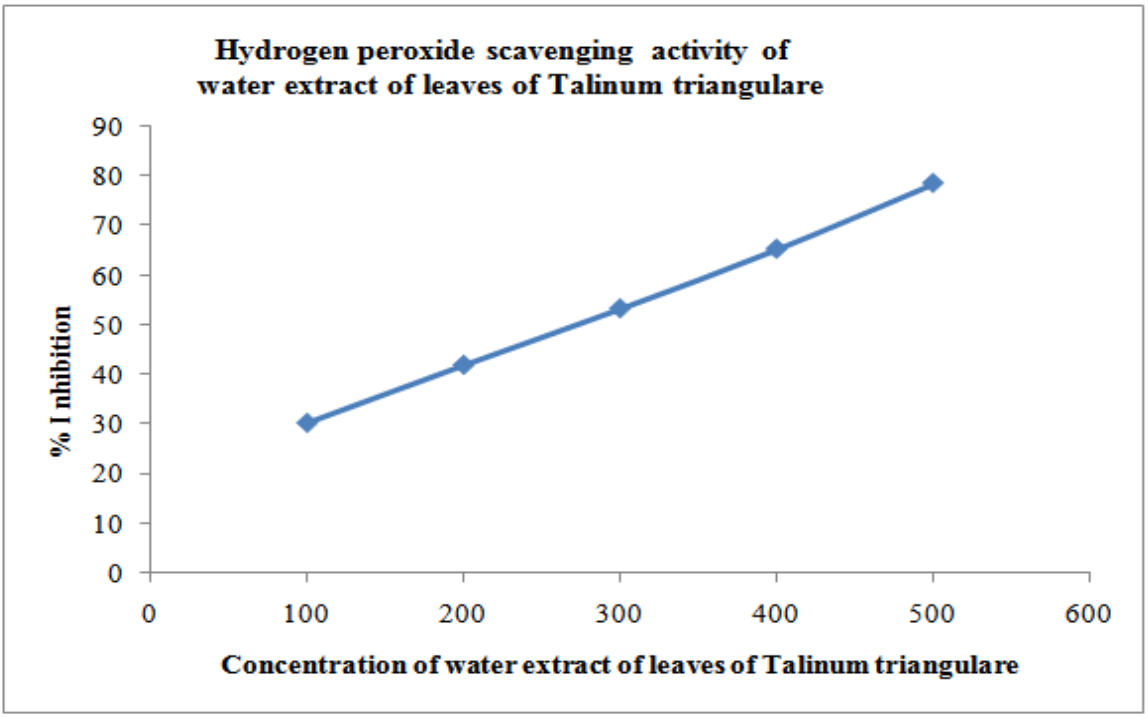

Figure 2: Hydrogen peroxide scavenging activity of Ascorbic acid

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 4 July-Aug 2022, pp: 1259-1264 www.ijprajournal.com ISSN: 2456-4494

Table 3: Comparison of IC_{50} value of extract with IC_{50} value of standard ascorbic acid

Sl No	Sample	IC_{50} ((µg/ml)
1	Ascorbic acid	164.66
2	Water extract of leaves of T. triangulare	267.79

The extract was capable of scavenging hydrogen peroxide in a concentration-dependent manner. From figure shows that water extract of leaves of T. triangulareshows scavenging activity (H_2O_2) than that of Ascorbic acid. The IC_{50} value for scavenging of H_2O_2 for extract is was 267.79µg/ ml while IC_{50} value for ascorbic acid was 164.66µg/ ml.

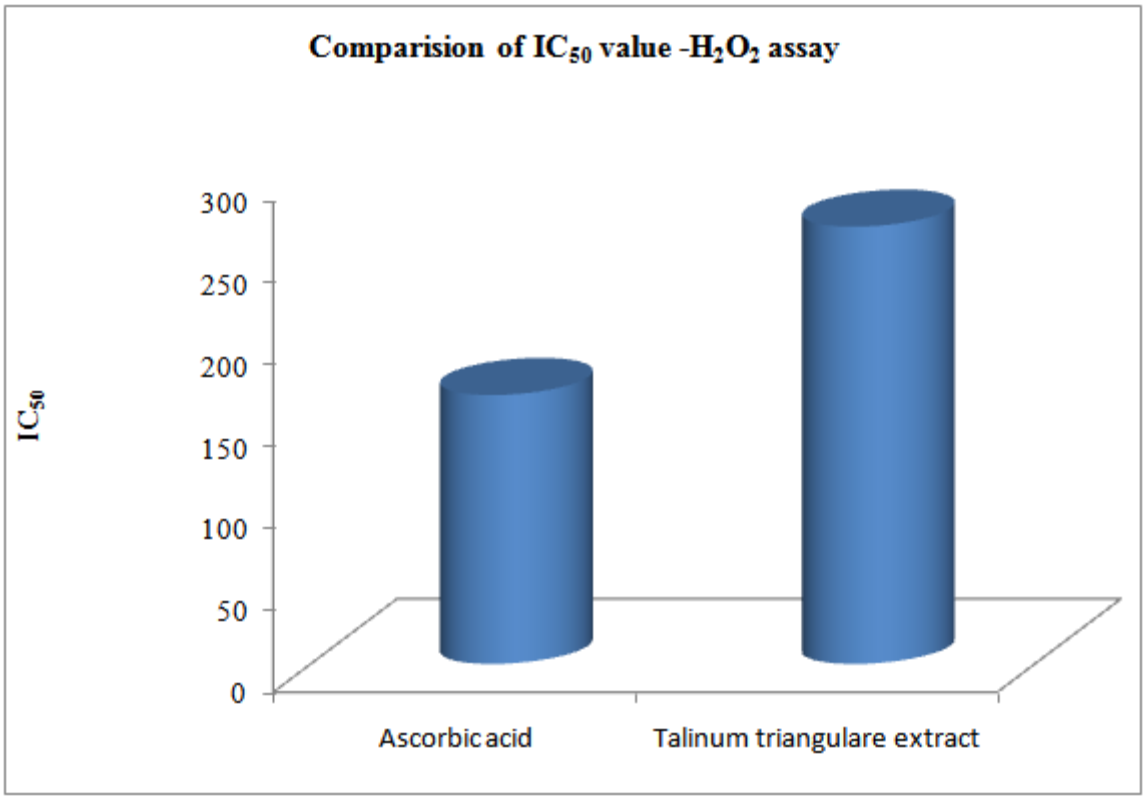

Figure 3: comparison of IC50 value of water extract of leaves of T. triangularewith standard ascorbic acid

IV. CONCLUSION

The antioxidant property of the water extract of leaves of T. triangularewas investigated in the present study. The water extract was found to be shows maximum antioxidant activity at a concentration of 500 microgram. The water extract scavenge hydrogen peroxide radicals and exert protective effect against oxidative stress. So further research can be carried out in this direction of isolating and identifying constituents from the T. triangulareextract by chromatographic and spectroscopic techniques andinvitro antioxidant studies on the isolated constituents

REFERENCES

[1]. Rates SM. Plants as source of drugs. Toxicon. 2001 May 1;39(5):603-13.
[2]. Liu CH, Abrams ND, Carrick DM, Chander P, Dwyer J, Hamlet MR, Macchiarini F, PrabhuDas M, Shen GL, Tandon P, Vedamony MM. Biomarkers of chronic inflammation in disease development and prevention: challenges and opportunities.

Nature immunology. 2017 Nov;18(11):1175-80.
[3]. Aitken SL, Karcher EL, Rezamand P, Gandy JC, VandeHaar MJ, Capuco AV, Sordillo LM. Evaluation of antioxidant and proinflammatory gene expression in bovine mammary tissue during the periparturient period. Journal of Dairy Science. 2009 Feb 1;92(2):589-98.
[4]. Bishop A. Role of oxygen in wound healing. Journal of wound care. 2008 Sep;17(9):399-402.
[5]. Aruoma OI. Free radicals, oxidative stress, and antioxidants in human health and disease. Journal of the American oil chemists' society. 1998 Feb;75(2):199-212.
[6]. Lefer DJ, Granger DN. Oxidative stress and cardiac disease. The American journal of medicine. 2000 Sep 1;109(4):315-23.
[7]. Shahidi F, Janitha PK, Wanasundara PD. Phenolic antioxidants. Critical reviews in food science & nutrition. 1992 Jan 1;32(1):67-103.
[8]. Matteo V, Esposito E. Biochemical and therapeutic effects of antioxidants in the treatment of Alzheimer's disease, Parkinson's disease, and amyotrophic lateral sclerosis. Current Drug Targets-CNS & Neurological Disorders. 2003 Apr 1;2(2):95-107.
[9]. Sreejayan N, Rao MN. Free radical scavenging activity of curcuminoids. Arzneimittel-forschung. 1996 Feb 1;46(2):169-71.
[10]. Cai Y, Luo Q, Sun M, Corke H. Antioxidant activity and phenolic compounds of 112 traditional Chinese medicinal plants associated with anticancer. Life sciences. 2004 Mar 12;74(17):2157-84.
[11]. Akinmoladun AC, Obuotor EM, Farombi EO. Evaluation of antioxidant and free radical scavenging capacities of some Nigerian indigenous medicinal plants. Journal of Medicinal food. 2010 Apr 1;13(2):444-51.
[12]. Sidhu K, Pannu K. Indigenous use of medicinal plants for health care. Studies on Ethno-Medicine. 2010 Aug 1;4(2):145-8.
[13]. Gacche R, Shaikh R, Pund M, Deshmukh R. Cyclooxygenase inhibitory, cytotoxicity and free radical scavenging activities of selected medicinal plants used in Indian traditional medicine. Pharmacognosy Journal. 2011 Jan 1;3(19):57-64.
[14]. Hendra R, Ahmad S, Oskoueian E, Sukari A, Shukor MY. Antioxidant, anti-inflammatory and cytotoxicity of Phaleriamacrocarpa (Boerl.) Scheff fruit. BMC complementary and alternative medicine. 2011 Dec;11(1):1-0.
[15]. Persoons P, Vermeire S, Demyttenaere K, Fischler B, Vandenberghe J, Van Oudenhove L, Pierik M, Hlavaty T, Van Assche G, Noman M, Rutgeerts P. The impact of major depressive disorder on the short-and long-term outcome of Crohn's disease treatment with infliximab. Alimentary pharmacology & therapeutics. 2005 Jul;22(2):101-10.
[16]. Fraga CG. Relevance, essentiality and toxicity of trace elements in human health. Molecular aspects of medicine. 2005 Aug 1;26(4-5):235-44.
[17]. Purdey M. Ecosystems supporting clusters of sporadic TSEs demonstrate excesses of the radical-generating divalent cation manganese and deficiencies of antioxidant co factors Cu, Se, Fe, Zn. Medical hypotheses. 2000 Feb 1;54(2):278-306.
[18]. Swarna J, Ravindhran R. Pharmacognostical and phytochemical evaluation of Talinumtriangulare (Jacq.) Willd. International Journal of Pharmacy and Pharmaceutical Sciences. 2013;5(2):249-56.
[19]. Keay RW, Hepper FN. Flora of west tropical Africa. London: Crown Agents for Oversea Governments and Administrations; 1958.
[20]. Sridhar R, Lakshminarayana G. Lipid classes, fatty acids, and tocopherols of leaves of six edible plant species. Journal of agricultural and food chemistry. 1993 Jan;41(1):61-3.
[21]. Ezekwe MO, Besong SA, Igbokwe PE, Ezekwe EI. Beneficial influence of Purslane and Waterleaf supplementation on cardiovascular disease risk in humans. InFASEB JOURNAL 2002 Mar 20 (Vol. 16, No. 4, pp. A639-A639). 9650 ROCKVILLE PIKE, BETHESDA, MD 20814-3998 USA: FEDERATION AMER SOC EXP BIOL.
[22]. Andarwulan N, Batari R, Sandrasari DA, Bolling B, Wijaya H. Flavonoid content and antioxidant activity of vegetables from Indonesia. Food Chem. 2010; 121:1231–1235.
[23]. Ikewuchi CC, Ikewuchi JC, Ifeanacho MO. Bioactive phytochemicals in an aqueous extract of the leaves of Talinumtriangulare.

Food science & nutrition. 2017 May;5(3):696-701.

[24]. Ruch RJ, Cheng SJ, Klaunig JE. Prevention of cytotoxicity and inhibition of intercellular communication by antioxidant catechins isolated from Chinese green tea. Carcinogenesis. 1989 Jun 1;10(6):1003-8.