Available online on 25.08.2019 at http://jddtonline.info

Journal of Drug Delivery and Therapeutics

Open Access to Pharmaceutical and Medical Research

Open Access Research Article

Anti-Oxidant Activity of Ethanolic Fruits Extract of *Scindapsus officinalis* (Roxb)

Pawan Tiwari , Anju Goyal

Department of Pharmaceutical Chemistry, Bhupal Nobel University, Udaipur, Rajasthan, India.

ABSTRACT

The *in-vitro* antioxidant activities of the fruits of *Scindapsus Officinalis* (Roxb) (*Araceae*). The fruits of the plant were shade dried with the help of grinder was subjected to successive soxhlet extraction with Petroleum Ether and 90% v/v Ethanol. The extracts were screened for quantitative estimation of total flavonoids, tannins, total phenols, and alkaloids. Effect of extracts of *Scindapsus officinalis Roxb* in 1, 1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging method was evaluated for *in-vitro* antioxidant activities. The quantity of DPPH reduced could be quantified by measuring a decrease in absorbance at 517 nm. The IC_{50} value was found to be 45.21and 40.11µg/ml for ethanolic extracts while the IC_{50} value of ascorbic acid was 18.53µg/ml significantly reduced DPPH radical by bleaching it. The ethanolic extract was found to be near to standard compounds and brought about significant antioxidant potential. This was due to the presence of one or more phytoconstituents present in ethanol extract.

Keywords: *Scindapsus Officinalis* (Roxb); DPPH; antioxidant, ascorbic acid.

Article Info: Received 27 June 2019; Review Completed 14 Aug 2019; Accepted 22 Aug 2019; Available online 25 August 2019

Cite this article as:

Tiwari P, Goyal A, Anti-Oxidant Activity of Ethanolic Fruits Extract of *Scindapsus officinalis* (Roxb), Journal of Drug Delivery and Therapeutics. 2019; 9(4-s):1087-1091 http://dx.doi.org/10.22270/jddt.v9i4-s.3782

***Address for Correspondence:**

Pawan Tiwari, Research Scholar, Department of Pharmaceutical Chmistry, Bhupal Nobel University, Udaipur, Rajasthan, India.

INTRODUCTION:

The main characteristic of an antioxidant is its ability to trap free radicals. Antioxidant compounds like phenolic acids, polyphenols and flavonoids scavenge free radicals such as peroxide[1] hydroperoxide or lipid peroxyl and thus inhibit the oxidative mechanism[2] that lead to degenerative diseases. Herbal plants considered as good antioxidant since ancient times.

The species *Scindapsus Schott*[3] (1832) covers about 35 species from Northeastern India to Western Polynesia It is an epiphytic climbing shrub, with ovate oblong, ovate oblong cordate or oblong lanceolate leaves bisexual flowers and naked spathe Florets[4] are without perianth, each having four stamens and a one-celled ovary with a solitary basal ovule About fifteen species of the plant and numerous hybrids, all of which are evergreen, root clinging climbers with juvenile and adult stages, belong to this genus.

These are the phytoconstituents which were reported earlier in dried fruits of *Scindapsus officinalis* Glucosides viz. Scindapsin A[5] & Scindapsin B[6], Sugars & Fixed Oil, ll-hydroxy-cis,cis,.5,8- tetracosadienoic acid[7], cyclopropenoid fatty acids, piperine[8], mixture of glycerine and ascorbic acid[9], and ascorbic acid.

MATERIALS AND METHOD:

Collection and identification:

Plant was collected from the India, during the months of august and September 2017. Taxonomic and ethno medicinal identification of the collected fruits of plant by Mr. S.L. Meena (Deputy Director of botanical survey of india, near khem ka kuaon, Nandan Van, Jodhpur-324008)

Preparation of plant material:

The fruits of plant were shade dried, reduced to coarse powder with the help of grinder and stored in airtight container till further use.

Analytical Parameter:

Ash Values:

The residues remaining after incineration is the ash content of the fruits powder. Ash values are helpful in determining the quality and purity of crude drug, especially in the powdered form. It usually represents the inorganic salts

naturally occurring in the drug and adhering to it, but it may also include inorganic matter added for the purpose of adulteration. Hence, an ash determination furnishes a basis for judging the identity and cleanliness of a drug and gives information regarding its adulteration with inorganic matter[10].

Determination of total ash value:

Accurately weighed about 3 gm of air dried powdered drug was taken in a tared silica crucible and incinerated by gradually increasing the temperature to make it dull red hot until free from carbon. Cooled and weighed, repeated for constant value. Then the percentage of total ash[11] was calculated with reference to the air dried drug.

Determination of acid insoluble ash value:

The ash obtained as directed under total ash value was boiled with 25 ml of 2N HCl for 5 minutes. The insoluble matter was collected on an ash less filter paper, washed with hot water, ignited and weighed, then calculated the percentage of acid insoluble ash[12] with reference to the air dried drug.

Determination of water soluble ash value:

The total ash obtained was boiled with 25 ml of water for 5 minutes. The insoluble matter was collected on an ash less filter paper, washed with hot water and ignited for 15 minutes at a temperature not exceeding 450°C. The weight of insoluble matter was subtracted from the weight of total ash. The difference in weight represents the water soluble ash. The percentage of water soluble ash was calculated with reference to the air dried drug [13-15].

Extractive Values:

Extractive values of crude drugs are useful for their evaluation, especially when the constituents of a drug cannot be readily estimated by any other means. Further, these values indicate the nature of the constituents present in a crude drug.

Determination of Alcohol Soluble Extractive Value:

10gms of the air-dried coarse fruits powder of *Scindapsus officinalis Roxb* .were separately macerated with 100 ml of 90% ethanol in a closed flask for 24 hours, shaking frequently during the first 6 hours and allowing standing for 18 hours. Thereafter, it was filtered rapidly taking precautions against loss of the solvent. Out of that filtrate, 25 ml of the filtrate was evaporated to dryness in a tared flat bottomed shallow dish, dried at 105°C and weighed. The percentage of ethanol soluble extractive value was calculated with reference to the air-dried drugs [16].

Determination of Water Soluble Extractive Value:

Weigh accurately the 10 gm of coarsely powdered drugs and macerate it with 100 ml of water in a closed flask for 24 hours, shaking frequently during the first 6 hours and allowing standing for 18 hours. Thereafter, it was filtered rapidly taking precautions against loss of the solvent. Then 25 ml of the filtrate was evaporated to dryness in a tared flat-bottomed shallow dish, dried at 105°C and weighed. The percentage of water soluble extractive was calculated with reference to the air dried drugs [17].

Loss on Drying:

Loss on drying is the loss in weight in % w/w determined by means of the procedure given below. It determines the amount of volatile matter of any kind (including water) that can be driven off under the condition specified (Dessicator or hot air oven). If the sample in the form of large crystals, then reduce the size by quickly crushing to a powder [8].About 1.5 gm, of powdered drug was weighed accurately in a porcelein dish which was previously dried at 105°C in hot air oven to constant weight and then weighed. From the difference in weight, the percentage loss of drying with reference to the air dried substance was calculated. [18]

Quantitative determination of the chemical constituents:

Total phenols Determination:

The total content of phenols in the crude ethanol extract was determined using a modified Folin-Ciocalteu colorimetric method with Gallic acid as a standard. The extract solution in DMSO (700 µL) was transferred to a 10 mL volumetric flask, the Folin-Ciocalteu reagent (400 µL) was added and after 3 min, each flask was made up to the mark with sodium carbonate (Na_2CO_3) solution (75 g/L). After 2 hours, the suspension was centrifuged (5000 r.p.m., 5 min) and the absorbance of the solution was measured at 760 nm. The total phenolic content was expressed as a Gallic acid equivalent (GAE) in g/100 g of dry extract. Data are reported as mean ± SD for three replicates. The total phenol was calculated [19].

Total alkaloid determination:

5 g of the sample was weighed and transfer into a 250 ml beaker and 200 ml of 10% acetic acid in ethanol was added and covered and allowed to stand for 4 h. This was filtered and the extract was concentrated on a waterbath to one-quarter of the original volume. Concentrated ammonium hydroxide was added drop wise to the extract until the precipitation was complete. The whole solution was allowed to settle and the precipitated was collected and washed with dilute ammonium hydroxide and then filtered. The residue is the alkaloid, which was dried and weighed. The total alkaloid was calculated [20].

Total tannin determination:

500 mg of the sample was weighed into a 50 ml plastic bottle. 50 ml of distilled water was added and shaken for 1 h in a mechanical shaker. This was filtered into a 50 ml volumetric flask and made up to the mark. Then 5 ml of the filtered was pipetted out into a test tube and mixed with 2 ml of 0.1 M Ferric chloride in 0.1 N HCl and 0.008 M potassium ferrocyanide. The absorbance was measured at 120 nm within 10 min. The total tannin was calculated [21].

Total flavonoid determination:

10 g of the plant sample was extracted repeatedly with 100 ml of 80% aqueous methanol at room temperature. The whole solution was filtered through whatman filter paper No 42 (125 mm). The filtrate was later transferred into a crucible and evaporated into dryness over a water bath and weighed to a constant weight.[22]

Extraction and fractionation:

1 kg of powdered drugs were packed in soxhlet apparatus and continuously extracted with petroleum ether to defat the fruits powder. Petroleum ether was removed from the powdered defatted drug, which was then extracted with ethanol (90%), the extracted were evaluated for in-vitro antioxidant activity, then extract further fractioned with hexane, and ethanol. The solvents were removed from extract and fraction by distillation and the last traces of solvent being removed under reduced pressure, extracts was stored in refrigerator for further experimental work. [23].

Anti-oxidant activity *in-vitro*

The *in vitro* methods include the determination of Total phenolic content and Total flavonoid content. Besides these, the antioxidant activity of the extracts and fractions were determined in different *in-vitro* experimental methods like Diphenyl-picryl-hydrazyl (DPPH) free radical scavenging activity with reference to standard antioxidant ascorbic acid [24-26].

RESULT AND DISCUSSION:

Table 1. Physical parameters of *Scindapsus officinalis Roxb. Fruits* powder

Studied parameters	Observation (% w/w)
Loss on drying	6.9
Total ash value	5.2
Acid insoluble ash value	4.3
Water soluble ash value	3.1
Alcohol extractive value	16.7
Water extractive value	6.7

Anti-oxidant activity study of the extracts

Determination of total phenolic and flavonoid content of ethanolic extracts of Scindapsus officinalis Roxb

The perusal of table-2 showed that the total phenolic and total flavonoid contents of ethanolic extracts of fruit of *Scindapsus officinalis Roxb.* found to 56.75mg of gallic acid equivalent (GAE)/g, and total flavonoids content of extracts of *Scindapsus officinalis Roxb.* found to be 6.86mg equivalent of quercetin /gm of the dry weight basis which is quantitatively a greater value.

Table2. Determination of Total Phenolic and Flavonoid content of ethanolic and aqueous extracts of *Scindapsus officinalis Roxb*

Groups	Total Phenolic content (mg.GAE/g)	Total Flavonoid content (mg QE /g)
***Scindapsus officinalis Roxb.*Ethanolic Extract**	56.75 ± 1.12	6.86 ± 0.32

Values are expressed in MEAN ± S.E.M (n =3).

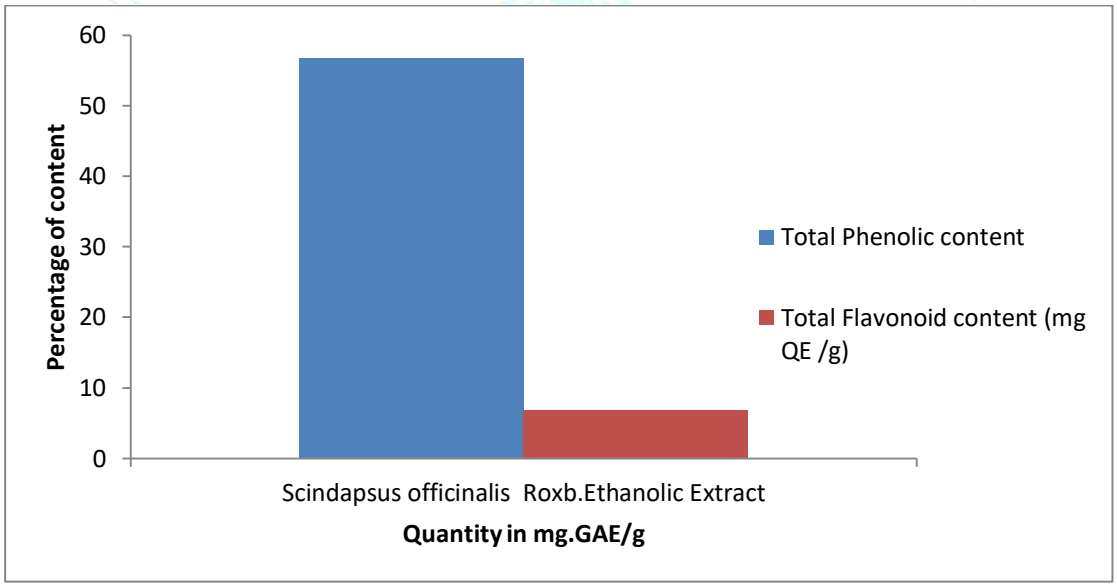

Fig.1: Total phenolic and flavonoid content of ethanolic extracts of *Scindapsus officinalis Roxb*

Effect of extracts of Scindapsus officinalis Roxb. in 1, 1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging method

The DPPH is stable free radical which reacts with appropriate reducing agent (hydrogen), to become paired off (diamagnetic molecules) and solution be converted into colourless stoichometrically depending on the number of electron taken up (Shirwaikar et al., 2006). The capabilities of ethanolic extracts of fruit powder of *Scindapsus officinalis Roxb.* to scavenge DPPH was measured *in-vitro* the related IC_{50} values and the % scavenging results are mentioned in table-4.21.

The extracts, *Scindapsus officinalis Roxb.* scavenges DPPH radical in a concentration dependent way. The antioxidants react through DPPH, a purple colored stable free radical and convert it into a colorless α-α-diphenyl-β-picryl hydrazine. The quantity of DPPH reduced could be quantified by measuring a decrease in absorbance at 517 nm. The IC_{50} value was found to be 45.21and 40.11µg/ml for ethanolic extracts while the IC_{50} value of ascorbic acid was 18.53µg/ml significantly reduced DPPH radical by bleaching it. From the results, it may be postulated that ethanolic extract of fruits of *Scindapsus officinalis Roxb.* have hydrogen donors thus, scavenging the free radical DPPH.

Table- 3: Antioxidant activity of ethanolic extracts of *Scindapsus officinalis Roxb.* in DPPH radical scavenging method

Sample	Concentration µg/ml	% inhibition	IC $_{50}$ value µg/ml
Ethanolic Extract	20	29.21 ± 2.14	45.21
	40	47.53 ± 1.85	
	60	59.21 ± 2.46	
	80	74.72 ± 2.68	
	100	87.17 ± 1.45	
Ascorbic acid			18.53

Values are expressed in MEAN ± S.E.M (n =3).

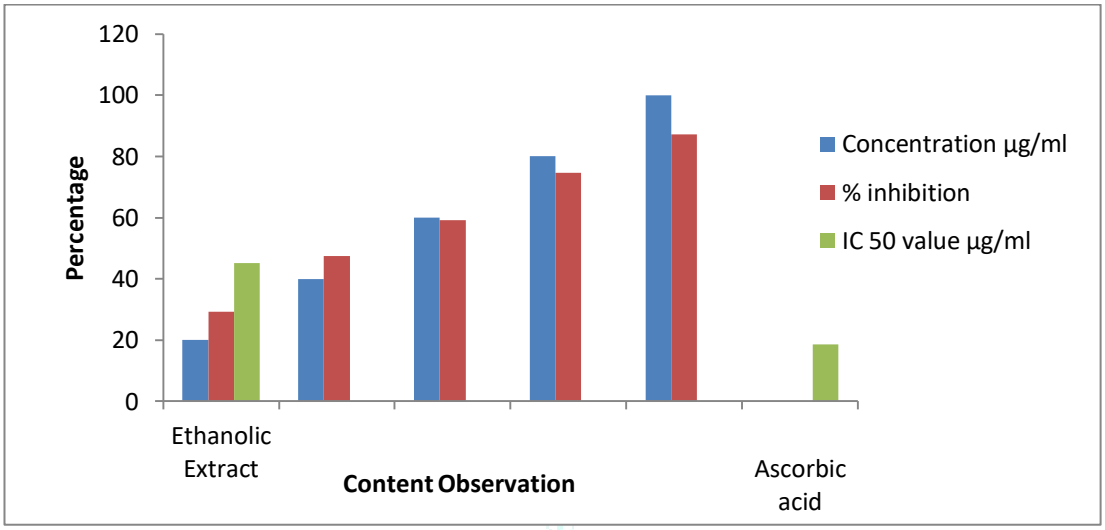

Fig.2: Effect of ethanolic extracts of *Scindapsus officinalis Roxb.* in DPPH radical scavenging method

CONCLUSION:

The observed data showed that the total phenolic contents of ethanolic extracts of fruits of *Scindapsus officinalis Roxb.* found to 56.75mg of gallic acid equivalent (GAE)/g, and total flavonoids content of extracts of *Scindapsus officinalis Roxb.* found to be 6.86mg equivalent of quercetin /gm of the dry weight basis which is quantitatively a greater value. The extracts, *Scindapsus officinalis Roxb.* scavenges DPPH radical in a concentration dependent way. The antioxidants react through DPPH, a purple colored stable free radical and convert it into a colorless α-α-diphenyl-β-picryl hydrazine. The quantity of DPPH reduced could be quantified by measuring a decrease in absorbance at 517 nm. The IC_{50} value was found to be 45.21and 40.11µg/ml for ethanolic extracts while the IC_{50} value of ascorbic acid was 18.53µg/ml significantly reduced DPPH radical by bleaching it. From the results, it may be postulated that ethanolic extract of fruits powder of *Scindapsus officinalis Roxb.* have hydrogen donors thus, scavenging the free radical DPPH.

REFERENCES:

1. Ramkumar, K.M., Rajaguru, P., Latha, M. and Ananthan, R. (2007), Ethanol extract of *Gymnema montanum* leaves reduces glycoprotein components in experimental diabetes, Nutr. Res., 27:97-103.
2. Clark, E.P. and Collip, J.B. (1925), A study of the Tisdall method for the determination of blood serum calcium with a suggested modification, Biochem., 63:461-463.
3. Muller, F.L., Lustgarten, M.S, Jang, Y., Richardson, A., Van R. H., 2007. Trends in oxidative aging theories. *Free Radical Biology* and *Medicine* 43 (4), 477–503.
4. Ran, Q., Liang, H., Ikeno, Y., 2007. Reduction in Glutathione Peroxidase 4 Increases Life Span through Increased Sensitivity to Apoptosis. The Journals of *Gerontology* Series A: Biological Sciences and Medical Sciences 62 (9), 932–942.
5. Scholz, R.W., Graham, K.S., Gumpricht, E., Reddy, C.C., 1989. Mechanism of interaction of vitamin E and glutathione in the protection against membrane lipid peroxidation. *Annals* of the *New York Academy* of Sciences 570, 514-517.
6. Lewis, P. *et al*., 2007. Lack of the Antioxidant Enzyme Glutathione Peroxidase-1 Accelerates Atherosclerosis in Diabetic Apolipoprotein E–Deficient Mice. Circulation 115, 2178-2187.
7. Fridovich, I., 1995. Superoxide radical and superoxide dismutases. The *Annual* Review of *Biochemistry* 64, 97–112.
8. Archibald, F.S., Fridovich, I., 1982. The scavenging of superoxide radical by manganous complexes: in vitro. *Archives* of *Biochemistry* and *Biophysics* 214, 452–463.
9. Groner, Y., 1994. Cell damage by excess CuZn SOD and Down's syndrome. Biomedicine & *Pharmacotherapy* 48, 231-240.
10. Gawloski, T., Bernd, S., Ruth, R., 2009. Advanced glycation end products strongly activate platelets. European Journal of Nutrition 48(8), 475-481.
11. Sundaram, R.K, Anusha, B., Selvamani, V., 1996. Antioxidant status and lipid peroxidation in type II diabetes mellitus with and without complications. Clinical Science 90, 255-260.
12. Hatori, Y., Kawasaki, K., Abe M., 1991. Superoxide dismutase altered endothelium dependent relaxation in the rat. The *American Journal of Physiology - Heart* and Circulatory *Physiology* 261, 1084-1094.
13. Renu, A., Kowluru, L.A., Yeh, S.H., 2006. Role of mitochondrial superoxide dismutase in development of diabetic retinopathy. Investigative ophthamology and visual science 47, 1594-1599.
14. Bert, S., De B.L., 2007. Impact of oxidative stress on endothelial dysfunction of children and adolescents with type 1 diabetes mellitus: Protection by superoxide dismutase. Pediatric Research 62(4), 456-461.
15. Curr. Sci., 83:30-38.
16. Fong, S.D., Alello, L., Gardner, W.T., King, L.G., Blankenship, G., Cavallerano, D.J., Ferris, L.F. and Klein, R. (2004), Retinopathy in diabetes, Diabetes Care, 27:S84-S87.
17. Hippisley-Cox, J. and Pringle, M. (2004), Prevalence, care and outcomes for patients with diet-controlled diabetes in general practice: crosssectional survey, Lancet, 363:423-428.
18. Kamalakannan, N. and Prince, S.M.P. (2003), Effect of *Aegle marmelos* Correa (Bael) fruit extract on tissue antioxidants in streptozotocin diabetic rats, Indian J. Exp. Biol., 41:1285-1288.
19. Karthikeyan, J. and Rani, P. (2003), Enzymatic and non-enzymatic antioxidants in selected *Piper* species, Indian J. Exp. Biol., 41:135-140.
20. Koida, H. and Oda, T. (1959), Pathological occurrence of glucose-6- phosphatase in liver disease, Clin. Chem. Acta, 4:554-561.
21. Srinivasan, K., Muruganadhan, S. and Lal, J. (2001), Evaluation of anti• inflammatory activity of *Pongamia pinnata* leaves m rats, J. Ethnopharmacol., 78:151-157.
22. Vessby, J., Basu, S., Mohsen, R., Berne, C. and Vessby, B. (2002), Oxidative stress and antioxidant status in type 1 diabetes mellitus, Blackwell Science Ltd., JIM, 251:69-76.
23. Zafrilla, P., Mulero, J., Xandri, J.M., Santo, E., Caravaca, G. and Morillas, J.M. (2006), Oxidative stress in Alzheimer's disease in different stages of the disease, Curr. Med. Chem., 13:1075-1083
24. Rotruck, J.T., Pope, A.L., Ganther, H.E. and Swanson, A.B. (1984), Selenium: Biochemical roles as a component of glutathione peroxidase, Science, 179:588-590.
25. Luo, J.Z. and Luo, L. (2008), Ginseng on hyperglycemia: effects and mechanisms, eCAM Advance Access, 1-5.
26. Fiske, C.H. and Subbarow, Y. (1925), The colorimetric determination of phosphorus, J. Biol. Chem., 66:375-400.