International Journal of Medicinal Plants and Natural Products (IJMPNP)
Volume 3, Issue 1, 2017, PP 29-31
ISSN 2454-7999 (Online)
DOI: http://dx.doi.org/10.20431/2454-7999.0301005
www.arcjournals.org

In Vitro Antioxidant Activity of *Melastomastrum capitatum* (Vahl) A. & R. Fern. (Melastomataceae) Leaf Methanol Extractby DPPH Radical Scavenging Activity

Ukwubile Cletus A.

Department of Science Laboratory Technology, Biology Unit, Federal Polytechnic Bali, Nigeria

Abstract: *Antioxidant activity of methanol extract of Melastomastrumcapitatum leaf was evaluated using DPPH antioxidant assay. The methanol extract of the plant showed potent radical cat ion scavenging activity. The maximum inhibitory concentration (IC_{50}) and radical cat ion scavenging activity of the plant was found to increase in concentration dependent fashion from 100, 200, 300, 400 and 500 µg/mL. This study indicates significant free radical scavenging potential of the plant of M. capitatumwhich can be exploited for the treatment of various free radical mediated ailments like cancers and tumours.*

Keywords: *In vitro, Antioxidant activity, Melastomastrumcapitatum, DPPH scavenging.*

1. INTRODUCTION

Antioxidants are substances which are used as foods or as additives to foods whether in smaller amount or bigger amount, which are capable of preventing the oxidation of oxidizing agents which are capable of releasing free oxygen radials in the body [1]. These substances have the potentials to inhibit specific oxidizing enzymes that can react with oxygen radicals, thereby causing damage to molecule in humancells [2].

Antioxidants act in the body in various ways by; reducing localized oxygen concentration, preventing the commencement of chain by scavenging radicals, breaking down lipid peroxides to peroxyl and alkoxyl radicals, reducing peroxides by converting them to non- radicals product, and breaking chain to prevent hydrogen reduction [3]. Currently, due to high toxicity of synthetic antioxidants, natural antioxidants of plant origin have gained popularity among natural product researchers.

Melastomastrum capitatum is a dicot plant belonging to the family *Melastomataceae*. It is locally called ‘’*Belkon’’* in Fulani language in Nigeria’s North-East, Taraba State. Anti-inflammatory and analgesic activity as well as anti-hyper-cholesterolemic activities of the leaf methanol extract in albino mice has been reported by Ukwubile *et al.* [4]. The crude leaf methanol extract contains mainly glycosides, alkaloids, tannins and carbohydrates. In traditional medicine, the plant is used as anti-rheumatic agents, to treat stomach ache, for blood purification, for treating diuresis, for correcting intestinal and pulmonary problems [4].

This present study was carried out to evaluate the antioxidant activity of *M. capitatum* leaf methanol extract *in vitro* by DPPH scavenging radical assay.

2. MATERIALS AND METHODS

2.1. Materials

DPPH, air dried leaves of *Melastomastrum capitatum*, ascorbic acid, beaker, micro pipette, distilled water, micro cuvette, test tube rack, test tube, spatula, UV/VIS spectrophotometer, ATI CO^{TM} Model, methanol, filter paper, Kim white, mortar and pestle, measuring cylinder, separating funnel, etc.

2.2. Methods

2.2.1. Collection and Identification of Plant

Fresh leaves of *Melastomastrum capitatum*were collected in the evening hour from Mambila Plateau Sardauna Local Government Area Taraba State, and was authenticated by Mr. Cletus A. Ukwubile

(Biology Unit) of the Department of Science Laboratory Technology. A plant press was prepared and was deposited with voucher number ''*MELA001''* in the herbarium of Biology Unit of Science Laboratory Technology Department, Federal Polytechnic, Bali, Nigeria.

2.2.2. Preparation and Extraction of Plant Material

The leaves of *Melastomastrum capitatum*, were air-dried at room temperature (40^{O}C) for two weeks and was reduced into fine powder using electronic blender. 600g of the powder was defatted in 700 mL petroleum ether and then extracted with separating funnel by cold maceration techniques. The extract was then filtered using Whatman No 1 filter paper. The filtrate was concentrated, *in vacuo* at room temperature. After this, the methanol extract was further partitioned successively using solvents in increasing order of polarity from the eluotropicseries in this other: carbon tetrachloride, chloroform, acetone, ethyl acetate and methanol. The final weight of the methanol leaf extract was calculated from the formula below:

% yield = (Final weight of powder/initial weight of powder) X100.

2.2.3. Antioxidant and Free Radicals Scavenging Assay

The method of Brain-Williams*et al.* [7] was used in a methanol solution of 2, 2- diphenyl-picryl-hydrazyl (DPPH) radicals (concentration 1.0X 10^{-4}m). The test extract was added in concentrations of 100,200,300,400 and 500 µg/mL. The reaction mixture was shaken vigorously and kept in the dark for 30 min. The absorbance of the solution were measured using ATICO^{TM}Model UV-Vis spectrophotometer at 546.0nm wavelength against a blank without DPPH. Decreasing of DPPH solution absorbance indicated potential scavenging activity while the increase was given as DPPH radical scavenging activity. This activity is given as % DPPH radical scavenging activity that is calculated in the equation below:

$$\% \text{ DPPH radical scavenging} = \frac{\text{Sample absorbance}}{\text{Control absorbance}} \times 100$$

DPPH solution without sample solution was use as control. All tests were run in triplicate and average. Ascorbic acid was use as reference drug [5-8].

3. RESULTS AND DISCUSSION

The DPPH analysis (% scavenge) showed a higher percentage of radical sequestration with statistical difference. In the concentration of 100 µg/mL, the DPPH scavenge, showed a higher concentration of 91.70±14.63 and at the concentration of 500 µg/mL, the DPPH scavenge was 25.90 ±1.97, which means that the lower the concentration 100ug/mL the higher the DPPH scavenging (91.70±14.63), and the higher the concentration (500ug/mL) the lower the DPPH scavenging (25.90±1.97) of the plant extract. The inhibitory concentration showed that the lower the concentration (54.2%). At the concentration of 500ug/mL, the inhibitory concentration was 87.1%.The antioxidant activity of *M. capitatum* revealed that the plant showed higher antioxidant activity at a higher concentration (Table 1).

The presence of non-antioxidant food component (amino acid and uronic acid) may interfere in the quantification of antioxidant activity in food [9]. Studying the antioxidant capacity of catching and Gallic acid, using DPPH with different solvents (water, methanol/water, methanol acetone/water) found different among the method. However the DPPH assays did not demonstrated any interference due to solvent polarity. Begetti *et al.* [9] quantified the antioxidant activity of *M.capitatum,* which showed high antioxidant activity for the DPPH method as demonstrated by the leaf extracts. Total phenol have antioxidant activity , acting in the neutralization of free radicals, and contributing to the control of oxidative stress in pancreatic islets of cancer mice . The result regarding antioxidant activity showed that methanol extract of *M. capitatum* has strong antioxidant activity suggesting antioxidant property, as demonstrated by the in vitro study [10].

Table1. *Antioxidant activity of Melastomastrum capitatummethanol leaf extract*

Conc. (µg/mL)	**DPPH Scavenging (nm)**	**I C_{50} (%)**
Control	200± 7.49	-
100	91.70 ±1.61	54.2
200	70.40 ± 1.14	64.8
300	64.40 ± 1.72	67.8
400	63.80 ± 1.75	68.1
500	25.90±1.97	87.1

Abs (546 nm), ascorbic acid is the reference drug

4. CONCLUSION

The study showed that methanol leaf extract of *M. capitatum* has a higher antioxidant activity. It is possible that the presence of major compounds found in these extract reported (ellagic acid, gallic acid and rutin) by previous researchers, might have contributed to the antioxidant effect of the extract. Overall, the result are very promising and may demonstrate the action of compound present in *M. capitatum* leaf with antioxidant property.

However, despite the antioxidant property found during this study , further study are necessary to determine the respond of methanol leaf extract, and the antioxidant signaling process of organs responsible for this, which will consolidate the results for future drug development.

ACKNOWLEDGEMENT

The author is thankful to Mr. Godfrey Victor for his assistance in plant collection and preparation for extraction.

REFERENCES

[1] Al-salih, R.M. (2010). Clinical Experimental Evidence: Synergistic Effect of Gallic Acid and Tannic Acid as Anti-diabetic and Antioxidant agents; 4: 109-119.

[2] Benzie, S.E., Strain,J.J. (1996). The ferric reducing ability of plasma (FRAP) as a measure of "Antioxidant Power": The FRAP assay. *Anal of. Biochemistry*; 239: 70-76.

[3] Nenadis, N., Wang, L.F., Tsimidou, M., Zhang, H.Y.(2004). Estimation of scavenging activity of phenolic compound using the ABTS assay. *Journal of Agric. Food chem.* 52: 4669-4674.

[4] Ukwubile, C.A., Agu, M.O., Agabila, E. J. (2015). Phytochemical screening and acute toxicity study of *M. capitatum* leaf extract. *International Journal of Biological chemistry*; 3(2): 56-61.

[5] Halliwell, B., Aeschbach, R., Loliger, J., Aruoma, O.I. (1995). The characterization of Antioxidant. *Food and chemical. Toxicology*; 33: 601-617.

[6] Larrauri, J., Reperez, P., Saura, C.F. (1997). Mango peel fibers with antioxidant activity. *Journal of Food Science*; 205: 29-42.

[7] Perez-Jimenez, J., Calixto, F.S. (2006). Effect of solvent and certain food constituents on different antioxidant capacity assays. *Food Res. Int.* 39: 791-800.

[8] Temple, N.J. (2001). Antioxidant and disease: More question than answers. *Nutritional Research;* 20: 449-459.

[9] Bergetti, M., Facco, E.M.P., Piccolo, J., Hirsch, G.E., Rodriguez Yamaha, D., Kobori, C.N. (2011). Physicochemical characterization of peppermint. *International Journal of Plant Products*; 31: 141-154.

[10] Coloma, T.C., Figueiredo, D., Jcazarin, C.B., Schumacher, N.S.G., Marostica, M.R., Jr., Meletti, L.M., (2013). Antioxidant and anti-diabetic potential of *Passiflora alatacurtis* methanol leaf extract in type 1 diabetes mellitus (NOD-mice). *International Journal of Immuno-pharmacology;* 18: 106-115.