Research Article **ISSN: 2347–8330**

Journal of Pharmaceutical and Biological Research
Online at ***www.pharmaresearchlibrary.com/jpbr***
JPBR, 2014, Vol.2(2): 125-128

In Vitro Antioxidant Activity of Methanolic Leaf Extract of *Mentha arvensis.*

Syama .M.Suresh[1], S. N. Suresh*[2], P. Sagadevan[1], S. Rathish Kumar[2]

[1]PG & Research Department of Biotechnology, Kongunadu Arts and Science College, Coimbatore-641029.
[2]Department of Biotechnology, Sree Narayana Guru College, K.G. Chavadi, Coimbatore, India-641105.

NCBC'14, 27 August 2014, Organized by PG & Research Department of Biotechnology,
Sree Narayana Guru College, K.G. Chavadi, Coimbatore, India-641105.

Contents

***Corresponding author**
S. N. Suresh
Department of Biotechnology,
Sree Narayana Guru College,
K.G. Chavadi, Coimbatore, India-641105.
Manuscript ID: NCBC2014-JPBR2263

PAPER QR-CODE

Abstract

In vitro antioxidant effects of the methanolic extract of *Mentha arvensis leaves* were determined by both enzymic (CatalaseSuperoxide dismutase, Glutathione reductase, Glutathione-stransferaseand Glutathione peroxidase) and non enzymic (Ascorbic acid, α-Tocopherol, Polyphenols, Reduced glutathione, Flavonoids and Carotenoids) methods. Preliminary phytochemical screening revealed that the extract of the leaves of Artemisia niligirica possesses Tannin, Terpenoids, Alkaloids, and Flavonoids materials. The results obtained in the present study indicated that the *Mentha arvensis might* be a good source of natural antioxidant.

Keywords: antioxidant, α- Tocopherol, Polyphenols, Reduced glutathione

1. Introduction

Antioxidants have gained importance in recent years due to their ability to neutralize free radicals or their actions [1]. It has been suggested that the ingestion of dietary antioxidants suppress the free radical production or scavenge free radicals and may prevent harmful effect of these radicals [2]. The applications of antioxidants are industrially widespread in order to prevent polymers oxidative degradation, auto-oxidation of fats, synthetic and natural pigments discoloration. There is an increased interest of using antioxidants for medical purposes in the recent years, particularly in those intended to prevent the presumed deleterious effects of free radicals in the human body and to prevent the deterioration of fats and other constituents of foodstuffs [3].These antioxidants are polyphenol compounds which are found in all plants and in all parts of the plants (tree bark, stalks, leaves, roots, flowers, pods and seeds) [4]. They affect the process of lipid oxidation at different stages due to the differences in their mode of

action. Because of the complexity of the oxidation process itself, the diversity of the substrates and the active species involved, the application of different test methods is necessary to evaluate antioxidants [5].

The aim of the present work was to evaluate the methanolic extract of *Mentha arvensis in vitro* antioxidant activity. *Mentha arvensis* is the aromatic shrub found throughout then mountains [6, 7]. It is also said to be anthelmintic, antiseptic and expectorant, leaves & flowering tops districts of India. *Mentha arvensis* wile shows reasonably high are bitter, astringent, aromatic, anti-inflammatory, appetizer, digestiveanddiuretic. Also use in cough, asthma, nervous and leprosy [8, 9].

2. Materials and Methods

Sample collection

The *Mentha arvensis* leaves were collected from the in around, Coimbatore and shade dried. They were then powdered and stored in airtight container at room temperature until use.

Extract preparation

The powdered plant sample was extracted with methanol for seven days at room temperature by occasional shaking. On the seventh day, it was filtered, concentrated at 40oc and evaporated to dryness under vacuum. The resulting brown colour gummy residue was dissolved in DMSO and used for the study

Qualitative determination of phytochemicals

Qualitative analysis of the leaves of was carried out *Mentha arvensis* systematically to identify the phytochemicals like tannin (Thenmozhi *et al*., 2011), steroids (Khan *et al*., 2010), Terpenoids (Siddi qui *et al.*, 2009), alkaloids (Santhi, *et al*., 2011), phenols (Benze and Schmid, 1954) and flavonoids (Beknal *et al.*, 2010).

Assessment of the activities of Enzymic and non enzymic antioxidants

Activities of various Enzymic antioxidants like Catalase, Superoxide dismutase, Glutathione peroxidase, Glutathione reductase and Glutathione-s-transferase and nonenzymic antioxidant such as Ascorbic acid.α-Tocopherol, Reduced glutathione, Polyphenols, Flavonoids and Carotenoids

3. Results and Discussion

Identification of the phytochemicals in the leaves of Mentha arvensis.

The leaves of Mentha arvensis was screened qualitatively for the presence of various phytochemicals, the observation and results are depicted in Table I. From the Table I, it is clear that the extract of leaves and roots of Mentha arvensis were Found to contain Tannin, Steroid, Saponins, Glycosides Terpenoids, Alkaloids and Flavonoids. These phytochemical smaking them a rich source of different types of medicines.

Table 1: Identification of the phytochemicals in the leaves of *Mentha arvensis*

Components	***Mentha arvensis***
Flavanoids	Present
Tannins	Present
Steroids	Present
Alkaloids	Present
Saponins	Present
Glycosides	Present

Enzymic and non enzymic antioxidants

Activities of various enzymic antioxidants like Catalase, Superoxide dismutase, Glutathione peroxidase, Glutathione reductase and Glutathione-s-transferase and nonenzymicantioxidanta such as Ascorbic acid.α- Tocopherol, Reduced glutathione, Polyphenols, Flavonoids and Carotenoids in the leaves of *Artemisia niligirica* was tested and results obtained are depicted in table II and III

From the table II, it is clear that the leaves of *Artemisia niligirica* exhibited the maximum activities of Glutathione reductase and Superoxide dismutase when compared to other enzymic antioxidants. Catalase found to be considerable source in the leaves. Others like Glutathione s- transferase and Glutathione peroxidase were found to negligible amount in the leaves. The table III reveals that the leaves of *Artemisia niligirica* contain maximum activity of Flavonoids and Carotenoids. Ascorbic acid, α – Tocopherol, Polyphenols and Reduced glutathione were present in minimum levels. Since, *Mentha arvensis* contains good amount of all the enzymic and non enzymicantioxidants analyzed it may prevent the risk factor of serious disease caused by free radicals Such as cancer, heart diseases, diabetes, aging and cataract

Table 2: Enzymic antioxidants in *Mentha arvensis*

Enzymatic Antioxidants U/mg	Mg/Ml
Catalase[1]	*3.70±0.02*
Superoxide dismutase2	20.2 ±0.25
Glutathione reductase 3	32.1 ±0.02
Glutathione peroxidase 4	0.8±0.001
Glutathione S Transferase [5]	*0.14 ±0.1*

Values are mean± SD of triplicates

1. Amount of enzyme that brings about decrease in absorbance of 0.05 at 240nm
2. Amount of SOD that cause 50% reduced in the extent of NBT oxidation
3. Millimoles of NADPH oxidized/min/g sample
4. Millimoles of CDNB-GSH conjugates/min/g sample
5. Millimoles of GSH utilized/minute

Table 3: Non- antioxidants in *Mentha arvensis*

Non Enzymatic Antioxidants U/mg	**Mg/ Ml**
Ascorbic acid	23.18 ± 0.07
Flavonoids	178.08 ± 0.60
Polyphenols	43.32 ± 0.11
Reduced glutathione	6.25 ± 2.06
α – Tocopherol	8.2± 0.23
Total carotenoids	216.66 ± 100.16

4. Conclusion

Our results indicate a good in vitro antioxidant activity of methanolic extract of the leaves of *Mentha arvensis*. Therefore it can prevent cells against oxidative damage and toxic effects of reactive oxygen species and control several diseases

5. References

1. Mishra, A., Bapat, M.M., Tilak, J.C. and Devasagayam, T.P.A. Antioxidant activity of *Garcinia indica* (kokam) and its syrup, Current Science, **2006**, 91(1): 90-94.
2. Beknal, A.K., Konwar, P.G., Halkai, M.A., Kulkarni, U., Patil, B.S. and Soodam, S.R. Int. J. Curr Pharm Res., **2010**, 2 (4): 36- 39.
3. Gupta, R.C., Sharma, V., Sharma, N., Kumar, N. and Singh, B. *In vitro* antioxidant activity of *Oroxylum indicum (*L.) Vent. - a north Indian highly threatened and vulnerable medicinal plant, Journal of Pharm res., **2008**, 1(1): 66-71.
4. Stoilova, I., Krastanov, A.,Stoyanova, A., Denev, P. and Gargova, S.Antioxidant activity of a ginger extract *(Zingiber officinale)*, Food chemistry, **2007**, 102(1): 764-770.
5. Ghasemzadeh, A., Jaafar, H.Z.E. and Rahmat, A. Antioxidant activities, total phenolics and flavonoids content in two varieties of Malaysian young Ginger (*Zingiber offficinale*) Roscoe, Molecules, **2010**, 15: 4324-4333.
6. Chopra R.N., Chopra .I.C., Handa K.L., Kapoor .L.D., Indigenous Drug of India. Academic publication, Calcutta 2nd Edition., **1994**, 2-15, 72.
7. Chopra, R., Nayar, S., Chopra, I., In glossary of Indian Medicinal Plant. 3rd Edition. Council of Scientific and Industrial Research, New Delhi., **1980**, 32.
8. Kirtikar, K.P, Basu, B.D., In Indian Medicinal Plant. 2nd edition Periodical expert, New Delhi., **1975**, 887.
9. Petrus A.J.A., Seetharaman, R.T., Antioxidant flavone c-biosides from the aerial parts of *Alternanthera pungens*, Indian J.Pharm. Sci., **2005**, 67(2): 187.
10. Thenmozhi, M., Rajeshwari, S., Hiranmal, Y. R. A comparative phytochemical analysis of *Alstonia scholaris, Lawsonia inermis, Ervatamia divaricata* and *Asparagus racemosus,* Int.J.Pharm Research and development., **2010**, 2(9): 86-91.
11. Siddi qui, S., Verma, A., Rather, A.A., Jabeen, J. and Meghvansi, M.K. Preliminary phytochemical analysis of some important medicinal and aromatic plants, Advan. Biol. Res., **2009**, 3: 5-6.
12. Santhi, R., Lakshmi, G., Priyadarshini, A.M. and Anandaraj, L. Phytochemical screening of *Nerium oleander* leaves and *Momordica charantia* leaves, Int. Research J.Pharmacy, **2011**, 2(1): 131-135.
13. Luck, H. Methods of enzymatic analysis, Academic Press, **1974**, 78; 885 – 894.
14. Misra, H.P. and Fridovich, A. Assay of superoxide dismutase, Journal of Biol.Chem.,**1972**, 247:3170-3171.

15. David, M and Richard, J.S. in methods of enzymatic analysis – 3, (Ed. Bergmeyer J and Marianna, Gra.B), Verlag chemic wein hein dein, field, Beah Florida, Basel, **1983**, 358.
16. Habig, W.H., Pabst, M.J and Jacoby, W.B. Glutathione S– transferase. The first enzymatic step in mercapturic acid formation, Journal of Biological Chemistry., **1974**, 2491, 7310-7339.
17. Rotruck, T.T., Ganther, A.L., Swanson, A. B., Hafeman, D.G. and Hoeckstra, W.G. Selenium: Biochemical role as a component of glutathione peroxidase science, **1973**, 199: 588–590.
18. Roe J.H. and Keuther.A. the determination of ascorbic acid in whole blood and Wine through 2, 4 – dinitrophenyl hydrazine derivative of dehydroascorbic acid, Journal of Biochemistry, **1953**, 147, 399 – 404.
19. Rosenberg, H.R. Chemistry and physiology of the vitamins, Inter science publishers Inc., **1992**, 452-453.
20. Moron, M.S., De, P. J.N. and Manervik, V. Levels of glutathione, glutathione Reductase and glutathione – s – transferase activities in rat lung and liver, Biochemistry and Biophysics, Acta, **1979**, 582: 67– 68.
21. Malick, C.P., and Singh, M.B. Plant enzymology and Histo Enzymology, Kalyani Publishers, **1980**, 286.
22. Cameroon, G.R., Milton, R.F., and Allan, J.W. **1943**, Lancet, 179.
23. Zakaria, H., Simpson, K., Brown, P.R. and Krutulovic, A. Use of reversed phase HPLC analysis for the determination of provitamin carotenoids in tomatoes, Journal of Chromatography, **1979**, 176: 109 – 117.