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NOTE

Antioxidant Activity of Three Basidiomycete by $ABTS^+$ Radical Cation Decolourization Assay Method

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The antioxidant activity of three basidiomycete namely *Lentinus* sp., *Pleurotus aureovillosus* and *Schizophyllum commune* were investigated by applying 2,2'-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid) ($ABTS^+$) radical cation decolourization assay method. The mycelial extracts of these three mushrooms showed better antioxidant activity by decolourizing the $ABTS^+$ radicals. Among these three mushrooms, *Lentinus* sp. showed maximum decolourization of $ABTS^+$ radicals.

Key Words: Basidiomycetes, Methanolic extract, $ABTS^+$ radicals.

The univalent reduction of molecular oxygen results in the formation of reactive oxygen species (ROS). Reactive oxygen species include free radicals, such as superoxide anion ($O_2^{\bullet}$), hydrogen peroxide (H_2O_2) and hydroxyl radical ($^{\bullet}OH$)[1]. Although the generation of ROS is an essential defense mechanism is some instances, it can also cause tissue damage and a wide range of common diseases, including inflammation, aging, arteriosclerosis, hypertension and diabetes[2,3].

Recently, health beneficial effects of fungi are attracting much attention as a biological response modifier (BRM) because of the wide range of physiological activities. Several active components in it showing immuno-modulating or activating functions have been isolated and identified from many other fungi species such as *Lentinus edodes*, *Coriolus versicolor* and *S. commune*[4]. Antioxidant in it reduces the effect of dangerous oxidants by binding together with the harmful molecules decreasing their destructive power. Cellular damage caused by reactive oxygen species (ROS) has been implicated in several diseases and hence antioxidants have significant importance in human health[5]. In the present study, antioxidant activity of three basidiomycete namely *Lentinus* sp., *P. aureovillosus* and *S. commune* were tested against $ABTS^+$ radicals.

These fungi were grown under submerged conditions using potato dextrose broth. The mycelium was harvested on 15th day and the residual was dried at 45-50 ºC. The dried mycelium was ground in the methanol and was evaporated thoroughly. 50 mg of the residues was dissolved in 5 mL of methanol and stored. The preformed radical monocation of $ABTS^+$ radical, a blue-green chromophore is generated by oxidation of ABTS with potassium persulfate[6]. A stable solution of $ABTS^+$ was produced by reacting a 1 mL of 7 mM ABTS with 88 µL of potassium persulphate and incubated[7] for 12 h. After incubation, the optical density was taken and was

adjusted to 1.00 by diluting with methanol. 25 µL of crude extracts was added to one set of $ABTS^+$ radicals and 50 µL of crude extract was added to another set of $ABTS^+$ radicals. The samples were read spectrophotometrically at 734 nm. The influences of both the concentration of antioxidant and duration of reaction on the inhibition of the radical cation absorption are taken into account when determining the antioxidant activity[8].

The reduction in the optical density of $ABTS^+$ indicates the presence of antioxidant potential in the mushroom crude extract. Among these three basidiomycete, 50 µL *Lentinus* sp. mycelial extract when treated with $ABTS^+$ for 10 min, maximum decolourization of $ABTS^+$ (96.2 %) was recorded and expressed as 12.00 µm of antioxidant potential equivalent which is followed *P. aureovillosus* decolourized $ABTS^+$ to the extent of 67.6 % in 10 min and expressed as 8.37 µm antioxidant potential equivalent. *S. commune* decolourized $ABTS^+$ upto 2.46 % in 10 min which was expressed as 2.12 µm antioxidant potential equivalent. Correspondingly lesser values were noticed for lower dose (25 µL) of crude extract and for lesser reaction time (5 min) which was represented in Table-1. The above results were correlated with earlier studies by Iwagaki[9], Lakshmi *et al.*[10] and Lee *et al.*[11]. The active components of these mushrooms extract which is responsible for the antioxidant activity remains to be elucidated by further studies.

TABLE-1
ANTIOXIDANT ACTIVITY OF THREE DIFFERENT BASIDIOMYCETES MYCELIAL EXTRACTS

Basidiomycetes	Antioxidant equivalent (µm)			
	25 µL		50 µL	
	5 min	10 min	5 min	10 min
Schizophyllum commune	0.87	1.87	1.75	2.12
Lentinus sp.	8.25	8.75	10.75	12.00
P. aureovillosus	6.70	6.42	7.65	8.37

REFERENCES

1. B. Halliwell and J.M.C. Gutteridge, Free Radicals in Biology and Medicine. Oxford University Press, New York, pp. 22-35 (1998).
2. M.S. Cooke, N. Mistry, C. Wood, K.E. Herbert and J. Lunoc, *Free Radic. Biol. Med.*, **22**, 151 (1997).
3. V. Darely-Usmer and B. Haliwell, *Pharmacol. Res.*, **13**, 649 (1996).
4. T. Mizuno and M. Kawai, Chemistry and Biochemisty of the Fungi, Gakkai Publishing Centre, p. 35 (1992).
5. K.K. Janardhanan, B. Lakshmi, J.C. Tilak, S. Adhikari and T.P.A. Devasagayam, *Pharm. Biol.*, **42**, 179 (2004).
6. R. Re, N. Pellegrini, A. Protegent, A. Pannala, M. Yang and C. Rice-Evans, *Free Radic. Biol. Med.*, **26**, 1231 (1999).
7. N. Pellegrini, M. Serafini, B. Colobmi and D. Del Rio, *J. Nutr.*, **21**, 77 (2003).
8. N. Pelligrini, R. Re, M. Yang and C. Rice-Evens, *Enzyme Molecul.*, **299**, 379 (1991).
9. H. Iwagaki, *Biotherapy*, **4**, 1885 (1990).
10. B. Lakshmi, C.J. Tilak, S. Adhikari, T.P.A. Devasagayam and K.K. Janardhanan, *Pat. J. Antibiot.*, **32**, 130 (2005).
11. I.K. Lee, Y.S. Kim, Y.W. Jang, J.Y. Jung and B.S. Yun, *Bioorg. Med. Chem.*, **17**, 6678 (2007).

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