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The Extraction of Wild Mushrooms (*Ganoderma Lucidum* and *Phellinus Torulosus*) and Their Antioxidant Activities

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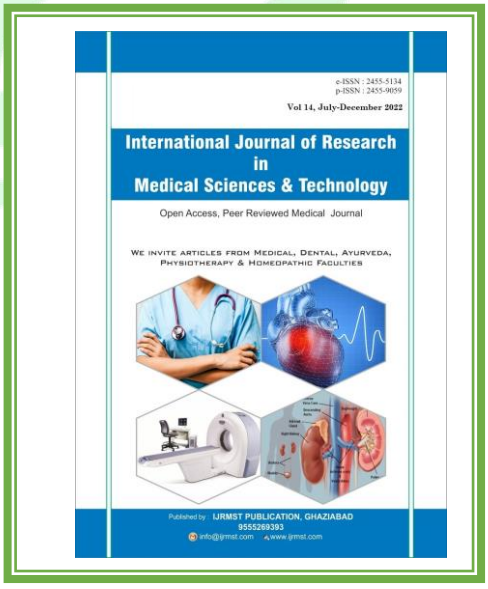

ABSTRACT

The purpose of this study was to find DPPH (1,1-diphenyl-2-picrylhydrazyl) scavenging activities and the extract yields of two mushroom species, namely, *Ganoderma lucidum* (stored) and *Phellinus torulosus (fresh)*. For the extraction of both mushroom bodies, methanol was used as solvent by using Blois extraction methods. The antioxidant activities of extracts were measured by UV-vis spectrophotometer at 517 nm. Butylated hydroxytoluene (BHT) was employed as a reference antioxidant.

In conclusion, the highest DPPH scavenging activity (96.4%) was found in the body of *Ganoderma lucidum* while the lowest DPPH scavenging activity value (92.58%) was found for that of *Phellinus torulosus*. The DPPH scavenging power of the whole extract studied here was higher than that of BHT.

Keywords: Mushroom; *Phellinus torulosus*; *Ganoderma lucidum*; Antioxidant activity.

INTRODUCTION

Mushrooms have become pretty as a functional food and an important source of physiologically beneficial medicines and nutraceuticals. They are ubiquitous in nature and produce various classes of biologically active primary and secondary metabolites. Among them, mushrooms in the genus Phellinus have received great attention recently due to its long history of use in oriental countries and its medicinal values for the treatment of lots of diseases such as stomachaches, inflammation, arthritis of the knee, gastro enteric disorders, tumors and lymphatic disorders [1].

Species of Phellinus are lignicolous hymenomycetes belonging to the order Hymenochaetales. All cause a white rot; the type species *Phellinus torulosus* (Pers.) Bourd. & Galz. Usually decays heartwood in roots and lower stem [2].But the Species *Ganoderma lucidum* (P. Karst. 1881) is a mushroom belonging to the *Ganodermataceae* relatives and Polyporales order [3].

In this study, radical scavenging activity from the tow mushrooms was screened for using the 2, 2-diphenyl-1-picryhydrazyl (DPPH) technique comparison with butylated hydroxytoluene (BHT) [1].

MATERIAL AND METHODS

Mushroom Materials

Phellinus torulosus Mushroom was collected from Duhok province, north Iraq, in April 2015 by Mr. Mooner YASIN. This mushroom was identified by Prof. Dr.Hasan Huseyin DOGAN, Department of Biology, Faculty of Science, Selcuk University, based on their morphology.

The other mushroom *Ganoderma lucidum* was collected from Kahramanmaraş province, turkey, in 2013 by Mr. Ayhan Zülkadir. This mushroom was identified by M.Sc. Ayhan Zülkadir, East Mediterranean area Directorate of Agricultural Research Station Kahramanmaraş, Turkey.

Extraction

Each of *Phellinus torulosus* and *Ganoderma lucidum* mushrooms were ground to powder and 10 g of each powdered, *P. torulosus* mushroom was extracted with 100 mL of %90 methanol as a solvent. But 200mL of % 90 methanol was used as a solvent for the *G. lucidum* mushroom because its powder likes the cotton as shown in figure: 2. then left for 24 hour and completed the volume by added 50 mL of solvent to *P. torulosus* mushroom and 100 mL to *G. lucidum.* the liquid extract was separated from the solid residue by filtration. Finally, filtrates were collected and evaporated in a rotary vacum evaporator [3].

Fig. 1. *Phellinus torulosus powder*

Fig. 2. *Ganoderma lucidum powder*

DPPH radical scavenging activity of mushroom extract

The free radical scavenging activity of methanol extract of the *Phellinus torulosus* and *Ganoderma lucidum* mushrooms were determined by the DPPH assay by following the standard method of Blois (1958) with little modification. In its radical form, 1,1-diphenyl-2-picrylhydrazyl (DPPH) absorption level decreases at 517 nm with reduction of an antioxidant or a radical specie. Briefly, 0.1mM DPPH was prepared for methanol extraction. Then 0.1, 0.2 and 0.3 ml of sample solutions mixed with methanol up to 3 ml in a check tube. Then, added 1 ml of DPPH. The mixtures were then shaken vigorously and were kept for Thirty min in a dark environment at room temperature. Later, the absorbance was measured by Shimadzu UVvis 1240 spectrophotometer at 517 nm. Butylated hydroxyltoluene (BHT) was used as a reference. Radical scavenging activity was expressed as the inhibition percentage of free radical by the sample and calculated with the following equation [4] [6].

$$\%\ antiradical\ activity = \frac{Control\ absorbance\ -\ Sample\ absorbance}{Control\ absorbance} \times 100$$

Yield determination

The extraction yield is a measure of solvent efficiency to extract specific components from the original material and it was defined as the amount of extract recovered in mass compared with the initial amount of dry sample [4].

Powder mushrooms (10 g) were extracted, *Phellinus torulosus* with 150ml methanols and *G.lucidum* with 300 ml same solvent by using Conventional extraction method, the yield percentage of the extract was determined by using the following equation :

$$Yield\ percent\ (\%) = \frac{X}{Y} \times 100$$

Where, X is the dry weight of extract (g), Y is the dry weight of the sample (g).

RESULTS

Antioxidants have important roles for preserve human health due to their ability to scavenge free radical in the body. Table 1 show that the DPPH percentage had a good amount of antioxidant activity (96.48%) for *Ganoderma lucidum* with 0.1 ml Concentration. Our results indicate that mushroom possesses a good antioxidant

potential, and consumptions of supplemented antioxidants from fruits and mushrooms in our diets is very important [5].

The yield percentage of the mushroom extracts prepared by conventional method by using methanol is summarized in Table 2.

Table 1. DPPH radical scavenging activity of Phellinus torulosus and Ganoderma lucidum bodies and BHT.

Mushroom	Sample			BHT		
	DPPH Radical Scavenging (%)					
	Sample Extract Concentration (mL)					
	0.1	0.2	0.3	0.1	0.2	0.3
Phellinus torulosus	95.02	95.31	94.73	88.3	89.9	90.1
Ganoderma lucidum	96.48	95.70	94.24	88.3	89.9	90.1

Table 2. Yield percentage in mushroom sample.

Mushroom	Yield percentage (%)
Phellinus torulosus	1.5
Ganoderma lucidum	4.71

CONCLUSIONS

In conclusion, the data obtained in the present study show that *Ganoderma lucidum* methanol extract possess antioxidant activity but to a greater extent compared to *Phellinus torulosus* methanol extract, confirms the fact that the both type of mushroom is important for antioxidant capacity and also have greater antioxidant activity when compared with other type of mushroom such cultivated *Pleurotus ostreatus* [2].

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Conflict of Interest: None

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