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Preliminary Phytochemical Screening of Different Solvent Extracts of *Pleurotus Florida* and *Pleurotus Djamor*

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ABSTRACT

Qualitative analysis of phytochemical screening of *P. florida* and *P. djamor* mushroom fruit body was studied. Nine solvents viz: 20% Methanol, Ethanol, chloroform, Ethyl acetate, Petroleum ether, Acetone, Hexane, Benzene, and Water were used to obtain extracts from fruit body powders of mushroom parts. The extracts were subjected to qualitative phytochemical screening using standard procedures. Result showed that nine phytochemicals screened were present. They are alkaloids, Carbohydrates and Proteins, present in all extract of both sample. However Tannins, Oxalate, phenols, quinones, were absent in both sample in all extracts. Flavonoids, sterols present in 3 extracts (i.e) methanol, ethanol, acetone and 2 types of sample solvent extracts. The diversity of phytochemicals found present suggests that *P. florida* and *P. djamor* could serve as a source of useful drugs.

Key words: *Pleurotus florida*, *Pleurotus djamor*, phytochemical, different solvent extracts.

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INTRODUCTION

Edible mushrooms are valuable healthy foods, having rich source of vitamins, proteins and minerals, especially in potassium and phosphorus. They possess low calories and fats highly suitable for obese person¹. The genus of *Pleurotus* is a cosmopolitan group, including several cultivated species such as *P.pulmonarius*, *P.cornucopiae*, *P.sajor-caju*, *P.eryngii*, *P.cystidiosus*, and *P.ostreatus*¹⁶. The oyster mushroom (*P.djamor* and *P.florida*) is commercially cultivated important in the world. Several species are grown, commercially on a large and small scale in many countries. As primary decomposers capable of degrading lignocelluloses they are cultivated on a variety of treated and even untreated agricultural by products¹⁷. There are many varieties of mushroom species, of which *Pleurotus* are characterized by a white spore print, attached to gills often with an eccentric oyster mushrooms¹⁸. They are highly nutritive as they contain good quality proteins, vitamins and minerals¹⁹. Fungi of the *Pleurotus* genus have an important place among the commercially employed basidiomycetes they have gastronomic, nutritional and medicinal properties and can be easily cultivated on a wide range of substrates. Besides, the studies in solid culture aiming for the production of fruit bodies the submerged culture of the genus *Pleurotus* has also been studied by several authors with varied objective including the production of liquid inoculums¹⁰. Extracellular enzymes¹¹ flavoring agents¹² β -glucosidases¹³ antimicrobials¹⁴ vitamins¹⁵ biomass, intra and extracellular polysaccharides (EPS), are also the aim of several studies. Mushrooms accumulate a variety of secondary metabolites including flavonoids, phenol compounds, terpenes, polyketides, and steroids. Phenolic compounds were found to have antioxidant activity in the inhibition of LDL oxidation². Some common edible mushrooms like *Pleurotus* sp., which are widely consumed in Asian culture, have been found to possess antioxidant and synergist that is not mutagenic²⁰. Which is well correlated with their total phenolic content. Phytochemicals in food materials and their effects on health, especially the suppression of active oxygen species by natural antioxidants from tea, species and herbs have been extensively studied³. *Pleurotus* is the third most important cultivated mushroom for food purposes. Nutritionally, it has unique flavour and aromatic properties, and it is considered to be rich in protein, fiber, carbohydrates, vitamins and minerals and cholesterol free. *Pleurotus* spp. are promising as medicinal mushrooms, exhibiting hematological, antiviral, antitumour, antibacterial, hypocholesterolic and immune modulating activities⁴. The effect of extract from *Pleurotus* species against some pathogenic organisms and anti-oxidant have been reported by researchers. In the

present investigation, the phytochemical activity of different solvent extracts from *P.florida* and *P.djamor* were assayed through various *in vitro* models.

MATERIALS AND METHOD

Collection of sample

The spawn of *Pleurotus florida* was obtained from the Department of plant pathology, Tamilnadu Agricultural University, Coimbatore and the spawn of *Pleurotus djamor* was obtained from the department of plant pathology, Tamilnadu Agriculture University. Madurai.

Phytochemical Screening

Phytochemical, alkaloids, cardiacglycosides, carbohydrate, flavonoids, oxalate, phenols, phlobatannin, proteins, saponins, sterols, tannins, terpenoids and quanines were screened.

Processing of mushroom fruit body materials⁵

The mushroom fruit body were washed in distilled water and cut into small bits to facilitate to drying. The pieces of fruit body materials were dried for 24 hours in a shade condition. The dried material was taken separately and ground using an electric blender to obtain a fine powder. The powder was further passed through 2mm sieve to obtain fine particles and the powdered samples were stored in a clean glassware container until needed for analysis.

Solvent extraction

One gram portions of powdered mushroom materials each were separately dispersed in 50 ml of each water, 20% Ethanol, Methanol, Acetone, Petroleum ether, Ethyl acetate, Chloroform, Hexane and Benzene. The solution was left to stand at room temperature for 24 hrs and was filtered with Whatman no.1 filter paper. The filtrate was used for the phytochemical screening using the following tests.

Phytochemicals screening⁵

Test for Alkaloids (Wagner's reagent)

A fraction of extract was treated with 3-5 drops of Wagner's reagent (1.27g of iodine and 2g of potassium iodide in 100 ml of water) and observed for the formation of reddish brown precipitate indicate the presence of alkaloids.

Test for Carbohydrates (Molisch's test)

Few drops of Molisch's reagent were added to 2ml portion of the various extracts. This was followed by addition of 2ml of conc. H₂SO₄ down the side of the test tube. The mixture was then allowed to stand for two-three minutes. Formation of a red or dull violet colour at the interphase of the two layers indicate positive test.

Test for cardiac glycosides (Keller Kelliani's test)

Five ml of extract was treated with 2 ml of glacial acetic acid in test tube and a drop of ferric chloride solution was added to it. This was carefully underlayered with 1ml concentrated sulphuric acid. A brown ring at the interface indicated the presence of deoxysugar characteristic of cardenolides. A violet ring may appear below the ring while in the acetic acid layer, a greenish ring may form indicate the presence of glycosides.

Test for Flavonoids (Alkaline reagent test)

Two ml of extracts was treated with few drops of 20% sodium hydroxide solution. Formation of intense yellow color which become colorless on addition of dilute hydrochloric acid, indicate the presence of flavonoids.

Test for phenols (Ferric chloride test)

A fraction of the extracts was treated with aqueous 5% ferric chloride and observed for the formation of deep blue or black colour.

Test for phlobatannins (Precipitate test)

Deposition of red precipitate when 2ml of extract was boiled with 1ml of 1% aqueous hydrochloric acid was taken as evidence for the presence of phlobatannins.

Test for Amino acids and Protein (1% ninhydrin solution in acetone)

Two ml of filtrate was treated with 2-5 drops of ninhydrin solution placed in a boiling water bath 1-2minutes and observed for the formation of purple colour.

Test for Saponins (Foam test)

To 2 ml of extract was added 6ml of water in the test tube .The mixture was shaken vigorously and observed for the formation of persistent foam that the presence of saponin.

Test for Sterols (Liebermann-Burchard test)

1ml of extract was treated with drop of chloroform acetic anhydride and 1ml of conc.H₂SO₄ and observed for the formation of dark pink or red colour.

Test for tannins (Braymer's test)

Two ml of extract was treated with 10% alcoholic ferric chloride solution and observed for the formation of blue or greenish colour solution.

Test for Terpenoids (Salkowki's test)

One ml of chloroform was added to 2ml of each extract followed by a few drops of concentrated sulphuric acid. A reddish brown precipitate produced immediately indicate the presence of terpenoids.

Test for Quinones

One ml of extract was treated with concentrated HCl and observed for the formation of yellow precipitate.

Test for Oxalate

To 3ml portion of extract were added a few drops of ethanoic acid glacial a greenish black colouration indicatethe presence of oxalate.

Table 1: Phytochemical screening of the dried metabolite from *Pleurotus florida*

Phytochemical analysis	Solvents								
	Methanol	Ethanol	Acetone	Peteroleum ether	Ethyl acetate	chloroform	hexane	benzene	water
Alkaloids	++	++	++	+	++	+	+	+	+
Cardiac glycosides	+	-	+	+	+	-	+	+	+
Carbohydrate	+	+	+	+	+	+	+	+	+
Flavonoids	+	+	+	-	-	-	-	-	+
Oxalate	-	-	-	-	-	-	-	-	-
Phenols	-	-	-	-	-	-	-	-	-
Phlobatannins	+	+	+	-	-	-	-	-	-
Proteins	+++	+++	+++	++	++	++	+	+	+++
Saponins	+	+	+	-	-	-	-	-	-
Sterols	+	+	+	-	+	-	+	+	+
Tannins	-	-	-	-	-	-	-	-	-
Terpenoids	+	+	+	+	+	+	+	+	+
Quinones	-	-	-	-	-	-	-	-	-

Table.2: Phytochemical screening of the dried metabolite from *Pleurotus djamor*

Phytochemical analysis	Solvents								
	Methanol	Ethanol	Acetone	Peteroleum ether	Ethyl acetate	Chloroform	hexane	benzene	water
Alkaloids	++	++	++	+	+	+	+	+	+
Cardiac glycosides	++	++	++	+	+	-	+	+	+
carbohydrate	+	+	+	+	+	+	+	+	+
Flavonoids	+	+	+	-	-	-	-	-	+
Oxalate	-	-	-	-	-	-	-	-	-
Phenols	-	-	-	-	-	-	-	-	-
Phlobatannins	+	+	-	-	-	-	-	-	-
Proteins	+++	+++	++	+	+	+	+	+	++
Saponins	+	+	+	-	-	-	-	-	-
Sterols	+	+	+	-	-	-	+	+	+
Tannins	-	-	-	-	-	-	-	-	-
Terpenoids	+	+	+	+	+	+	+	+	+
Quinones	-	-	-	-	-	-	-	-	-

++ =highly present; +=present; - absent

RESULT AND DISCUSSION

Result obtained for qualitative screening of phytochemicals in dried fruit body powder of *P. florida* and *P.djamor* were presented in Table 1 and 2. The thirteen phytochemicals screened for, eight were found by various solvent extracts. They are cardiac glycosides, flavonoids, phenols, carbohydrates, saponins, sterols, tannin and terpenoids. Remarkably flavonoids present in methanol, ethanol, acetone and water extract. saponins were present in all solvent extract of *P.djamor*. According to⁶ the factors affecting the choice of solvent are quantity of phytochemical to be rate of extraction, diversity of different compounds extracted, diversity of inhibitory compounds extracted, ease of subsequent handling of the extracts, toxicity of the solvent in the bioassay process potential health hazard of the extractant. The logic in using different solvents when screening for phytochemicals in mushroom fruit body materials was clearly validated. The results showed that sterols and terpenoids were exceptionally present in all extracts but absent in water⁷ also reported that the fruit body powder of *P.florida* and all other extracts showed the presence of alkaloid, cardiac glycosides, carbohydrates, proteins and terpenoids. According to⁸ qualitative analysis of phytochemicals of *P.djamor* revealed the presence of flavonoids, saponin and terpenoids. In the present investigation the fruit body of *P.djamor* and all other extracts showed the presence of alkaloids, cardiac glycosides, carbohydrates, proteins and terpenoids. Flavonoids phlobatannins, saponins, sterols were present in *P.florida* and *P.djamor* by using the three solvent such as methanol, ethanol and acetone. Oxalate, phenols tannins and quinones were absent in *P.florida* and *P.djamor* from the all solvent extractions. The result indicates *P.florida* and *P.djamor* fruit body powder hold promises as source of pharmaceutically important phytochemicals. Alkaloids generally present in both sample that play some metabolite role and control development in living system. They are also involved in protective function in animals and are used as medicine especially the sterols, alkaloids⁹. The flavonoid compounds in mushroom have been reported to exert multiple biological effects including anti-oxidant, free radical scavenging abilities, anti-inflammatory, anticarcinogenic etc.

CONCLUSION

It is concluded that phytochemicals present in *P.florida* and *P.djamor* fruit bodies extracts could be a potential source of natural antioxidants, and the consumption of mushroom might give certain level of health protection against oxidative damages with the established activity of these mushroom extract the chemical characteristic of the components in the extracts could be further

investigated. Thus, further study can be aimed at establishing nutraceuticals potential of this mushroom.

REFERENCES

1. M.F. Leon-Guzman, I. Silva, and M.G .Lopez, Contents of vitamins, mineral elements, and some phenolic compounds in cultivated mushrooms. *J. Agric and Food Chemistry* 1997;45(11):4329-433.
2. PL. Teissedre, N. Landrault, Wine phenolic contribution to dietary intake and Bioavailability, *Food Research International* 2000;33(6):461-467.
3. CT. Ho, T. Osawa, MT. Huang, RT. Rosen, Food Phytochemicals for cancer Prevention, ACS Symp. Series Washington 1994;547:2-19.
4. R. Cohen, L. Persky, Y. Hader, Biotechnological application and potential of wood degrading mushrooms of the genus *Pleurotus*. *Appl Microbiol Biotechnol* 2002; 58:582- 594.
5. S. Charles Ugochukwu, I. Arukwe Uche, O. Ifeanyi. Preliminary phytochemical screening of different solvent extracts of stem bark and roots of *Dennetia tripetala*. *Asian J Plant Sci Res.* 2013;3 (3):10-13
6. P. Tiwari, B. Kumar, M. Kaur, H. Kaur, Phytochemical Screening and extraction : A Review *Int. Pharm.Sciencia.*, (2011),1(1) 98-106.
7. C.S Misra, M.S. Pratyush, M.S. Lipin, J. James, A.K.T. Veetil, V.A. Thankamani, Preliminary Phytochemical screening of different solvent extracts of stem bark and roots of *Dennetia tripetala*. *Asian J Plant Sci and Res* 2011;, 3(3):10-13.
8. R. Sasidhara, T. Thirunalasundari, Phytochemical and antioxidant potentials of *Pleurotus djamor*. *J. Chem .Pharma. Res* 2014;6(4):950-953
9. T.Lalitha. and P.Jayanthi, Qualitative Phytochemical screening of different solvent Extracts, *Asian J. Plant Sci. Res* 2012;2(2):114 -115.
10. F.R. Rosuda, E.R. Carbonero, C. Kimmelmeier, C.A. Tischer, P.A.J. Gorin, M.A. Iaconini, *FEMS Microbiol., Lett.*2002.
11. A.M.V. Garzillo, S. Dipaolog, M. Kuzzi, V. Buonocore, Phytochemical, antioxidant and antimicrobial assay of mushroom metabolite from *Pleurotus pulmonarius* *Appl.Microbiol*,1994,42;476-481.
12. A.M. Martin, Phytochemical, antioxidant and antimicrobial assay of mushroom metabolite from *Pleurotus pulmonarius*. *Human Nutr*, 1992, 239-248.

13. H.Marois, C.Romas, N.Matos, E.Forgaes, T. Cserhati,V. Almeida, J.Oliveria, Y.Darwish, Z.Illes, Improving yield performance of *Pleurotus pulmonarius* through hyphal anastomosis fusion of dikaryons, *J.Chromaogr*, 2002, 770;111-119.
14. E.Wisbeck, A.P.Robert, S.A.Furkan, Phytochemical, antioxidant and antimicrobial and assay of mushroom metabolite from *Pleurotus pulmonarius* *Health Environ* 2002;3(2):07-10.
15. E.F. Solomko, G.S. Eliseeva, *Prikladnaya Biohimiya* , 1988; 24(2):64-169.
16. E.A. Adebayo, O.R. Ishola; Phytochemical and antimicrobial Screening of crude extracts of *Terminalia gaeescens*. *African J Pharma Pharmacol* 2009;3(5): 217-221.
17. S.T. Chang, P.G Miles; *Edible mushroom and their cultivation* CRC press, Inc.Florida.1989-345p.
18. P.G. Miles, S.T.Chang; *substratum formulation for laccase and mycelia biomass production of Pleurotus osteratus* world Scientific Singapore; 1997:194.
19. P. Khanna, HS, Garcha. Interaction of Aqueous extracts of *Pleurotus pulmonarius*(Fr) Quelcham with Glyburide in Alloxan Induced Diabetic mice. *News Lett Tropics* 1984,4:9- 14.
20. NK. Ishikawa, MCM Kasuya, MCD Vanetti. *Brazilian J Microbiol*; 2001, 32: 206-210.

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