

Antioxidant and antimicrobial activity of

Pleurotus ostreatus extracts

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Methods

Fruiting bodies of oyster mushroom were collected on Kopaonik mountain in September 2014. The voucher specimens were deposited at the Faculty of Pharmacy, Department of Pharmacognosy (No26). Fresh mushrooms were dried at room temperature, pulverized and extracted for two days with constant shaking at room temperature with cyclohexane (CCC), dichloromethane (CCD) and methanol (CCM). Aqueous extract (CCA) was prepared by boiling dry mushroom in distilled water for 30 min. The total phenolic content (TPC) of in CCM and CCA extracts was determined spectrophotometrically using Folin-Ciocalteu method. The ability of the CCM and CCA extracts to scavenge free radicals was measured using the common DPPH test. For testing antimicrobial activity of all four extracts, the broth microdilution method was used to determine minimal inhibitory concentrations (MICs) against different laboratory bacteria strains.

Introduction

Oyster mushroom, *Pleurotus ostreatus* (Jacq. ex Fr.) P.Kumm. Pleurotaceae, is the second most cultivated mushroom in the world, not only for its edible properties and delicious taste, but also for its dietary and medicinal importance (1). Anticancer properties are due to the presence of polysaccharides, terpenoids and essential unsaturated fatty acids, anti-atherogenic properties due to a naturally occurring statin lovastatin, and immunomodulatory activity due to the presence of lecithin (2). In our previous research we have shown that oyster mushroom from Serbia is low in fat and calories, but rich in dietary fibre, especially β -glucan, has high level of potassium and low level of sodium (3). Considering that also many secondary metabolites, including polyphenols, contribute to antioxidant and antimicrobial properties we aimed to investigate radical scavenging and antibacterial properties of extracts of different polarity of *P. ostreatus* from Serbia.



Figure 1. *Pleurotus ostreatus* fruiting bodies



Figure 2. Dry fruiting bodies of *Pleurotus ostreatus*

Results

Table 1. The total phenolic content and DPPH radical scavenging activity of *Pleurotus ostreatus* extracts.

	The total phenolic content (mg GA / g extract, d.w.)	DPPH scavenging activity (IC ₅₀ ; μ g/mL)
CCM	0.39 \pm 0.94	0.59 \pm 0.97
CCA	2.36 \pm 0.04	0.61 \pm 4.06

d.w.- dry weight

Table 2. Antibacterial activity of *Pleurotus ostreatus* extracts

Bacterial strains	MIC (μ g/mL)					
	CCC	CCM	CCA	CCD	Ampicillin	Amikacin
1 <i>Staphylococcus aureus</i> (ATCC 25923)	125	125	62.5	125	0.5	n.t.
2 <i>S. epidermidis</i> (ATCC 12228)	125	125	125	125	1.5	n.t.
3 <i>Bacillus subtilis</i> (ATCC 6633)	62.5	62.5	125	125	1.8	n.t.
4 <i>Escherichia coli</i> (ATCC 25922)	125	250	125	125	2.0	1.5
5 <i>Pseudomonas aeruginosa</i> (ATCC 27853)	125	125	125	125	2.8	2.5
6 <i>Klebsiella pneumoniae</i> (NCIMB 9111)	125	250	125	125	n.t.	2.0
7 <i>Salmonella abony</i> (ATCC 13076)	125	250	125	125	n.t.	n.t.

n.t.- not tested

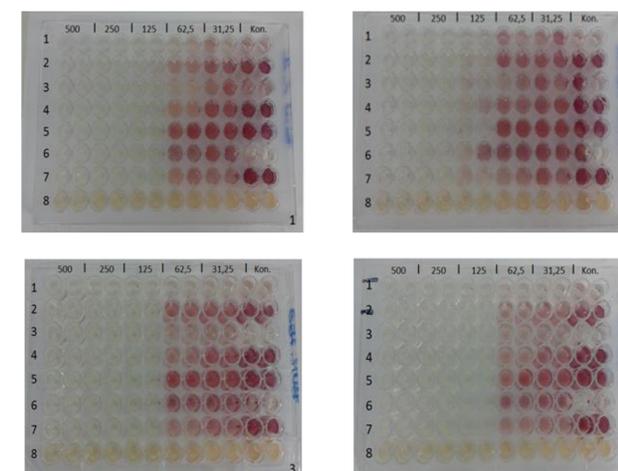


Figure 3. Microdilution plates of *Pleurotus ostreatus* extracts
1) CCC 2) CCM 3) CCA and 4) CCD

Conclusions

Although results clearly show that the different extracts of *P. ostreatus* collected in Serbia possess not only great nutritional value but could also be a rich source of potential antibacterial and antioxidant bioactive compounds, further research on this topic should be undertaken.

1 Silva, R.R., Carmo, C.O., Oliveira, T.A., Figueirêdo, V.R., Duarte, E.A., Soares, A.C., 2020. Biological efficiency and nutritional value of *Pleurotus ostreatus* cultivated in agro-industrial wastes of palm oil fruits and cocoa almonds. *Arq. Inst. Biol.* 87, 1–10, e0852018. doi: 10.1590/1808-1657000852018

2 Mohamed, E.M., Farghaly, F.A., 2014. Bioactive Compounds of Fresh and Dried *Pleurotus ostreatus* Mushroom. *Int. J. Biotech. Well. Indus.* 3, 4–14. doi: 10.6000/1927-3037.2014.03.01.2

3 Kolundžić, M., Radović, J., Tačić, A., Nikolić, V., Kundaković, T., 2018. Elemental composition and nutritional value of three edible mushrooms from Serbia. *Zaštita materijala*, 59, 45–50. doi: 10.5937/ZasMat1801045K