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**FROM BIOTECHNOLOGY TO HUMAN  
AND PLANETARY HEALTH**



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## PP33

## POLYPHENOL PROFILE AND ANTI-TYROSINASE POTENTIAL OF THE POLYPORE MUSHROOMS *FOMITOPSIS PINICOLA* AND *GANODERMA LUCIDUM*

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Tyrosinase is widely present in plants and mushrooms and is responsible for enzymatic browning reactions in damaged foodstuff. Accordingly, its inhibitors act as anti-browning compounds and have an important role in maintaining food quality. In the cosmetic industry, inhibitors of tyrosinase have important applications as skin-lightening agents. Due to the ability of phenols to react with proteins, the potential of polypore mushrooms methanol extracts to inhibit tyrosinase was investigated. Fresh wild-growing fruiting bodies of the two mushroom species, namely *Fomitopsis pinicola* and *Ganoderma lucidum*, were collected from the Kopaonik and Avala mountains, Republic of Serbia. Their methanol extracts were analyzed for the total phenol content (TPC) and phenolic profile using liquid chromatography coupled with mass spectrometry (LC-MS/MS). The tyrosinase inhibitory potential was determined in the reaction solution of 46 units/mL tyrosinase and 2.5 mM of dihydroxyphenylalanine (L-DOPA). Results were expressed as IC<sub>50</sub> values, the concentration of extract required for 50% in vitro inhibition. The results showed that TPC levels were

from 38.6 to 133.1 mg gallic acid equivalent (GAE) of extract dry weight (DW), with *F. pinicola* having the highest level. *F. pinicola* extract displayed the strongest tyrosinase inhibitory activity (0.10 mg/mL) almost comparable with kojic acid (0.079 mg/mL) commonly used as a standard inhibitor of tyrosinase. A very strong and significant correlation between TPC and IC<sub>50</sub> values in tyrosinase inhibition was observed ( $r = -0.96$ ). Gallic acid (951.12 µg/g extract DW) was found to be the main polyphenol ingredient of *F. pinicola* extract. In addition, the anti-tyrosinase activity exhibited by investigated methanol extracts could also be attributed to the presence of other phenolic acids like protocatechuic, p-hydroxybenzoic, chlorogenic, vanillic, p-coumaric, and caffeic acid. The results of the present study suggest that methanol extract of the polypore mushrooms *F. pinicola* and *G. lucidum* originating from Serbia act as natural tyrosinase inhibitors and are rich sources of phenolic acids. These mushrooms may be a good material for the development of anti-browning additives as well as additives in skin-lightening cosmeceutical formulations.

**KEYWORDS:** polypore mushrooms; phenolic acids; tyrosinase inhibition; anti-browning; skin-lightening

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