

CONTENT OF HEAVY METALS AND METALLOIDS IN SAMPLES OF WILD GROWING MUSHROOMS *GANODERMA LUCIDUM* AND *GANODERMA APPLANATUM*

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For centuries, mushrooms have been used in East Asian countries to improve health and longevity, and then their use spread around the world. Medicinal species of mushrooms are edible or inedible species that show a therapeutic effect on human health. Due to their diverse composition, they have an important place in the food and pharmaceutical industry. They are an excellent source of raw materials for both functional foods and nutrients. The chemical composition of wild and cultivated species may differ due to the conditions in which they grow. Mushrooms from a mushroom farm don't develop defense mechanisms and do not synthesize secondary metabolites sufficiently because they do not need it to survive, but unlike wild species, which may contain a higher content of toxic elements, due to the contaminated soil on which they grow, they can be safer to consume. The content of toxic elements in wild mushrooms can be a major problem for human health, so the aim of this study was to determine the content of potentially toxic elements (PTEs) in mushrooms, *Ganoderma lucidum* and *Ganoderma applanatum*. They are wild, inedible, medicinal mushrooms that are often used for medicinal purposes due to their chemical composition. Owing to the varying quality of *G. lucidum* in the wild and the increasing demand for it in the food service, pharmaceutical, cosmetics, and health product industries, cultivation has become a major source of the mushroom (1). The measurements of elements (As, Cd, Hg, Pb, Cu, Fe and Cr) were carried out by inductively coupled plasma optical emission spectrometer (ICP-OES). The mean of As, Cd, Hg, Pb, Cu, Fe and Cr concentration in *Ganoderma lucidum* was 0.084 ± 0.001 , 1.6 ± 0.1 , 0.14 ± 0.02 , 2.8 ± 0.1 , 8.6 ± 0.5 , 64.8 ± 4 and 0.26 ± 0.02 mg/kg and in *Ganoderma applanatum* 0.22 ± 0.02 , 1.6 ± 0.1 , 0.22 ± 0.03 , 1.8 ± 0.2 , 33.7 ± 2 , 8.5 ± 0.5 , 0.3 ± 0.03 mg/kg dry weight, respectively. Compared with the literature average values, for mentioned elements in wild mushroom species, the obtained values are within allowed limits (2). However, in cultivated species, the content of the mentioned elements is lower, except for Cu for species *L. applanatum* and Fe for both species (3). Therefore, it is extremely significant to study the safety of medicinal mushrooms.

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SADRŽAJ TEŠKIH METALA I METALOIDA U UZORCIMA SAMONIKLIH PEČURAKA *GANODERMA LUCIDUM* I *GANODERMA APPLANATUM*

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Vekovima su se pečurke koristile u istočnoazijskim zemljama za poboljšanje zdravlja i dugovečnosti, a zatim se njihova upotreba proširila po celom svetu. Lekovite vrste mogu biti jestive ili nejestive pečurke koje pokazuju terapijski efekat na zdravlje ljudi. Zbog svog raznolikog sastava, imaju važno mesto u prehrambenoj i farmaceutskoj industriji. Hemijski sastav samoniklih i gajenih vrsta može se razlikovati zbog uslova u kojima rastu. Gajene pečurke ne razvijaju u dovoljnoj meri odbrambene mehanizme, jer im nisu potrebni za opstanak, pa je i sinteza sekundarnih metabolita manja, ali se mogu smatrati sigurnijim za konzumiranje jer rastu u kontrolisanim uslovima. Za razliku od njih, samonikle vrste su bogatije sekundarnim metabolitima ali mogu imati i veći sadržaj toksičnih elemenata. Sadržaj toksičnih elemenata u divljim pečurkama može predstavljati veliki problem za zdravlje ljudi, pa je cilj ove studije određivanje sadržaja potencijalno toksičnih elemenata (PTE) u pečurkama, *Ganoderma lucidum* i *Ganoderma applanatum*. To su nejestive, lekovite pečurke koje se zbog svog hemijskog sastava često koriste u medicinske svrhe. Zbog varijacija u kvalitetu pečurke *G. lucidum* koja se može naći u prirodi, kao i sve većoj potražnji za njom u prehrambenoj, farmaceutskoj, kozmetičkoj i industriji zdravih proizvoda, uzgajanje je postao glavni izvor snabdevanja ovom vrstom (1). Određivanje sadržaja elemenata As, Cd, Hg, Pb, Cu, Fe i Cr urađeno je uz pomoć induktivno spregnute plazme sa optičko-emisionom spektrometrijom (ICP-OES). Koncentracija As, Cd, Hg, Pb, Cu, Fe i Cr u *Ganoderma lucidum* bila je $0,084 \pm 0,001$, $1,6 \pm 0,1$, $0,14 \pm 0,02$, $2,8 \pm 0,1$, $8,6 \pm 0,5$, $64,8 \pm 4$ i $0,26 \pm 0,02$ mg/kg suve mase i u *Ganoderma applanatum* $0,22 \pm 0,02$, $1,6 \pm 0,1$, $0,22 \pm 0,03$, $1,8 \pm 0,2$, $33,7 \pm 2$, $8,5 \pm 0,5$, $0,3 \pm 0,03$ mg/kg suve mase. U poređenju sa prosečnim vrednostima iz literature, za navedene elemente kod samoniklih vrsta pečuraka, dobijene vrednosti su u dozvoljenim granicama (2). Međutim, kod gajenih vrsta sadržaj navedenih elemenata je manji, osim vrednosti za sadržaj Cu za vrstu *L. applanatum* i sadržaj Fe za obe vrste (3). Iz ovih razloga je od izuzetne važnosti proučavanje elementnog sastava kod lekovitih samoniklih vrsta pečuraka.

Literatura

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