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AN INSIGHT TO THE NUTRACEUTICAL POTENTIAL OF FRUITING BODIES OF THE OYSTER MUSHROOM *PLEUROTUS* SPP. GROWN ON AGROWASTES IN CUBA

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Abstract

Nowadays, in many countries people have no access to an adequate intake of essential food compounds such as essential amino acids containing proteins, essential fatty acids, vitamins, minerals as well as physiologically active molecules. This is where the role of edible and medicinal mushrooms with their products has become important in developing countries. Edible mushrooms are a significant source of such essential compounds and functional substances, being useful for the prevention and treatment of various diseases. Thus, mushrooms produced are not only food but are raw material for development of functional food and dietary supplements (nutraceuticals) for health and quality life of humans. Between 80% and 85% of mushroom products are taken from fruit bodies which obtained under good manufacture practices (GMP) can be used in the formulation of consistent and safe mushroom products. In this work, a compositional type-study was performed on fruiting bodies of the oyster mushroom *Pleurotus* sp. obtained by solid state fermentation (SSF) on agrowastes (coffee pulp or cocoa shells), for applications as functional food/nutraceutical in Cuba. The yields of mushroom biomass and bioactive functional substances vary depending on the specific strains characteristics and on cultivation conditions such as nutrient content in the medium, light exposition and temperature. Mushrooms packed with a wide array of bioactive components are excellent antioxidant agents which may help to prevent the occurrence and aid the treatment of chronic diseases associated with the oxidative stress. Phenolic compounds were detected in five extracts obtained from fruit bodies of *Pleurotus* sp., with solvents of different polarity; however, the highest levels were found in polar extracts (water and ethanol) with values of 138.4 and 86.37 mg/100 g, dry base, respectively. The antioxidant activity was well correlated with their total phenolic content. *Pleurotus* fruiting bodies also contain important antioxidant minerals (Cu, Zn, Mn) and ascorbic acid (10.29 mg/100 g). Moreover, enzymes - glucose oxidase, superoxide dismutase, peroxidases and laccases may prevent oxidative stress. The coffee pulp induced extracellular laccases production because with this substrate a maximum laccase activity was obtained (1,745 U g⁻¹) at 60 days of fermentation in *Pleurotus ostreatus* CCEBI 3023 strain. On the other hand, the concentration of total mycoesterols, (mainly ergosterol and ergosterol-peroxide) determined by gas chromatography, showed an increase according to the light exposition time: 115, 141 and 349 mg% corresponding to exposure of 4, 8, and 12 h. These results strongly demonstrated the potentialities of *Pleurotus* mushrooms as a raw material to obtain ergosterol (pro-vitamin D) which also exerted some antitumor activities in experimental studies. As part of the fibre constituents the presence of β -1,3-1,6-D-glucans with prebiotic and immunomodulating effects was also demonstrated (1.54 g/100 g). In sum, these results suggest that *Pleurotus* fruiting bodies as functional food/nutraceuticals can be used in human diet thus promoting health and life quality, and as an early intervention of sub-healthy states preventing the consequences of life threatening diseases.

Key words: edible and medicinal mushrooms, β -glucans, laccases, mycoesterols, nutraceuticals, phenolics, *Pleurotus*, solid-state fermentation

Subject: Potential Values and New Developments of Medicinal Mushroom Products

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