Extracts of white mushroom (*Agaricus bisporus*) protect against breast tumors/cancer and atherosclerosis in vitro

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Abstract

Edible mushrooms include many fungal species that are either harvested wild or cultivated, and are consumed by humans for their nutritional and medicinal values. White mushrooms such Agaricus bisporus, belong to Agaricaceae family, is the most extensively cultivated mushroom in the world including Egypt, accounting for 38% of the world production of cultivated mushrooms. Therefore, the present study aims to investigate the potential protective effects of such white mushroom species extracts against breast tumors/cancer and aarteriosclerosis in vitro. White mushroom samples were obtained from the interior areas of Egypt and used for preparation of various media extracts including water, ethanol and methanol. The methanolic extract showed the strongest antioxidant activity (AA, 89.96%) and the highest bioactive compounds (except vitamin c) including total phenolics content (104.69 mg GAE.g.), flavonoids (17.54 QE.g') carotenoids (2.4 mg.g‘l) and minerals (Fe, 1.58 mg.g' and Se, 21.87 mg.g') while the water extract showed the lowest activity (AA= 46.43 %) and low concentration of total phenolics 31.64 mg GAE.g‘'), flavonoids (4.92 QE.g') carotenoids (0.61 mg.g') and minerals (Fe, 0.67 mg.gi' and Se, 6.04 mg.g). When all different mushroom extracts were included in the statistical analysis, there was a relatively positive and significant ($p< 0.01$) relationship between total phenolics ($r = 86.45$), flavonoids ($r=81.65$), carotenoids ($r= 71.56$) and vitamin C ($r=68.89$) and vitamin E ($r= 62.1$) and antioxidant activity. Also, mushroom methanol extract may be a useful chemopreventive agent for breast cancer/ tumor, as they have been shown to decrease in maximal optical density of intact DNA and DNA fragmentation in EAC (Ehrlich Ascites Carcinoma) cell line in all extract tested concentrations (0.50, 1.00, 1.5 and 2.0%). Furthermore, data confirmed a possibility of white mushroom extracts may be more promising in the prevention of atherosclerosis by inhibiting LDL oxidation and scavenging peroxyl radicals forming during oxidation of lipids in oxidative stress. Hence, white mushroom might be useful as antioxidant, anticarcinogenic and

Antiatherosclerosis agents, and its extracts especially the methanol one will probably be used successfully for development of dietary foods, food products and pharmaceutical industry.

Keywords: White mushroom, methanol extract, antioxidant, bioactive compounds, minerals, DNA fragmentation, inhibition, LDL oxidation.