Antioxidant Effects of Medicinal Mushrooms Agaricus brasiliensis and Ganoderma lucidum (Higher Basidiomycetes): Evidence from Animal Studies.

Yurkiv B¹, Wasser SP², Nevo E³, Sybirna NO⁴.

Author information

Abstract
With diabetes mellitus and increased glucose concentrations, the mitochondria electron transport chain is disrupted, superoxide anions are overproduced, and oxidative stress develops in cells. Thus, preventing oxidative stress can produce a decrease in the antioxidant system activity and an increase in apoptosis in immune cells. The application of medicinal mushrooms is a new possible approach to diabetes mellitus treatment. Therefore, the aim of this work was to investigate the influence of administration of the medicinal mushrooms Agaricus brasiliensis and Ganoderma lucidum on antioxidant enzyme activity in rat leukocytes. Wistar outbred white rats were used in the study. Streptozotocin was intraperitoneally injected once at a dose of 50 mg/kg body weight. Mushroom preparations were orally administered at a dose of 1 g/kg/day for 2 weeks. This revealed that in diabetes mellitus, the level of antioxidant enzyme activity is significantly decreased compared with control values, whereas the levels of lipid peroxidation is increased; this manifested in an increase in the amount of thiobarbituric acid reactive substances (TBARS). The medicinal mushrooms' administration is accompanied by an increase in antioxidant enzyme activity to control values and is even higher in the case of A. brasiliensis administration when compared with the diabetic group. As for the indicators of lipid peroxidation under mushroom administration of A. brasiliensis and G. lucidum, we observed a significant decrease of TBARS levels compared with the diabetic group. Increased activity of antioxidant enzymes and reduction of TBARS level indicate pronounced antioxidant properties of studied mushrooms.

Antifungal property and phytochemical screening of the crude extracts of Funtumia elastica and Mallotus oppositifolius.

Adekunle AA¹, Ikumapayi AM.

Author information

Abstract
The antifungal properties of aqueous and ethanol extracts of Funtumia elastica and Mallotus oppositifolius were carried out using the disc diffusion agar assay. The crude extracts exhibited definite significant antifungal activity on most of the fungi. The zone of inhibition varied for the fungi, which were: Aspergillus flavus, Candida albicans, Microsporium audouinii, Penicillium sp, Trichophyton mentagrophytes, Trichoderma sp and Trichosporon cutaneum with respect to the type of plant extract. The aqueous extracts of Mallotus oppositifolius had the highest zone of inhibition of 24.75 +/- 0.86 mm on Penicillium sp. The fulcin antibiotic had zone of inhibition of 11.94 +/- 0.43 mm on Microsporium audouinii, being its highest inhibition on any of the fungi tested. Preliminary phytochemical studies of F elastica and M oppositifolius extracts revealed that they contain anthocyanins, butacyanin, flavonoids, steroids and tannins. Phytobutanin was absent in the extracts. Heavy metal analysis of plant materials showed absence of cadmium, zinc, lead, chromium and nickel, while the presence of copper iron and manganese was less than 0.95%.
Antimicrobial and anti-inflammatory properties of Funtumia elastica.


Christian Agyare, George Asumeng Koffuor, Yaw Duah Boakye, Kwesi Boadu Mensah

Funtumia elastica (Preuss) Stapf. (Apocynaceae) has a long ethnopharmacological history for uses such as treatment of whooping cough, asthma, blennorhea, painful menstruation, fungal infections, and wounds.

To investigate the antimicrobial and anti-inflammatory properties of ethanol extracts from the leaves and stem bark of Funtumia elastica based on its ethnopharmacological uses and also determine the secondary metabolites present in the extracts.

The antimicrobial activities of ethanol leaf and bark extracts of F. elastica were determined using the microdilution technique (MIC determination) and agar diffusion method using 10, 25, and 50 mg/mL concentrations against Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus, Bacillus subtilis, Candida albicans, Aspergillus flavus and Aspergillus niger as test organisms. Anti-inflammatory activities of the doses of extracts at 30, 100, and 300 mg/kg per body weight were determined by carrageenan-induced edema in the footpad of 7-day-old chicks and the foot volumes measured at hourly interval post-treatment for 5 h.

The MIC ranges of both ethanol leaf and bark extracts against the test organisms were 125 (lowest MIC) to 1550 µg/mL (highest MIC) and 125 (lowest MIC) to 1750 µg/mL (highest MIC), respectively. The ethanol leaf and bark extract of F. elastica showed significant anti-inflammatory activity (p ≤ 0.001) at 30, 100 and 300 mg/kg. Preliminary phytochemical screening revealed that F. elastica bark contains hydrolysable tannins, sapogenetic glycosides, steroids and saponins while the leaves contain hydrolysable tannins, flavonoids, starch and alkaloids. Tannin contents of the leaf and stem bark were 2.4 and 1.3% w/w (related to the dried material), respectively.

Both ethanol leaf and bark extracts of F. elastica showed antimicrobial and anti-inflammatory activities and these pharmacological properties may be responsible for the ethnomedicinal uses of the leaves and stem bark of the plant.

Affiliation

Department of Pharmaceutics, Faculty of Pharmacy and Pharmaceutical Sciences, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. cagyare.pharm@knust.edu.gh