

Abstract

Project Code : MRG5280127

Project Title : Antifungal substance from the Shiitake (*Lentinus edodes*) extract: Effect on growth and mycotoxin production

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Contamination by many mycotoxigenic fungi is often found in foods and feeds. Fungi cause damage of plants, crops, and fruits and their mycotoxins are harmful to human and animal health. Several methods exist for controlling fungal contamination, including physical methods, chemical methods, and biological methods. The biological method is one of the strategies used to prevent infection by fungi. The functional properties of Shiitake mushroom have been previously studied and reported, but research on antifungal activity is rare. In this study, water and chloroform extracts of Shiitake mushroom were investigated for antifungal activity against nine strains of mycotoxigenic fungi: *Aspergillus flavus* 9090, *A. parasiticus* TISTR 3276, *A. ochraceus* TISTR 3557, *Penicillium citrinum* TISTR 3437, *P. expansum* BCC 7541, *Fusarium oxysporum* BCC 4977, *F. graminearum* 1895, *F. moniliforme* TISTR 3175, and *F. verticillioides* 1641. The chloroform extract showed higher antifungal activity than water extract against all tested fungi. The chloroform extract exhibited strong inhibitory activity against *Fusarium* spp. with minimum inhibitory concentration (MIC) ranging from 1.95-3.9 mg/ml. The MIC results for chloroform extract showed reduction in colony radial growth rate (K_r) and specific growth rate of the colony (μ) of four *Fusarium* strains, when compared with the control. The chloroform extract was further evaluated to measure its inhibitory efficiency against mycotoxin production by four *Fusarium* strains. The extract was shown to significantly reduce FB_1 production from *F. verticillioides*. FB_1 production was decreased by about 75% by the end of incubation. Based on these results the biological active compounds from the chloroform extract were purified. The compounds were isolated using chromatographic methods and then

identified by spectroscopy methods. Three purified compounds, ergosterol peroxide (1), ergosterol (2) and linoleic acid (5), were successfully isolated from the extract. It was demonstrated that Shiitake extract may provide an alternative approach to control of the mycotoxigenic fungi, especially fusariotoxin-producing *Fusarium* strains, and inhibition of their mycotoxin production.

Keywords : Shiitake extract, Antifungal activity, Mycotoxigenic fungi, Fumonisin B₁ production