

Antifungal Potential of Higher Basidiomycetes Mushrooms

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Abstract : Last years, the search for natural sources of novel and effective antifungal substances became a scientific and technological challenge. In the present research, thirty basidiomycetes isolated from various ecological niches of Georgia and belonging to different taxonomic groups were screened for their antifungal activities against pathogenic fungi such as *Aspergillus*, *Fusarium*, and *Guignardia bidwellii*. Among mushroom tested, several potential producers of antifungal substances have been revealed, such as *Schizophyllum commune*, *Lentinula edodes*, *Ganoderma abietinum*, *Fomes fomentarius*, *Herichium erinaceus*, and *Trametes versicolor*. For mushroom cultivation and expression of antifungal potential, submerged and solid-state fermentations of different plant raw materials were performed and various approaches and strategies have been exploited. *Sch. commune* appeared as a most promising producer of antifungal compounds. It was established that among different agro-industrial wastes, the presence of mandarin juice production waste in a nutrient medium, causing the significant increase of antifungal activity *Sch. commune* (growth inhibition: *Aspergillus* - 59 %, *Fusarium* - 55 %, *G. bidwellii* - 78 %, after 3, 2 and 4 days of cultivation, respectively). Besides this, *Sch. commune* demonstrate similar antifungal activities in the presence of glucose, glycerol, maltose, mannitol, and xylose, and growth inhibition of *Fusarium* ranged in 41 % - 49 % during 6 days of cultivation. Inhibition of *Aspergillus* growth inhibition varied in 27 % - 36 %, and inhibition of *G. bidwellii* was in the range 49 % - 61 %, respectively. *Sch. commune* under solid-state fermentation of mandarin peels at 13 days of cultivation demonstrates powerful growth inhibition of pathogenic fungi (growth inhibition: *Aspergillus* - 50 %, *Fusarium* - 61 %, *G. bidwellii* - 68 %, after 3, 4, and 4 days of cultivation, respectively) as well as at 20 days old mushroom (growth inhibition: *Aspergillus* - 41 %, *Fusarium* - 54 %, *G. bidwellii* - 66 %, after 3 days of cultivation). It was established that *Sch. commune* was effective as a producer of antifungal compounds in submerged as well as in solid-state fermentation. Finally, performed study confirms that the higher basidiomycetes possess antifungal potential, which strongly depends on the physiological factors of growth. Acknowledgments: The work was implemented with the financial support of fundamental science project FR-19-3719 by the Shota Rustaveli National Science Foundation of Georgia.

Keywords : antifungal potential, higher basidiomycetes, pathogenic fungi, submerged and solid-state fermentation

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