FEASIBILITY OF USING USEFUL BACTERIA TO ENHANCE THE GROWTH OF EDIBLE MUSHROOMS UNDER DIFFERENT CLIMATIC CONDITIONS

By

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B.Sc. Agric. Sci. (Agric. Microbiology), Ain Shams University, 2003

M.Sc. Agric. Sc. (Agric. Microbiology), Ain Shams University, 2009

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ABSTRACT

Norhan Hassan Abd El-Aziz, "Feasibility of Using Beneficial Bacteria to Enhance Growth of Edible Mushrooms Under Different Climatic Conditions" Unpublished Ph.D. Thesis, Department of Agricultural Microbiology, Faculty of Agriculture, Ain Shams University, 2018.

Five different bacterial strains namely *Peanibacillus. polymyxa* (AT13), *Bacillus circulans* (SD6), *Bacillus megaterium* (PSB), *Azotobacter chrococcum* (A101) and *pseudomonas. fluorescens* (Ps1) were tested for their antagonistic activities against eight edible mushroom strains namely *Straphoria rugoso-annulate*, *Pleurotus sajor-caju*, *Auricularia*. sp, *Lentinula edodes*, *Vollvariella volvacea*. *Pleurotus eryngii*, *Pleurotus ostreatus* and *Pleurotus florida*. Most of the bacterial strains showed antagonistic, effects all the treatments except *Peanibacillus polymyxa* with *P. eryngii*, *P. ostreatus* and *Ps. fluorescens* with *P.florida* which revealed no antagonistic effects between each pair of them. Selected bacterial strains *Peani polymyxa* and *Ps. fluorescens* were examined for some biological activities such as nitrogenase activity, phosphate solubilization, potassium mobilization, production of indole acetic acid, gibberellic acid and cytokinins. The mycelial growth rate of three oyster mushroom strains namely *P. eryngii*, *P. ostreatus* and *P. florida* was examined on six different agar media to select the most suitable one. The mycelia growth of the tested oyster mushroom strains was examined at different pH values, temperatures and different levels of relative humidity on malt extract agar medium. The highest mycelial growth rate was obtained at 25°C and relative humidity of 65% after 6 days of incubation for the three tested oyster mushroom strains. Seven different cereal grains were tested for mushroom spawn production individually or in combinations (1:1). Millet and sorghum treatments showed highest mycelial growth for *P. florida*. Millet and yellow maize showed the best growth as combination treatment for *P. eryngii* and *P. florida*. Twelve different substrates were examined as growth substrates

for mycelial mushroom production. The best effects on mycelial growth were recorded with cottonseed cake followed by cotton seed hull for selected mushroom strains. Ammonium sulphate showed enhancement of mushroom mycelial growth as chemical additive at 0.5% for *P. eryngii* after12 days on cotton waste as growth substrate. Wheat bran showed the best effects on mycelial growth after 12 days from inoculation on cotton waste, cottonseed cake and corn cob at 20% of wheat bran. While *P. florida* showed the highest mycelial growth on cotton waste at 20% of wheat bran and on maize stalk and sugarcane bagasse at 30%. Biological additives were applied in spawn production stage and mycelial production stage at different levels of microbial inoculants. In spawn production, the best mycelial growth was recorded by adding 1ml of *Peani. polymyxa* on sorghum and millet + yellow maize after 12 days of inoculation for *P. eryngii*. In mycelial production stage, the best mycelial growth was recorded by adding 25% of *Peani. polymyxa* on cotton waste and cottonseed cake for *P. eryngii*. From the previous results all best treatments were applied in yield production stage and showed significant results on growth parameters (total yield, biological efficiency%, spawn run and primordia initiation) and chemical parameters (crude protein%, carbohydrate%, ash% and vitamin C mg/50g fruit bodies and crude fiber%) for selected mushroom strains.

Key words: Edible mushrooms fungi, biological activities, nutrient media, optimal conditions, mycelial growth, organic, chemical and biological additives, biological efficiency%.

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