Submerged Fermentation and Biological Activity of Tremella fuciformis and Antrodia cinnamomea Co-culture in Different Su

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ABSTRACT

Tremella fuciformis Berk, more commonly known as white fungus contains poLysaccharides with a variety of biological activities such as: anti-allergy, anti-tumor, and skin whitening. Antrodia cinnamomea, which is more commonly known as niu-chang-chih or chang-chih, also possesses a variety of biological activities, such as anti-tumor and anti-oxidation properties. According to the Literature, however, there has not been a study with Antrodia cinnamomea and Tremella fuciformis co-cultured. In this study, different Beansand Grains were used to explore the effects of T. fuciformis and A. cinnamomea cultured on the bioactive component. In this study, the first shake flask test of red beans, green beans, oatmeal and job ’ s tears were employed as extract mediums both separately and co-cultured and biological activity was measured. Other variables that were explored were different temperatures, shock speed and feed rate difference. Finally, the optimal culture conditions were determined from the metabolites using an antioxidant test and from a HeLa anti-tumor test. The results show that to achieve higher biomass and intracellular polysaccharide production in the shake flask experiment the green bean extract provided the best yield among the single cultures (4.35mg/mL, 1.38mg/mL). The optimal temperatures and shock speed were 25°C and 180rpm respectively; they were found to produce a high biomass and greater intracellular polysaccharide and crude triterpenoid production. In terms of feed rate difference a higher biomass and intracellular polysaccharide production was found at 2.0vvm (9.49mg/mL, 1.8mg/mL, respectively) but in crude triterpenoids production there was no significant difference. Anti-oxidation was measured by determining the ferrous ion cheLating ability, the DPPH scavenging capacity and the reducing capacity concentration increase. The ferrous ion chelating ability of the methanol extract of mycelium when 10mg/mL was 66%. The DPPH scavenging ability was 40% of the concentration when 10mg/mL, and the reducing ability was 1.51 of the concentration when 10mg/mL. An MTT assay of HeLa cervical cancer cell in a hot water extract of mycelium and extracellular polysaccharides in a 24 hour period found no significant effects on HeLa cells. The reLative survival rates of cells after 48 hours and 72 hours decreased gradually, however. The results showed that when the concentration of hot water in the extract of mycelium was increased from 100 μg/mL to 500 μg/mL, a downward trend in cells ’ relative survival was found. Exopolysaccharides were also examined, and it was found when the concentration was 100 μg/mL the cells ’ relative survival rate would decline, but among concentrations of 300 μg/mL to 700 μg/mL the cells ’ survival rate would increase. Concentrations of 900 μg/mL to 1000 μg/mL aLso displayed a decreased cellular relative survival rate. The results show that in the co-cuLtured Antrodia cinnamomea, polysaccharides and triterpenoids increase, an antioxidant capacity was found as well as the phenomenon of inhibition of HeLa cells. In the future, further research is warranted to study its specific immune activity in order to enhance its use in health food products.

Keywords : Tremella fuciformis、Antrodia cinnamomea、co-culture、biological activity

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