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Optimization of submerged culture conditions for the production of mycelial biomass and immunostimulatory polysaccharides from the fungus *Ganoderma lucidum*

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The medicinal mushroom *Ganoderma lucidum* (Ling Zhi or Reishi) is a basidiomycete white rot macrofungus which has been recognized as a medicinal mushroom for over 2000 years. *Ganoderma lucidum* is a source of polysaccharides with immunostimulatory, anticancer, hypocholesterolemic, hypoglycemic and other bioactive properties and is used in the treatment of several diseases. The primary objective of this study was to investigate the effect of different bioprocess conditions (pH, agitation, medium composition etc) on the production of *G. lucidum* biomass, extracellular polysaccharides (EPS) and intracellular polysaccharides (IPS) in submerged cultures. Also, mycelium morphology was analyzed through image analysis software and parameters such as pellet/hyphae formation, density, perimeter, roundness, length and width were studied in order to clarify how they may influence biomass, EPS and IPS accumulation in submerged cultures. A low agitation rate (e.g., 150 rpm) was preferable for biomass production and polysaccharide synthesis while the addition of organic nitrogen (peptone) increased biomass and IPS concentration in comparison to the use of ammonium salts. In addition, a medium with pH 5 was the most favorable for IPS and EPS production. Changes in mycelium morphology and EPS, IPS production were observed when *Ganoderma lucidum* was grown at different pH conditions (4.5, 5.0, 5.5 and 6.0). Based on the morphological observations we concluded that increased density values from 2th to 4th and 6th days improved IPS production while a significant reduction in density values was correlated with high EPS production which was observed from the 9th to the 18th day of fermentation.

Biography

Aris Miron is an Undergraduate Student from Technological Educational Institute of Thessaly, Department of Food Science and Technology. His final year dissertation is on the physiological studies and bioprocess optimization for polysaccharide production by *Ganoderma lucidum* was carried out and successfully completed at the Lab of Food Microbiology and Biotechnology (from January 2014 till April 2015) under the supervision of Dr Ioannis Giavasis, who is Assistant Professor in Food Microbiology & Biotechnology.

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