

Characterization and optimization of schizophyllan production from date syrup

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Abstract

This study demonstrates the efficient utilization of low-cost agricultural substrates, particularly date syrup, by *Schizophyllum commune* ATCC 38548 for schizophyllan production. Initially, one factor-at-a-time method was used to find the best carbon and nitrogen sources for schizophyllan production. Subsequently, response surface methodology was employed to optimize the level of culture medium components to maximize substrate conversion yield and schizophyllan production in submerged culture. Maximum product yield (0.12 g schizophyllan/g date syrup) and schizophyllan production (8.5 g/l) were obtained at concentrations of date syrup and corn steep liquor, inoculum size and agitation rate at 7.02 %w/v, 0.10 %w/v, 7.68 %v/v and 181 rpm, respectively. Sugar composition analysis, FTIR, NMR and molar mass determination revealed the purity and molecular properties of recovered schizophyllan produced from date syrup as glycosidic linkage analysis showed three main schizophyllan characteristic peaks arising from the 3-linked, 3,6-linked and terminal glucose residues. Finally, process economic analysis suggested that use of date syrup and corn steep liquor as nutrients would result in approximately 6-fold reduction in cost of raw materials for schizophyllan production as compared to conventional carbon and nitrogen sources such as sucrose and malt extract.

Keywords: Schizophyllan, *Schizophyllum commune*, Low-cost agricultural substrates.