

TITLE: EXTRACTION, CHARACTERIZATION, ANTIOXIDANT ACTIVITY AND THE INHIBITORY CAPACITY OF THE α -AMYLASE OF POLYSACCHARIDES OBTAINED FROM *Aspergillus niger* ATCC1004

AUTHORS: MENDES, T.P.S.¹; CEDRO, P.E.P.¹; SANTANA, R.A.¹; SANTOS, E.G.¹; NASCIMENTO JUNIOR, B.B.¹; COSTA, G.M.¹; NADER, H.B.²; VALASQUES JÚNIOR, G.L.¹

INSTITUTION: ¹UNIVERSIDADE ESTADUAL DO SUDOESTE DA BAHIA, BAHIA, BA (AV. JOSÉ MOREIRA SOBRINHO, S/N - JEQUIEZINHO, CEP 45205-490, JEQUIÉ - BA, BRAZIL)

²UNIVERSIDADE FEDERAL DE SÃO PAULO, SÃO PAULO, SP (RUA TRÊS DE MAIO,100- 4º ANDAR, VILA CLEMENTINO, CEP 04044-020 - SÃO PAULO, SP - BRAZIL)

ABSTRACT:

The *Aspergillus niger* is a known species of substantial commercial value easily found in various environments throughout the planet and it grows within a wide range of pH and temperature. This species is composed of long cellular filaments and a cell wall consisting of polysaccharides, for such reasons it has been used in biotechnology for several years. The present study aimed to optimize the extraction, chemical characterization and assessment of the antioxidant capacity and inhibition of the α -amylase enzyme of the cell wall of polysaccharides obtained from the *Aspergillus niger* ATCC1004. The dry biomass was subjected to thermal treatment in alkaline solution after fermentation. The biopolymers dissolved in this solution were precipitated after three volumes of absolute ethanol were added to the supernatant. The functional groups, affiliation types and monomeric polysaccharides were constructed using Infrared Spectroscopy (FT-IR), Nuclear Magnetic Resonance (NMR) of Hydrogen and Carbon as well as High Performance Liquid Chromatography (HPLC). The evaluation of the enzymatic inhibition was performed with porcine α -amylase and the antioxidant activity of the sample was evaluated through two in vitro tests, which evaluated the ability to eliminate free radicals from the 1,1-diphenyl-2-picrylhydrazyl (DPPH), and 2,2-azino-bis(3-ethylbenzthiazoline-6-sulfonic acid) diammonium (ABTS+). Through the MSR the results of 13 and 180 minutes were found for the variables for pH and optimum extraction time, respectively. The chemical characterization allowed to predict that the polysaccharide in question is possibly a β -(1 \rightarrow 3)-(1 \rightarrow 6)-galactoglucan, very similar to the spectral profiles obtained from the analysis of other fungi. As a result of the radical scavenging assay, the observed EC50 value was 4.632 mg/mL and 3,765 mg/mL for DPPH and ABTS, respectively. The inhibitory activity for α -amylase was 53.7% for 2 mg/mL of polysaccharides. The *A. niger* cell wall polysaccharide seems to be a promising source in the application as an antioxidant and it has additionally a hypoglycemic potential.

Keywords: chemical characterization, free radicals, response surface methodology

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