Título: CHARACTERIZATION OF BACTERIAL CELLULOSE MEMBRANES WITH HYALURONIC ACID FROM CHICKEN CREST

Autores: Sabrina A. de Oliveira [1], Cesar Augusto Tischer [1] e Paula C. S. Faria Tischer[1]

Instituição: [1]Universidade Estadual de Londrina (Rodovia Celso Garcia Cid - PR 445 Km 380, s/n - Campus Universitário, Londrina - PR, 86057-970).

Abstract:

The bacterial cellulose, from *Glucanoacetobacter xylinum*, is a biofilm of higher crystallinity that can be used for therapeutic purposes, as ensuring proper wound healing. Hyaluronic acid (HA) is a constitutive polysaccharide found in tissues, such as skin and conjunctive, playing an important role in filling these, associating with the proteins. Considering the importance of the biopolymers, in this study cellulose membranes were produced with HA isolated from chicken crest. For isolation of HA, chicken crest were grounded and submitted to enzymatic digestion, followed by extraction with anionic resin, treatment with salts and ethanol precipitation. The isolated material was characterized and compared to a standard commercial HA (SIGMA) through spectra of FT-IR, CP/MAS ^{13}C NMR and degradation temperature by thermogravimetry. Cellulose membranes were produced in glucose medium under static conditions, and the HA was added during the fermentation process: on the first day (CBHAT0) and third day (CBHAT3). For the characterization of the membranes were carried out solid-state ^{13}C NMR spectroscopy and in infrared, thermogravimetry and atomic force microscopy. The results of the modified membranes (CBHAT0 and CBHAT3) were compared with the native membrane (CB). The presence of HA isolated in the cellulose membranes was proved by FT-IR. It was observed in the FT-IR spectra from the O-H and N-H band at 3360 cm^{-1}, C-O band at about 1650 cm^{-1}, and at about 1427 cm^{-1}, 1317 cm^{-1} and 1289 cm^{-1} bands characteristic of the amide I, II and III respectively. Signals from HA can be seen, the carbonyl at 173,21ppm, C2 N-acetylated at 55,57 ppm and the methyl group of the acetamide at 23,46 ppm spectra in the solid-state ^{13}C NMR of membranes modified, and both showed signs of the peptide chain, possibly Arg-Gly-Asp. Thermograms of CBHAT0 and CBHAT3 showed two points of degradation temperature, the first signal related HA with temperatures around 277ºC and the second signal related bacterial cellulose, where the CB showed degradation temperature below the modified membranes. The comparison of the AFM images of native and modified membranes reveals a change in surface morphology of membranes with the addition of HA, checking incorporation of HA in cellulose fibrils, generating an increase in the roughness CBHAT3. Based on the results achieved were considered that the time of addition of HA isolated in the fermentation process influences the properties of produced membranes.

Palavras-chaves: bacterial cellulose; hyaluronic acid; enzymatic digestion

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