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Carlos Molina-Ramírez, Carla Enciso, Mabel Torres-Taborda, Robin Zuluaga, Piedad Gañán, Orlando J. Rojas, Cristina Castro

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Effects of Alternative Energy Sources on Bacterial Cellulose Characteristics produced by *Komagataeibacter medellinensis*

Carlos Molina-Ramírez[1,*‡], Carla Enciso[2‡], Mabel Torres-Taborda[1], Robin Zuluaga[2], Piedad Gañán[1], Orlando J. Rojas[3] and Cristina Castro[4]

1 Facultad de Ingeniería Química; Universidad Pontificia Bolivariana; Circular 1°, No 70-01, Medellín 050031, Colombia
2 Departamento de Desarrollo e Innovación; Nutreo; Parque empresarial Multicentro, Bodega 9-10, Rionegro, Colombia
3 Facultad de Ingeniería Agroindustrial; Universidad Pontificia Bolivariana; Circular 1°, No 70-01, Medellín 050031, Colombia
4 Biobased Colloids and Materials Group (BiCMat), Department of Bioproducts and Biosystems, Aalto University, School of Chemical Engineering, Espoo 02150, Finland
5 Facultad de Ingeniería Textil; Universidad Pontificia Bolivariana; Circular 1°, No 70-01, Medellín 050031, Colombia
* Correspondence: carlosan.molina@upb.edu.co
‡ These authors contributed equally to this work.

Abstract

Bacterial cellulose (BC) was produced by *Komagataeibacter medellinensis* using Hestrin and Schramm modified medium in the presence of alternative energy sources (AES), such as ethanol and acetic acid, to explore the effect of AES on the characteristics and properties of the resulting BC. In this study, the physicochemical and structural characteristics of the obtained BC were determined using Fourier-transform infrared spectroscopy, X-ray diffraction spectrometry, thermogravimetric analysis, and mechanical testing analysis. Ethanol and acetic acid (at 0.1 wt%) were proven to improve the BC yield by *K. medellinensis* by 279% and 222%, respectively. However, the crystallinity index (%), the degree of polymerization, and maximum rate of degradation temperatures decreased by 9.2%, 36%, and 4.96%, respectively, by the addition of ethanol and by 7.2%, 27%, and 4.21%, respectively, by the addition of acetic acid.

The significance of this work, lies on the fact that there is not any report about how BC properties change when substances like ethanol or acetic acid are added to culture medium, and which is the mechanism that provokes those changes, that in our case we could