

Synthesis and characterization of bio-cellulose produced by cell-free system

Muhammad Wajid Ullah¹, Shaukat Khan¹, 김예지¹,
Mazhar Ul-Islam^{1,2}, 장재현¹, 노태용¹, 박중곤^{1,†}

¹경북대학교; ²Department of Chemical Engineering, College of Engineering, Dhofar
University
(parkjk@knu.ac.kr[†])

Microbial cellulose is produced by a class of acetic acid bacteria. It possesses unique structural features such as high crystallinity, tensile strength, ultrafine fiber network, and moldability into three dimensional structures, and physiological properties such as high water holding capacity and slow water release rate that bestow it extra advantages over plant cellulose. Recently, the cell-free technology has received immense consideration for synthesis of various bioproducts. In the current study, we have developed a *Gluconacetobacter hansenii* PJK based cell-free system for bio-cellulose synthesis. The system successfully produced bio-cellulose which was characterized for its structural, physico-mechanical and thermal properties. All the characteristic features of bio-cellulose were comparable to microbial cellulose. The developed system could effectively address the limitations associated with microbial cellulose production and produced bio-cellulose could be potentially used as a substitute for microbial cellulose for various applications.