World Academy of Science, Engineering and Technology
International Journal of Biotechnology and Bioengineering
Vol:10, No:02, 2016

Bacterial Cellulose: A New Generation Antimicrobial Wound Dressing Biomaterial

Authors : Bhavana V. Mohite, Satish V. Patil

Abstract : Bacterial cellulose (BC) is an alternative for plant cellulose (PC) that prevents global warming leads to preservation of nature. Although PC and BC have the same chemical structure, BC is superior with its properties like its size, purity, porosity, degree of polymerization, crystallinity and water holding capacity, thermal stability etc. On this background the present study focus production and applications of BC as antimicrobial wound dressing material. BC was produced by Gluconoacetobacter hansenii (strain NCIM 2529) under shaking condition and statistically enhanced upto 7.2 g/l from 3.0 g/l. BC was analyzed for its physico mechanical, structural and thermal characteristics. BC produced at shaking condition exhibits more suitable properties in support to its high performance applications. The potential of nano silver impregnated BC was determined for sustained release modern antimicrobial wound dressing material by swelling ratio, mechanical properties and antimicrobial activity against Staphylococcus aureus. BC in nanocomposite form with other synthetic polymer like PVA shows improvement in its properties such as swelling ratio (757% to 979%) and sustainable release of antibacterial agent. The high drug loading and release potential of BC was evidenced in support to its nature as antimicrobial wound dressing material. The nontoxic biocompatible nature of BC was confirmed by MTT assay on human epidermal cells with 90% cell viability that allows its application as a regenerative biomaterial. Thus, BC as a promising new generation antimicrobial wound dressing material was projected.

Keywords : agitated culture, biopolymer, gluconoacetobacter hansenii, nanocomposite
Conference Title : ICBN 2016 : International Conference on Biotechnology and Nanotechnology
Conference Location : Paris, France
Conference Dates : February 22-23, 2016