

ABSTRACT

*This research examines a serious issue faced by Diabetes Mellitus patients, particularly related to difficult-to-heal neuroischemic wounds that have the potential to cause serious complications. These wounds are characterized by tissue necrosis and impaired blood flow. Therefore, the development of an effective wound dressing is imperative in the management of wounds in Diabetes mellitus patients, serving as a physical barrier to protect the wound from bacterial contamination and creating an optimal environment for healing. The study involves the synthesis of a biocomposite by combining bacterial cellulose, chitosan, and glycerol. Bacterial cellulose is synthesized through the cultivation of *Acetobacter xylinum* bacteria in coconut water and dried using an oven at 60°C. Composite formation is carried out by immersing the bacterial cellulose pellicle in chitosan solutions with varying concentrations (1% w/v, 3% w/v, and 5% w/v). After immersion, the biocomposite samples are air-dried at room temperature in an incubator. Characterization includes the use of FTIR, tensile strength testing, morphology examination with Scanning Electron Microscope (SEM), and swelling tests. FTIR analysis reveals the presence of amino groups in chitosan. Tensile strength measurements indicate varying tensile strength and elongation for each sample: control (10.92MPa & 25.7%), BC-1% chitosan (12.13MPa & 43%), BC-3% chitosan (14.95MPa & 32.5%), and BC-5% chitosan (21.90MPa & 32%). Swelling ratios for control (127%), BC-1% chitosan (215%), BC-3% chitosan (187%), and BC-5% chitosan (194%). Through SEM tests, it was discovered that the membrane thickness reached 214.8 µm, with an optimal pore size between 76.1 to 202.9 µm. The test results show the BC-1% chitosan variation as the best because of the highest elongation value and the best swelling or swelling test. Overall, this characterization supports the conclusion that the bacterial cellulose-chitosan and glycerol biocomposite has potential as a wound dressing for neuroischemic wounds in diabetes mellitus sufferers.*

Keywords: *Diabetes mellitus, Chitosan, Glycerol, Bacterial cellulose and Wound dressing.*