



BACTERIAL CELLULOSE PRODUCTION FROM OIL PALM FROND JUICE AND ITS IMPREGNATION WITH SILVER NANOPARTICLES FOR ANTIBACTERIAL WOUND DRESSING

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Abstract	<p>Bacterial cellulose-silver nanoparticles (BC-AgNPs) composite was prepared for a bacterial wound dressing. The oil palm frond (OPF) juice was utilised as a low-cost raw material for BC production. The AgNPs were incorporated in the BC composite by thermal reduction of 1 mM silver nitrate for their antibacterial agent. The BC-AgNPs composite had dense nanofibrils with an average diameter of 61.5 +/- 1.0 nm as shown in the field emission scanning electron microscope (FESEM) images. The composite had a crystallinity index of 86.5% and the nanoparticles had a face-centred cubic geometry with a crystal size of 26.5 nm as determined by X-ray diffraction analysis (XRD). The Ag content was 1.463 mg/100 cm2 in the composite analysed by atomic absorption spectrophotometry (AAS).10.4% of the total Ag content was released from AgNPs in 72 hr as measured by inductively coupled plasma mass spectrometry (ICP-MS). The composite also demonstrated excellent antibacterial action against Staphylococcus aureus, giving a 29 +/- 0.8 mm inhibition zone by the disk diffusion assay. Pure BC composite exhibited no cytotoxicity effect on the HSF1184 fibroblast cells and 10%-40% BC-AgNPs composite extracts were compatible with the cell growth. The study suggests the BCaAgNPs composite is a good material for antibacterial wound dressing.</p>
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