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Characterization of bacterial cellulose produced from agricultural by-product by *Gluconacetobacter* strains

Bacterial cellulose (BC) is well known as natural biomaterial exhibiting a broad applications. In this study, in order to obtain the BC with low-cost production, isolation and characterization the newly isolates from the fermented products was carried out by using non-detoxified crude glycerol derived from biodiesel processing as sole carbon source. Based on 16S rRNA, *Gluconaceter xylinum* NKC19 was isolated and identified with the highest BC production of 12.31 g/l of dried weight BC by using 1% (w/v) of crude glycerol. Increasing of crude glycerol led the production decreased suggesting that the impurities in crude glycerol might affect the cell activity. The optimal BC production was found at acidic pH and yeast extract was favorable nitrogen source. Addition of pineapple peel extract by hot water into crude glycerol without any supplementation could improve BC production. The structural and morphological properties analyzed by X-ray diffraction (XRD) and scanning electron microscope (SEM) showed similar to that of produced from the other commercial sugars, glucose and glycerol as carbon source. This study demonstrated that utilization of the by-products from biodiesel industry and agriculture could be used as the sole source of nutrient for production of BC, being a potential biomaterial and applicable to other materials.

Keywords: bacterial cellulose, crude glycerol, biodiesel, agricultural by-product

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