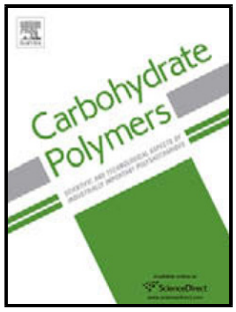

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PII: S0144-8617(18)30681-7
DOI: https://doi.org/10.1016/j.carbpol.2018.06.026
Reference: CARP 13700

To appear in:

Received date: 4-3-2018
Revised date: 7-5-2018
Accepted date: 5-6-2018

Please cite this article as: Tian D, Shen F, Hu J, Renneckar S, Saddler JN, Enhancing bacterial cellulose production *via* adding mesoporous halloysite nanotubes in the culture medium, *Carbohydrate Polymers* (2018), https://doi.org/10.1016/j.carbpol.2018.06.026

Enhancing bacterial cellulose production *via* adding mesoporous halloysite nanotubes in the culture medium

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Highlights

- Enhanced bacterial cellulose productivity via adding mesoporous halloysite nanotube
- Cell immobilization of halloysite nanotube enhanced the activity of bacterial cells
- Oxygen release of halloysite nanotube overcome wall-effect of cellulose production
- Bacterial cellulose exhibited negligible content of halloysite after washing
- Bacterial cellulose synthesized with halloysite showed higher porosity

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Abstract

Although bacterial cellulose (BC) is a fascinating, highly pure cellulose material for various downstream applications, production has been challenged by its low productivity. This work reported a facile route to significantly enhance BC yield without compromising its structural advantages *via* adding mesoporous halloysite nanotubes (HNTs) in the culture medium at static cultivations. The BC productivity of *Gluconacetobacter xylinus* was increased from 2.2 to 5.9 g L^{-1} after 15 days of cultivation when 2 wt% of HNTs was added into the standard fructose medium. It appeared that the dual functionality of cell immobilization and oxygen release of the HNTs were responsible for enhancing the BC productivity. Moreover, the HNTs-resulted BC pellicle exhibited negligible content of HNTs contamination (~2 wt%),