



Lignin content analysis in oil palm frond juice base medium: effect on bacterial cellulose production by *Acetobacter xylinum* 0416

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Abstract Extensive work on bacterial cellulose (BC) cultivation is crucial in optimizing BC performance and versatility in application. Herein, this study aims to investigate the lignin content in oil palm frond (OPF) juice medium that could affect the BC production by *Acetobacter xylinum* 0416 in static culture. The effects of lignin content were observed by the performances of BC production from the raw and pre-treated OPF juice medium fermentation with Hestrin-Schramm (HS) medium as a point of comparison. The TAPPI methods analysis outlined up to 3.719 g/L of total lignin content in raw OPF juice and FTIR analysis depicted the functional group of a typical lignin compound, thus confirming its presence as a component inhibitor. The raw OPF

juice was further pre-treated using an alkaline precipitation method resulting in acid-insoluble lignin removal up to 75.47% of the total lignin content. The results revealed that the BC yield from the raw OPF juice fermentation was lower compared to the HS medium with dried BC content of 0.152 g/L and 2.52 g/L, respectively. The BC cultivation using the pre-treated OPF juice medium was improved as the BC yield significantly increased to 1.91 g/L. Therefore, a proper pre-treatment strategy on OPF juice medium for lignin content removal could improve the medium capability in BC cultivation for higher-scale production.

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