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PII: S0960-8524(17)30843-X
DOI: http://dx.doi.org/10.1016/j.biortech.2017.05.175
Reference: BITE 18201

To appear in: *Bioresource Technology*

Received Date: 12 March 2017
Revised Date: 26 May 2017
Accepted Date: 27 May 2017

Please cite this article as: Eliseus, A., Bilad, M.R., Nordin, N.A.H.M., Putra, Z.A., Wirzal, M.D.H., Tilted membrane panel: a new module concept to maximize the impact of air bubbles for membrane fouling control in microalgae harvesting, *Bioresource Technology* (2017), doi: http://dx.doi.org/10.1016/j.biortech.2017.05.175

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Abstract

Microalgae harvesting using membrane technology is challenging because of its high fouling propensity. As an established fouling mitigation technique, efficacy of air bubbles can be improved by maximizing the impact of shear-rates in scouring foulant. In this study, it is achieved by tilting the membrane panel. We investigate the effect of tilting angle, switching period as well as aeration rate during microalgal broth filtration. Results show that higher tilting angles (up to 20◦) improve permeability of up to 2.7 times of the vertical panel. In addition, operating a one-sided panel is better than a two-sided panel, in which the later involved switching mode. One-sided membrane panel only require a half of area, yet its performance is comparable with of a large-scale module. This tilted panel can lead to significant membrane cost reductions and eventually improves the competitiveness of membrane technology for microalgae harvesting application.

Keywords: tilted panel;microalgae harvesting;membrane photobioreactor; membrane fouling; air bubbles.