

Accepted Manuscript

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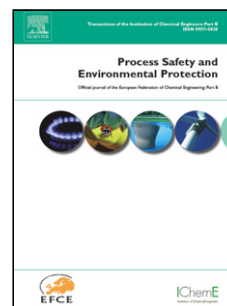
PII: S0957-5820(17)30186-6
DOI: <http://dx.doi.org/doi:10.1016/j.psep.2017.06.006>
Reference: PSEP 1086

To appear in: *Process Safety and Environment Protection*

Received date: 31-1-2017
Revised date: 1-4-2017
Accepted date: 6-6-2017

Please cite this article as: Priyadharshini, S.Dayana, Bakthavatsalam, A.K., Phycoremediation of phenolic effluent of a coal gasification plant by *Chlorella pyrenoidosa*. *Process Safety and Environment Protection* <http://dx.doi.org/10.1016/j.psep.2017.06.006>

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Phycoremediation of phenolic effluent of a coal gasification plant by *Chlorella pyrenoidosa*

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Highlights

- Degradation of coal gasification effluent by *C. pyrenoidosa*
- Cultivation of *C. pyrenoidosa* in high phenolic concentrations
- Experimentation conducted under ambient conditions
- 91% degradation of phenolic effluent with 20% concentration during 7 days treatment

Abstract

Batch experiments were carried out to investigate the degradation effect of *Chlorella pyrenoidosa* (KX686118) on the phenolic effluent of a Coal Gasification (CG) plant. The major pollutant present in the effluent is phenol (C_6H_5OH). The effect of *C. pyrenoidosa* on phenol degradation was analyzed by inoculating 1gram of wet biomass into four different phenolic effluent concentrations viz. 20, 40, 60 and 80% i.e. the total phenols concentration of 282 ± 1 , 564 ± 1.5 , 846 ± 2.2 and $1128 \pm 2 \text{mgL}^{-1}$ respectively. The experiments were performed under ambient temperature of $30 \pm 5^\circ\text{C}$ at pH 8.0. The results indicated that 1gram of wet biomass per Liter of effluent could degrade more than 90% of phenol and other contaminants, for effluent concentrations up to 60%. Bio kinetic coefficients viz., k -reaction rate constant and K_m -half-saturation constant were determined using Michaelis-Menten rate expression and found as $k = 50 \text{mg of phenol g}^{-1}(\text{algae})\text{day}^{-1}$, $K_m = 347 \text{mgL}^{-1}$. The highest carbon fixation rate of $0.25 \text{gL}^{-1} \text{day}^{-1}$ was obtained with a 60% effluent concentration.

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