Rasayan Journal of Chemistry • *Open Access* • Volume 14, Issue 1, Pages 254 - 260 • 2021

Document type
Article • *Bronze Open Access*

Source type
Journal

ISSN
09741496

DOI
10.31788/RJC.2021.1416087

External mass transfer model for degradation of simulated textile effluent in packed bed reactor

Rengadurai S.[a] ; Preetha B.[a]; Ashok Kumar A.[b]; Manikandan K.[a]; Elavarasan P.[a]

[a] Department of Chemical Engineering, Annamalai University, Annamalai nagar, Tamil nadu, 608002, India

[b] Department of Biotechnology, Periyar Maniammai Institute of Science and Technology, Vallam, Tamil nadu, 613403, India

Abstract

The present study includes the treatment of Simulated Textile Effluent (STE) with a white rot fungus Trametes hirsuta immobilized on Na-alginate mixtures, in a co-current upflow packed bed reactor. The mass transfer coefficients were calculated based on the findings of the present investigation on the degradation of STE. For STE degraded with Trametes hirsuta immobilized Na-alginate of different sizes of beads (0.2 cm, 0.5 cm and 0.8 cm), different concentration of STE (775, 1550, 2325 and 3100 mg/l of COD) and different flow rates (0.026, 0.057, 0,102, 0.204 and 0.408 cm^3 /s) were studied. A mass transfer model of the form $jD = K(Re')^{n-1}$ was produced with values of 'K' as 1.98, 1.35 and 1.22, the value of '(n-1)' was found to be – 0.28.

Author keywords

COD; CR; Degradation; RR111; RR251; STE; T.hirsuta

Sustainable Development Goals 2022 New

SciVal Topics

Metrics

References (22)

View in search results format >

All

CSV export | Print | E-mail | Save to PDF | Create bibliography

1 Lourenço, N.D., Novais, J.M., Pinheiro, H.M.
Kinetic studies of reactive azo dye decolorization in anaerobic/aerobic sequencing batch reactors
(2006) *Biotechnology Letters*, 28 (10), pp. 733-739. Cited 31 times.
doi: 10.1007/s10529-006-9051-5
View at Publisher

2 Yaseen, D.A., Scholz, M.
Textile dye wastewater characteristics and constituents of synthetic effluents: a critical review (Open Access)
(2019) *International Journal of Environmental Science and Technology*, 16 (2), pp. 1193-1226. Cited 752 times.
http://www.springerlink.com/content/1735-1472
doi: 10.1007/s13762-018-2130-z
View at Publisher

3 Rengadurai, S., Devanesan, M.G., Elavarasan, P., Riswanali, S. B.
(2020) *International Journal For Innovative Research In Multidisciplinary Field*, 14, p. 26.

4 Zaharia, C., Suteu, D., Muresan, A., Muresan, R., Popescu, A.
Textile wastewater treatment by homogeneous oxidation with hydrogen peroxide
(2009) *Environmental Engineering and Management Journal*, 8 (6), pp. 1359-1369. Cited 159 times.
www.eemj.eu
doi: 10.30638/eemj.2009.199
View at Publisher

5 Rengadurai, S., Preetha, B.
(2019) *American International Journal of Research in Sciences, Technology, Engineering and Mathematics*, p. 157.
Spl. Issue

6 Patel, U.D., Suresh, S.
Effects of solvent, pH, salts and resin fatty acids on the dechlorination of pentachlorophenol using magnesium-silver and magnesium-palladium bimetallic systems
(2008) *Journal of Hazardous Materials*, 156 (1-3), pp. 308-316. Cited 25 times.
doi: 10.1016/j.jhazmat.2007.12.021
View at Publisher