Advanced bamboo industry wastewater treatment through nanofiltration membrane technology

Donglei Wu¹*, Wei Wangª, Shaojun Chenª, Zhizhong Yangª, Guangming Tianª, Shams Ali Baigª, Qaisar Mahmoodb

¹Department of Environmental Engineering, College of Environmental and Resource, Zhejiang University, Hangzhou 310058, P.R. China
Tel. +86 571 88982050; Fax: +86 571 8838 8393; email: wudl@zju.edu.cn
²Department of Environmental Sciences, COMSATS University, Abbottabad, Pakistan

Received 7 March 2012; Accepted 22 October 2012

ABSTRACT

The present study reports the results of nanofiltration (NF) for treating COD, ammonium, color, and conductivity of bamboo industry wastewater (BIWW). The influence of operational parameters such as trans-membrane pressure (TMP), influent concentration, pH, permeate flux and operating temperature on the membrane rejection efficiencies were investigated. Molecular weight distribution (MWD) and gas chromatography–mass spectrometer (GC–MS) analyses were also performed in the study. Results demonstrated that the color obtained during rejection was higher than 99% regardless of any operating parameter. However, permeate flux, COD, ammonium, and conductivity rejections were affected by operational parameters’ discrepancies. The operational changes along with the polarization concentration and accumulative mass had mainly influenced the effluent water quality. The permeate flux was recorded higher than 40 L/m² h, while the TMP was around 7 bar. Moreover, during the experiment, 90, 84, and 83% rejection of COD, ammonium, and conductivity, respectively, were observed. MWD data indicated that the NF module effectively removed most of the macromolecular organics and GC–MS analysis revealed the majority of organic compounds in BIWW were rejected by NF membrane.

Keywords: BIWW; Nanofiltration; Permeate flux; Rejection; MWD; GC–MS

---

*Corresponding author.

Desalination and Water Treatment
www.deswater.com
doi: 10.1080/19443994.2012.749327

51 (2013) 3454–3462
April

Taylor & Francis
Taylor & Francis Group

Advanced bamboo industry wastewater treatment through nanofiltration membrane technology

Donglei Wu¹*, Wei Wangª, Shaojun Chenª, Zhizhong Yangª, Guangming Tianª, Shams Ali Baigª, Qaisar Mahmoodb

¹Department of Environmental Engineering, College of Environmental and Resource, Zhejiang University, Hangzhou 310058, P.R. China
Tel. +86 571 88982050; Fax: +86 571 8838 8393; email: wudl@zju.edu.cn
²Department of Environmental Sciences, COMSATS University, Abbottabad, Pakistan

Received 7 March 2012; Accepted 22 October 2012

ABSTRACT

The present study reports the results of nanofiltration (NF) for treating COD, ammonium, color, and conductivity of bamboo industry wastewater (BIWW). The influence of operational parameters such as trans-membrane pressure (TMP), influent concentration, pH, permeate flux and operating temperature on the membrane rejection efficiencies were investigated. Molecular weight distribution (MWD) and gas chromatography–mass spectrometer (GC–MS) analyses were also performed in the study. Results demonstrated that the color obtained during rejection was higher than 99% regardless of any operating parameter. However, permeate flux, COD, ammonium, and conductivity rejections were affected by operational parameters’ discrepancies. The operational changes along with the polarization concentration and accumulative mass had mainly influenced the effluent water quality. The permeate flux was recorded higher than 40 L/m² h, while the TMP was around 7 bar. Moreover, during the experiment, 90, 84, and 83% rejection of COD, ammonium, and conductivity, respectively, were observed. MWD data indicated that the NF module effectively removed most of the macromolecular organics and GC–MS analysis revealed the majority of organic compounds in BIWW were rejected by NF membrane.

Keywords: BIWW; Nanofiltration; Permeate flux; Rejection; MWD; GC–MS

---

*Corresponding author.

Desalination and Water Treatment
www.deswater.com
doi: 10.1080/19443994.2012.749327

51 (2013) 3454–3462
April

Taylor & Francis
Taylor & Francis Group