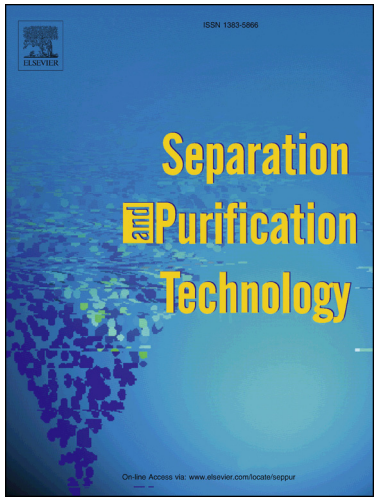

Assessment of the chemical stability of nanofiltration and reverse osmosis membranes employed in treatment of acid gold mining effluent

Bárbara C. Ricci, Carolina D. Ferreira, Larissa S. Marques, Sofia S. Martins, Beatriz G. Reis, Míriam C.S. Amaral

PII: S1383-5866(16)30739-0
DOI: http://dx.doi.org/10.1016/j.seppur.2016.11.007
Reference: SEPPUR 13340

To appear in: *Separation and Purification Technology*

Received Date: 14 June 2016
Revised Date: 5 November 2016
Accepted Date: 7 November 2016

Please cite this article as: B.C. Ricci, C.D. Ferreira, L.S. Marques, S.S. Martins, B.G. Reis, M.C.S. Amaral, Assessment of the chemical stability of nanofiltration and reverse osmosis membranes employed in treatment of acid gold mining effluent, *Separation and Purification Technology* (2016), doi: http://dx.doi.org/10.1016/j.seppur.2016.11.007

ASSESSMENT OF THE CHEMICAL STABILITY OF NANOFILTRATION AND REVERSE OSMOSIS MEMBRANES EMPLOYED IN TREATMENT OF ACID GOLD MINING EFFLUENT

Bárbara C. Ricci [a*]; Carolina D. Ferreira [a]; Larissa S. Marques[a]; Sofia S. Martins; Beatriz G. Reis [a]; Míriam C. S. Amaral[a]

[a]Department of Sanitary and Environmental Engineering - Federal University of Minas Gerais. P.O. Box 1294, ZIP 30.270-901, Belo Horizonte, MG, Brazil.

* ***Corresponding author:*** Tel.: +55 31 3409-3669; fax: +55 31 97166-1087. E-mail address: barbararicci.eq@gmail.com .

ABSTRACT

As reported in our previous work, the association of nanofiltration (NF) and reverse osmosis (RO) has proved to be a promising treatment for pressure oxidation process (POX) effluent, generated in gold ore processing. Despite the excellent performance achieved, it was essential to evaluate if the membrane performance could be impaired by continuous exposure to effluent. Accordingly, this study aimed to investigate the effect of continuous exposure to POX effluent on characteristics of nanofiltration (MPF-34) and reverse osmosis (TFC-HR) membranes, used in POX effluent treatment. The membranes were immersed in the effluent and in acid solutions in order to simulate the continuous exposure during the treatment. The effect of exposure on NF membrane was evaluated based on the rejections of glucose, magnesium sulfate, sulfuric acid, and cobalt and nickel sulfates. The effect of exposure on the RO membrane was evaluated by assay of the rejections of sodium chloride and sulfuric acid. For both membranes, the effects of the exposure on the hydraulic permeability, hydrophobicity, and chemical and morphological characteristics were also evaluated. For MPF-34, the cobalt and nickel rejection decreased by 33% during exposure period, indicating a reduction of the NF ability in separation of metals from acid solution. TFC-HR membrane exhibited satisfactory stability under the acidic conditions employed in this investigation, thus exhibiting potential for practical implementation.