



Fractionating natural organic matter and evaluating the fouling potentials of its components

Junxia Liu^{a,b,*}, Zhihong Wang^a, Huan He^b, Bingzhi Dong^{b,*}, Guicai Liu^b, Weiwei Huang^b, Yao Yu^b, Mengliu Hu^b

^aSchool of Civil and Transportation Engineering, Guangdong University of Technology, Guangzhou 510006, China, Tel. +86 20 39322515; Fax: +86 20 39322515; emails: whjunxia@163.com (J. Liu), wzhihong@gdut.edu.cn (Z. Wang)

^bState Key Laboratory of Pollution Control and Resource Reuse, School of Environmental Science and Engineering, Tongji University, Shanghai 200092, China, emails: dbz77@tongji.edu.cn (B. Dong), huanhe@uw.edu (H. He), tiger_517@126.com (G. Liu), hwswsx@163.com (W. Huang), 267280403@qq.com (Y. Yu), 925790813@qq.com (M. Hu)

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ABSTRACT

This study was to fractionate natural organic matter (NOM) and evaluate the fouling potentials of its components in a pilot-scale microfiltration process. NOM in the feed water was fractionated into strongly hydrophobic acids (SHA), weakly hydrophobic acids (WHA), charged hydrophilic acids and neutral hydrophilic acids (NEU) fractions by resin adsorption; each fraction was then subdivided into low molecular weight (<1 kDa; LMW), medium molecular weight (1–10 kDa; MMW) and high molecular weight (10–10³ kDa; HMW) components via high-performance size exclusion chromatography coupled with peak-fitting. Principal component analysis and Pearson correlation analysis demonstrated that hydraulically irreversible fouling index significantly correlated to NEU–MMW ($R^2 = 0.787$, p value = 0.001), SHA–LMW ($R^2 = 0.927$, p value < 0.0001) and WHA–LMW ($R^2 = 0.899$, p value < 0.0001). Fouling control strategy should be targeted at removing these foulants.

Keywords: MF; HIFI; MW distribution; Hydrophobicity

* Corresponding author.