ABSTRACT

This paper investigated the effect of various powdered activated carbon (PAC) pretreatment on ultrafiltration (UF) performance for the removal of natural organic matters (NOM) from Taihu Lake. The hydrophilicity/hydrophobicity and molecular weight (MW) distribution of NOM were analyzed to understand the correlation between PAC adsorption and NOM characteristics. Experimental results demonstrated that PAC addition into raw water could enhance NOM removal efficiency of UF, whereas PAC-NOM particles could increase the trans-membrane pressure slightly. PAC was able to adsorb organics with small MW while UF alone could retain large MW. Fractionation results showed that UF could retain strongly hydrophobic acids (SHA) and neutral hydrophilic compounds (NEU), both of which could also be removed by PAC absorption. Fluorescence excitation–emission matrix spectra showed that PAC pretreatment could decrease extracellular protein-like organics and soluble microbial products significantly from the raw water.

Keywords: Powdered activated carbon; Ultrafiltration; Adsorption; Molecular weight distribution; Fluorescence excitation–emission matrix spectra