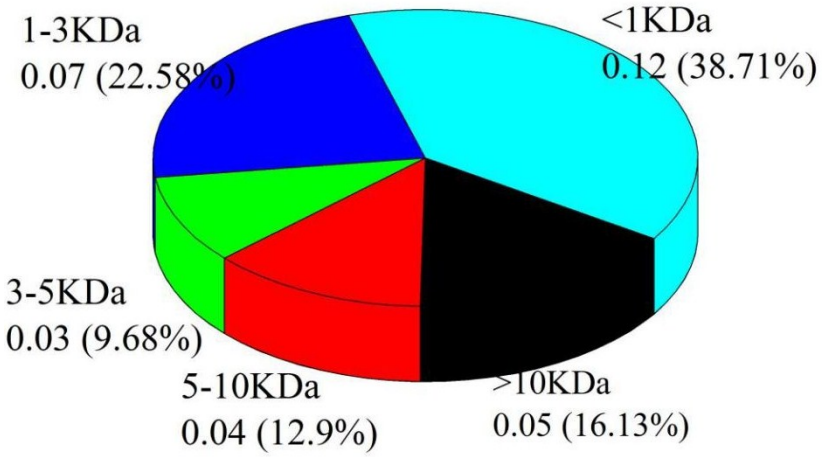
Supplementary data



FigS1.The result of molecular weight fractionation of dissolved organic nitrogen of raw water

The fractionation results of dissolved organic nitrogen by cellulose membranes are shown in **Fig.S1.**The organics nitrogen in portions of >10kDa,5-10kDa,3-5kDa,1-3kDa and<1kDa accounted16.13%,12.90%,9.68%,22.58% and 38.71% of total organics nitrogen in raw water,respectively.That is to say, the low molecular weight of organic nitrogen (<3kDa)accounted for more than 61%.This result of raw is similar to SFBW.

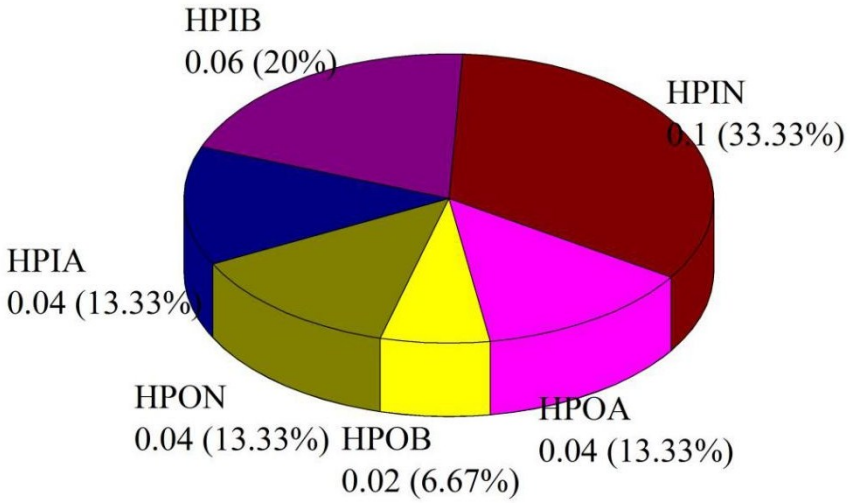
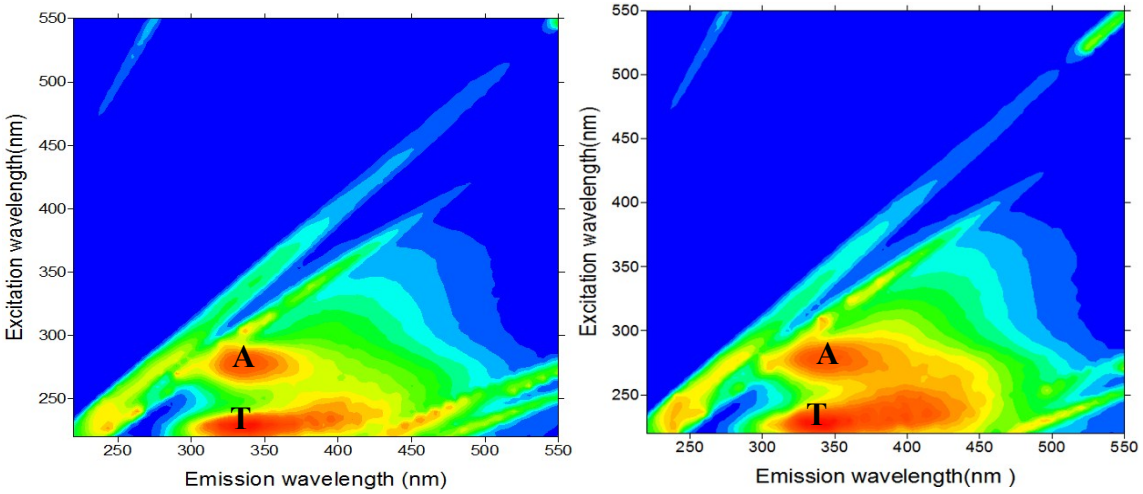


Fig.S2.The result of hydrophobic and hydrophilic fractionation of dissolved organic nitrogen of raw water

The fractionation results of dissolved organic nitrogen by resin are shown in **Fig.S2**.The organics nitrogen in portions of HPOA,HPOB,HPON,HPIA,HPIB,HPIN accounted13.33%,6.67%,13.33%, 13.33%,20%.33.33% respectively.In general,the hydrophilic fractionation of dissolved organic nitrogen accounted for 66.66%,it further prove that low molecular weight of dissolved organic

nitrogen generally is hydrophilic,And difficult to effectively remove by conventional water treatment technology.



Raw water SFBW

Fig S3.the fluorescence EEM spectra of raw water and FBWW

As prensent in **Fig S3**,It can be seen that the EEM spectra of tyrosine are characterized by a peakT at Ex/Em =230-240/320-340 nm and a peak A of SMPs are characterized at Ex/Em =270-280/320-340 nm in raw water and sand filter backwash water.The tyrosine was low molecular weight of organic nitrogen and the main precursors nitrogenous disinfection by-products.

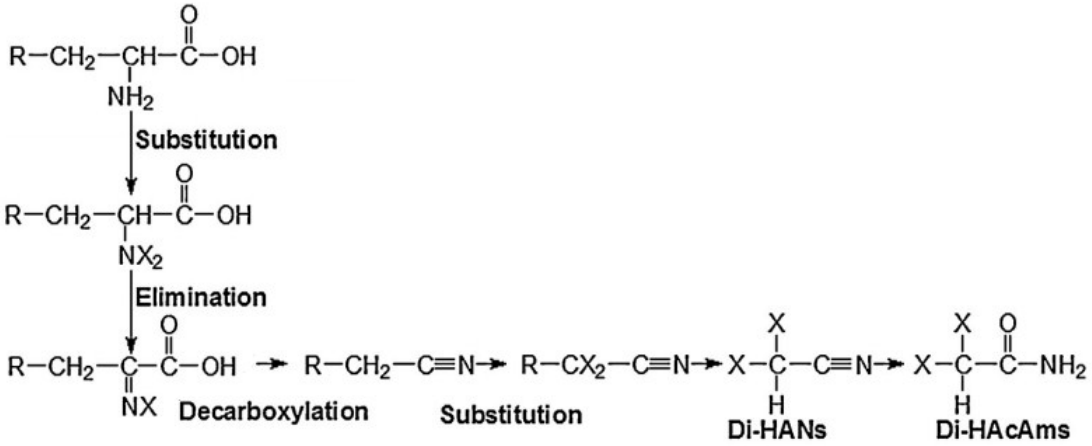


Fig.S4. Proposed formation pathways of di-HAcAms during chlorination

Chu et al(2010) speculate a proposed formation pathways(as shown in **Fig.S4**)of di-HAcAms during chlorination of amino acids by structural chemistry analysis method.