Cover Page for Supporting Information:

Factors Affecting N-nitrosodimethylamine (NDMA) Formation From polyDADMAC Degradation During Chloramination

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# Text S1. Materials

DMA hydrochloride (99%), Ammonium Chloride (99.5%), N, N-Diethyl-P-Phenylenediamine Sulfate (AR), potassium iodate (99.8%), potassium phosphate monobasic (99.5%), ethylenediamine tetraacetic acid disodium salt (99%), sodium acetate trihydrate (99%), sodium bicarbonate (99.5%), disodium hydrogenorthophosphate (99%), acetone (99.9%), benzenesulfonyl chloride (99%), potassium iodide (99.8%) were obtained from Kelong Chemical Industry. Sodium thiosulfate (99%), sodium hydroxide (96%), sodium hypochlorite (8.0-12.0%) and sodium bromide (99%) were purchased from Chongqing Boyi Chemical Industry. Sulfuric acid (95-98%) was obtained from Chongqing Chuandong Chemical Industry. Humic Acid (>70%) was purchased from Shanghai Yuanye Biological. Dichloromethane (99.9%) was obtained from TEDIA. Methanol (99.9%) was purchased from Fisher Scientific.

# Text 2. The process of jar test

Humic acid solution was prepared through following way: 1.0g humic acid was weighed and dissolved in 1000 ml 0.01 M NaOH solution for 24 h. The steps of jar test were: (1) polyDADMAC solution was added to the solution contained different concentration of humic acid or bromide in 1000 mL beakers; (2) stirred 2 min at 300 r/min (3) stirred 10 min at 70 r/min (4) settled for 30 min and supernatant was used to added performed monochloramine, buffered (10 mM phosphate buffer) at pH 7, and incubated in the dark at 25 °C for 24 h.

# Table S1 The factors and levels of orthogonal experimental design

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Factors | pH | Ammonia  (mg/L) | Bromide  (mM) | NOM (mg/L) | Monochloramine  (mg/L as Cl2/L) |
| Factor number | A | B | C | D | E |
| Level 1 | 5 | 0 | 0 | 0 | 2 |
| Level 2 | 6 | 0.1 | 0.05 | 0.25 | 4 |
| Level 3 | 7 | 0.4 | 0.1 | 0.5 | 6 |
| Level 4 | 8 | 1 | 0.2 | 1 | 8 |
| Level 5 | 9 | 1.5 | 0.3 | 2.5 | 10 |

# Table S2 The analysis of variance in orthogonal experiment

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Factor | Degree of Freedom | Critical Value of F-test | NDMA | | | DMA | |
| Sum of Deviation Squares | F Value | Sum of Deviation Squares | | F Value |
| pH | 4 | 6.39 | 1012069.50 | 7.92\* | 57.64 | | 7.92\* |
| Ammonia | 4 | 6.39 | 156517.27 | 1.23 | 70.68 | | 9.72\* |
| Bromide | 4 | 6.39 | 727761.02 | 5.70 | 66.95 | | 9.20\* |
| NOM | 4 | 6.39 | 336635.96 | 2.64 | 39.10 | | 5.37 |
| Monochloramine | 4 | 6.39 | 157204.96 | 1.23 | 46.79 | | 6.43\* |
| Error |  |  | 127714.14 |  | 7.28 | |  |

\* means significant factors

# Figure S1 **Chemical Structure of polyDADMAC**

../论文写作2/图/Figure1.pdf

# Figure S2 Chlorine residuals as functions of pH after 24 h of chloramination.



Chlorine residuals as functions of pH after 24 h of chloramination. Ten mg/L as active ingredient of polyDADMAC was reacted with 10 mg/L of Cl2/L of preformed monochloramine for 24h at 25 ℃ at pH 7 (10 mM phosphate buffer). Error bars represent one standard deviation of the measurement derived from the standard curve.