For research article

Response to Reviewer 1 Comments

1. Summary

We would like to thank the Editor and all reviewers for many constructive comments. We addressed the entire reviewer's concerns, revised the text, figures and SI accordingly, and double checked all technical and grammatical content to make sure they are accurate. We also made other changes to improve the manuscript as well. Please find the detailed responses below and the corresponding revisions highlighted changes in the re-submitted files.

In our response, each reviewer comment is listed in italicized font, followed by the authors' reply. We quote the changes in "blue font" in this reply. Changes shown in the manuscript are in blue font as well. The line numbers change in the revision. All updated line numbers are in red font in this reply.

2. Questions for General Evaluation	**Reviewer's Evaluation**	**Response and Revisions**
Does the introduction provide sufficient background and include all relevant references?	Can be improved	
Are all the cited references relevant to the research?	Yes/Can be improved/Must be improved/Not applicable	
Is the research design appropriate?	Can be improved	
Are the methods adequately described?	Can be improved	
Are the results clearly presented?	Must be improved	
Are the conclusions supported by the results?	Can be improved	

3. Point-by-point response to Comments and Suggestions for Authors

Comments 1: *While the authors establish background context by discussing the COVID-19 pandemic's effects on chlorine-based disinfectant usage, the introduction would benefit from a stronger articulation of the research objectives and its contributions to the field to help readers understand the research's novelty.*

Response 1: Thank you for this suggestion. We revised the introduction to more clearly articulate our research objectives and contributions to the field, and the following correction can be found in line 47-56.

"The potential impact of increased use of chlorine-containing disinfectants on drinking water safety and public health may have increased DBPs concentrations in water sources,

and further research is needed to assess and mitigate the risk. Considering the special conditions during the epidemic period, we assessed the change of DBPs by collecting and analyzing water samples during the epidemic period or studied the impact of high-concentration chlorine disinfectants on the formation of DBPs through simulation experiments, evaluated the impact of increased use of chlorine-containing disinfectants on the formation of DBPs under the epidemic conditions, and explored strategies to reduce the formation of DBPs. And provide a scientific basis for future public health emergencies."

Comments 2: *In this section, the authors should highlight how their research extends beyond existing studies and demonstrate the importance of DBPs research for both environmental protection and public health outcomes.*

Response 2: We sincerely thank this valuable feedback that we used to improve the quality of our manuscript. The following correction can be found in line 39-40 and line 79-83."… and have teratogenic, carcinogenic and mutagenic hazards "" We focused on typical DBPs and explored their generation and transformation mechanisms. Provided data and analysis to illustrate the rule of DBPs generation, and discussed specific strategies to improve public health by reducing DBPs exposure. To provide a theoretical basis for future research on the impact of various environmental factors on DBP generation."

Comments 3: *Despite incorporating multiple DBP studies, the literature review's organization could be improved. The previous research should be presented in a more organized manner, leading logically to the current study's objectives.*

Response 3: Thank you for your valuable suggestion. We improved the review's organization and reorganized the previous research.

Comments 4: *The justification for the chosen water sources (Yangtze River, Han River, Liangzi Lake) should be more explained.*

Response 4: We explained the justification for the chosen water sources (Yangtze River, Han River, Liangzi Lake). The following correction can be found in line 100-107" Liangzi Lake, the largest freshwater lake in Wuhan city, serves as a critical water resource for the region. Similarly, the Han River and Yangtze River, being the two most significant rivers through Wuhan City, play a vital role in the city's hydrological network. The selection of these three water sources for our study is predicated on their important connection to the potable water security of the Wuhan people. Given their significant role in urban water supply, an assessment of the drinking water safety parameters within these bodies of water is essential for understanding and ensuring the public health implications of water quality in Wuhan."

Comments 5: *The authors should better define acronyms and abbreviations upon first mention.*

Response 5: Thank you for pointing this out. We carefully modified all acronyms and abbreviations upon first mention.

Comments 6: *The authors should enhance the results section by including more comparative analysis with existing research and ensuring proper integration of all Figures and Tables. Ensure all figures and tables are well-referenced and sufficiently explained during the text.*

Response 6: We referenced the existing research and compared it with them. We made the following changes in line 397-400." The contrasting impact of the factors on TCM and TCAA in the Han River water source suggested that under certain conditions, the water quality could inhibit TCM generation when TCAA was generated in large quantities, while this

phenomenon didn't include effective chlorine concentrations of 5, 10, and 15 mg/L."
And we also provided a detailed explanation of the Figures and Tables in line 209-212.

Comments 7: ***Table 2*** *(Water Quality Indicators): The data is presented without explaining its relevance to DBP formation or how it supports this study.*

Response 7: Thank you for pointing this out. We added a detailed explanation below Table 2, explaining the direct relationship between each water quality indicator and DBPs formation in line 203-205." During the generation of DBPs, pH、EC, DO、COD、UV_{254}、SUV_{254}, and temperature may be directly related to the conversion and the rate of DBPs, while DO、TN、NH_4^+、DOC indirectly indicate the precursor of DBPs."

Comments 8: *For example,* ***Figure 3*** *(Reaction Time on DBPs Generation) - "The results indicated that TCM and TCAA were the main DBPs generated in the water sources of Liangzi Lake, Han River, and Yangtze River. Overall, the TCM content in the water samples from all three sources showed an increasing trend over time."*

The reviewer suggests after stating the increase of TCM, the authors could add: "This suggests that as the reaction time progresses, more trihalomethanes (THMs) form, which aligns with previous studies showing that prolonged chlorination promotes THM generation. However, the lower TCM levels in the Han River compared to Liangzi Lake may indicate the presence of other factors limiting its formation, such as the water's organic matter content or lower precursor availability ….."

Response 8: Thank you for your valuable suggestion. We made the following changes in line 287-294." This suggests that as the reaction time progresses, more trihalomethanes (THMs) form, which aligns with previous studies showing that prolonged chlorination promotes THM generation. However, the lower TCM levels in the Han River compared to Liangzi Lake may indicate the presence of other factors limiting its formation, such as the water's organic matter content or lower precursor availability. These factors may affect the generation of THMs and are worth further exploration in future research."

Comments 9: ***Section 3.2*** *(Correlation Analysis of DBPs and Water Quality Indicators): Why is this correlation important in the context of DBP formation and how is it tied to the study's overall goal?*

Response 9: Thank you for pointing this out. Correlation analysis is crucial for understanding the formation mechanism of DBPs. By identifying and quantifying the correlation between DBPs and water quality indicators, we can better understand which water quality parameters are the main driving factors for DBPs formation. By identifying these parameters, we can more accurately adjust the water treatment process to reduce the generation of DBPs, thereby protecting drinking water safety.

Comments 10: *To improve data interpretation, the authors should enhance the labeling and expand the captions of several figures, especially Figures 2 and 3. This would allow readers to understand the data without constantly referring to the main text for explanation.*

Response 10: We redesigned the labeling of Figures 2 and 3, and added the following items to facilitate readers' reading in line 250-251 and line 255-259." The larger the circle, the stronger the correlation, while the smaller the circle, the weaker the correlation."" Variables with arrows pointing in the same direction have a positive correlation on principal components, while variables pointing in the opposite direction have a negative correlation. The length of the arrow represents the variance contribution of the variable, and the longer

the length, the greater the explanatory power of the variable on the principal component."

Comments 11: *It provides a good summary of results, but the authors should outline how their findings could influence water treatment practices and identify areas requiring further investigation.*

Response 11: Thank you for your valuable suggestion. We added a conclusion section detailing how our research findings can provide guidance for water treatment practice and identify areas requiring further investigation in line 420-425." With previous research, We should reduce chlorination time, control the dosage of chlorinated disinfectants, and select the optimal conditions for four environmental factors in actual water treatment practices. Later, we can further investigate the optimal concentrations of chlorinated disinfectants and four environmental factors for reducing the generation of DBPs, and study the transformation mechanism of organic acids and humic substances in the system through fluorescence PCR technology and other methods."

Comments 12: *The authors need to review the entire manuscript to address grammar and punctuation inconsistencies.*

Response 12: We used Grammarly to assist in detecting and correcting grammar and punctuation errors.

Comments 13: *Ensure that all references are the most recent and relevant to the arguments in the paper.*

Response 13: Thank you for pointing this out. We carefully checked the references to make them the most recent and relevant to the arguments in the paper.

4. Response to Comments on the Quality of English Language

Point 1: *The quality of English does not limit my understanding of the research.*

Response 1: Thanks for your review of our paper and your valuable comments, we still use Grammarly to refine the grammar to ensure more accuracy and professionalism.