Reviewer Comments:

Reviewer

Thank you very much for your careful review of our manuscripts and constructive suggestions. We use black text to mark your questions. The content of our answers to your questions is marked with blue text. The place where the article content is modified is marked with red text.

1. The abstract should be rewritten; it should include the most important results and should summarize the experiment done.

Response 1:

Dear Reviewer,

Thank you very much for your careful review of our manuscripts and constructive suggestions. According to your suggestion, we have rewritten the abstract. And in the manuscript made a corresponding modification. Our changes to the content of the article are marked in red text.

Line:10-25

Optimal plant growth in many species is achieved when the two major forms of N are supplied at a particular ratio. The study investigated optimal nitrogen forms and ratios for tomato growth using the 'Jingfan 502' tomato variety. Thirteen treatments were applied with varying proportions of nitrate nitrogen (NN), ammonium nitrogen (AN), and urea nitrogen (UN). Results revealed that the combination of AN and UN inhibited tomato growth and photosynthetic capacity. Conversely, the joint application of NN and UN, NN and AN led to a significant enhancement in tomato plant growth. Notably, T12 and T4 treatments significantly increased the gas exchange and chlorophyll fluorescence parameters, thereby promoting the accumulation of photosynthetic products. The contents of fructose, glucose and sucrose were significantly increased by 121.07%, 206.26%, 94.64% and 104.39%, 156.42%, 61.40%, respectively, compared with that in the control. Additionally, AN favored starch accumulation, while NN and UN favored fructose, sucrose, and glucose accumulation. Gene expression related to nitrogen and sugar metabolism increased significantly in T12 and T4, with T12 showing greater upregulation. Key

enzyme activity in metabolism also increased notably. In summary, T12 enhanced tomato growth by upregulating gene expression, increasing enzyme activity, and boosting photosynthesis and sugar accumulation. Growers should consider using NN and UN to reduce AN application in tomato fertilization.

2. References should be provided for the methods used.

Response 2：

Dear Reviewer,

Thank you very much for your comments. According to your suggestions, we have reprovided the corresponding references for the methods used in the manuscript, and made corresponding modifications in the manuscript.

We have added references for gas exchange parameters (Line:208. References: 24.) Chlorophyll fluorescence parameters (Line: 214. References: 25,26 and 27.), Total soluble sugar (Line:221-223. References: 28.) determination methods.

3. Figures 3 and 4 should be revised for their numbering and their appearance in the text.

Response 3：

Dear Reviewer,

Thank you very much for your suggestion. We have changed the order of Figure 4 and Figure 3 in the manuscript. And in the manuscript also made a corresponding modification.

Line:349-388

4. Language and grammar need minor revision.

Response 4：

Dear Reviewer,

Thank you for your comments. According to your suggestions, our manuscripts have been handed over to professional institutions for English quality polishing.

5. In the materials section: The sources of N different form should be provided. Reference to the recommended doses of fertilizer for tomato should be provided.

Response 5：

Dear Reviewer,

Thank you very much for your careful review of our manuscripts and constructive suggestions. Based on your suggestions, we have added sources of different forms of nitrogen to the material section of the manuscript and modified accordingly in the manuscript. Our changes to the content of the article are marked in red text.

Line: 157-161

Nitrate nitrogen was provided by KNO_3 and $Ca(NO_3)_2$, purchased from Sinopharm Chemical Reagent Co., Ltd. Ammonium nitrogen was provided by $(NH_4)_2SO_4$, purchased from Tianjin Zhiyuan Chemical Reagent Co., Ltd. Amide nitrogen was provid-ed by urea, purchased from Anyang Zhongying Chemical Fertilizer Co., Ltd.