Impact of Elevated CO2 on Rice Photosynthesis and Grain Quality under Future Climate Scenarios

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As global atmospheric carbon dioxide (CO2) concentrations continue to rise, primarily due to human activities such as burning fossil fuels and deforestation, it is crucial to understand how this increase a ects agricultural systems. Rice, one of the world's most important staple crops, is particularly sensitive to changes in atmospheric CO2, as it plays a fundamental role in photosynthesis, plant growth, and ultimately, crop yields. Photosynthesis, the process by which plants convert light energy into chemical energy, is directly in uenced by CO2 availability, and increased CO2 is expected to have both positive and negative e ects on rice growth and quality. e future climate scenarios, marked by higher CO_2 levels, rising temperatures, and altered precipitation patterns, present complex challenges for rice cultivation. While elevated CO2 can potentially enhance photosynthesis and yield in certain conditions, it may also have negative consequences for rice grain quality, nutritional content, and resistance to pests and diseases. Understanding the full range of potential impacts of elevated CO2 on rice is essential for developing strategies to ensure food security in a changing climate. is paper explores the impact of elevated CO2 on rice photosynthesis and grain quality, focusing on how rising CO2 concentrations, in the context of future climate scenarios, could a ect rice production. By examining both the positive and negative consequences of CO2 enrichment, this paper aims to provide a comprehensive overview of the challenges and opportunities for rice farming in a high-CO2 world [1-4].

e increase in atmospheric CO2 generally enhances the rate of photosynthesis in C3 plants, including rice, through a process known

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the amount of carbohydrates stored in the grain, but this is often accompanied by a decrease in protein content. Increased CO2 has been shown to enhance starch production, but it may dilute protein and