

Vilai Saothongnoi 2014: Effect of Elevated Carbon Dioxide Concentration on Rice Growth, Rice Yield and Potential of Greenhouse Gases Emissions from Rice Cultivation. Master of Science (Environmental Science and Technology), Major Field: Environmental Science and Technology, Division of Science. Thesis Advisor: Ms. Kruamas Smakahn, Ph.D. 95 pages.

Effect of rising temperature and carbon dioxide (CO₂), concentration on growth and yield of rice was investigated in this study. The Suphanburi 1 variety was used in this study. The experiment design by Factorial in CRD with 3 main treatment included 1) rice cultivation in ambient air temperature condition (C or Control) 2) rice cultivation in rising temperature condition (HT), and 3) rice cultivation in rising temperature and elevated CO₂ concentration (HTC). In this experiment, rice plant were cultivated in 3 different soil conditions: 1) bare soil (soil without rice straw or rice straw ash), 2) soil with dried rice straw incorporation, and 3) soil with rice straw ash incorporation. Rice plant parameters were observed weekly, rice yield was collected at the end of growing season. In emission from rice cultivation in this experiment.

Rice cultivation under 3 conditions; C, HT, HTC shown significant different growth rate. ($P \leq 0.05$) Rice plant height, number of tiller, and number of panicle under HT condition were 0.3, 9.6, and 11.3 % lower than cultivation normal condition. Rice plant height in HTC condition was 7.06% lower than HT condition; The number of tiller and number of panicle were 30.96 and 31.51% higher than rice cultivated in HT condition. Average grain yield was lowest in HTC condition and approximately 75% decreased from control. Greenhouse gases emission from rice cultivated in HTC condition was approximately 76 and 39%, higher than HT and control condition, respectively. The results from this study suggested that rising temperature and CO₂ reduced rice growth, rice yield, but promoted greenhouse gases from rice cultivation

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