

研究报告

开放式二氧化碳浓度提高对武香粳14叶片硝酸还原酶活力的影响

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摘要 大田栽培条件下, 研究了开放式大气CO₂浓度提高 (FACE) 200 μmol·mol⁻¹对粳稻品种武香粳14各生育期功能叶片硝酸还原酶活力(NRA)的影响. 结果表明, FACE明显提高了各生育期功能叶片NRA, 拔节期、孕穗期、抽穗期、穗后10 d、穗后20 d水稻功能叶片NRA平均值分别比对照提高了50%、20%、60%、80%和30%, 其中, FACE处理对拔节期、抽穗期和穗后10 d水稻功能叶片NRA水平影响较大. 施氮处理明显影响了FACE条件下水稻功能叶片NRA, 并且在不同生育期存在不同的趋势: 拔节期, 中氮>低氮>高氮; 孕穗期和抽穗期, 高氮>中氮>低氮; 而穗后10 d及20 d则为中氮>高氮>低氮. FACE处理与施氮量对NRA存在互作效应, 拔节期及穗后20 d两者互作效应达极显著水平, 穗后10 d达显著水平, 而孕穗期及抽穗期互作效应不显著.

关键词 [开放式空气](#) [CO₂浓度增高\(FACE\)](#) [水稻](#) [硝酸还原酶](#)

分类号

Effect of free-air CO₂ enrichment (FACE) on leaf nitrate reductase activity of *Oryza sativa* L. cultivar Wuxianjing 14

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Abstract

With the target CO₂ concentration of FACE plots being 200 μmol·mol⁻¹ above that in ambient air, this paper studied the effect of free-air CO₂ enrichment (FACE) on leaf nitrate reductase activity (NRA) of *Oryza sativa* L. cultivar

Wuxianjing 14. The results showed that FACE obviously increased the NRA of functional leaves at all growth stages, with an average increment of 50%, 20%, 60%, 80% and 30% at the stages of jointing, booting, heading, 10 after heading, and 20 days after heading, respectively, showing a pronounced effect at jointing, heading and 10 days after heading. Nitrogen application rate also had an obvious effect on the absolute value of NRA in functional leaves under FACE condition. The magnitude of NRA in three nitrogen treatments was in the order of normal nitrogen (NN)>low nitrogen (LN)>high nitrogen (HN) at jointing stage, HN>NN>LN at both booting and heading stages, and NN>HN>LN at both 10 days and 20 days after heading, respectively. The interactive effect of FACE and N supply on NAR varied with the growth stage of Wuxianjing 14, being very significant or significant at the stages of jointing and 20 and 10 days after heading, but not significant at booting and heading stages.

The magnitude of NRA in three nitrogen treatments was in the order of normal nitrogen (NN)>low nitrogen (LN)>high nitrogen (HN) at jointing stage, HN>NN>LN at both booting and heading stages, and NN>HN>LN at both 10 days and 20 days after heading, respectively. The interactive effect of FACE and N supply on NAR varied with the growth stage of Wuxianjing 14, being very significant or significant at the stages of jointing and 20 and 10 days after heading, but not significant at booting and heading stages.

Key words [Free-air CO₂ enrichment \(FACE\)](#) [Rice](#) [Nitrate reductase \(NR\)](#)

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