

硅对水稻几丁质酶和 β -1,3-葡聚糖酶活性的影响及其与抗纹枯病的关系张国良¹, 丁原¹, 王清清¹, 戴其根², 黄慧宇¹, 霍中洋², 张洪程²¹淮阴工学院生命科学与化学工程学院, 江苏淮安223003; ²扬州大学, 江苏省作物遗传生理重点实验室, 江苏扬州225009Effects of silicon on chitinase and β -1, 3-glucanase activities of rice infected by *Rhizoctonia solani* and its relation to resistanceZHANG Guo-liang¹, DING Yuan¹, WANG Qing-qing¹, DAI Qi-gen², HUANG Hui-yu¹, HUO Zhong-yang², ZHANG Hong-cheng^{2*}¹ College of Life Science and Chemistry Engineering, Huaiyin Institute of Technology, Huaian, Jiangsu 223003, China; ² Key Laboratory for Crop Genetics and Physiology of Jiangsu Province, Yangzhou University, Yangzhou, Jiangsu 225009, China

摘要

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摘要 在溶液培养条件下, 以水稻抗病品种91SP和感病品种Lemont为材料, 研究施硅和接种纹枯病菌对水稻纹枯病发生情况、外切几丁质酶、内切几丁质酶和 β -1,3-葡聚糖酶活性的影响。结果表明, 施硅能降低抗病品种91SP的纹枯病病级和病情指数, 显著降低感病品种Lemont的病级和病情指数。在未接种纹枯病菌条件下, 施硅增加了抗病品种几丁质酶活性, 增加了感病品种的几丁质酶活性, 但对 β -1,3-葡聚糖酶活性影响不大。接种纹枯病菌后, 水稻几丁质酶活性被迅速激活后又下降, 施硅通过提高抗病品种91SP几丁质酶和 β -1,3-葡聚糖酶活性, 以及通过提高感病品种Lemont几丁质酶活性来增强对纹枯病的抗性, 但感病品种Lemont施硅处理的几丁质酶活性降低幅度小于抗病品种91SP。

关键词: 水稻; 硅; 纹枯病菌; 几丁质酶; β -1,3-葡聚糖酶

Abstract: In order to understand the mechanism of sodium silicate on enhancing the resistance of rice to sheath blight. We hydroponically cultured two rice cultivars with different resistances to *Rhizoctonia solani* (*R. solani*) infection (resistant cultivar 91SP, susceptible cultivar Lemont) and investigated the impacts of sodium silicate on rice exochitinase, endochitinase and β -1, 3-glucanase activities under *R. solani* infection. The results showed that after being inoculated with *R. solani*, the rice with sodium silicate application (the Si⁺ rice) had lower (but not statistically significant) disease rating and disease index compared to the Si⁻ rice plants in resistant cultivar 91SP, but the Si⁺ rice plants of susceptible cultivar Lemont had significantly lower rating and disease index with relative control effect of 27.42% compared to the Si⁻ rice plants. Uninoculated with *R. solani*, applying sodium silicate could increase chitinase activities of 91SP, and increase or significantly increase chitinase activities of Lemont, but it had little effect on β -1,3-glucanase activities of 91SP and Lemont. After being inoculated with *R. solani*, chitinase activities were induced to increase firstly, and then decreased. In conclusion, applying sodium silicate could enhance the resistance of 91SP to sheath blight by increasing chitinase and β -1, 3-glucanase activities, and enhance the resistance of Lemont to sheath blight by increasing chitinase activities, but the reduction scale of chitinase activities in Lemont with sodium silicate application were lower than those of 91SP.

Keywords: rice silicon *Rhizoctonia solani* chitinase β -1,3-glucanase

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