
C4H Coding Gene on Transcription Regulation of Rice Allelopathy

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Abstract

Allelopathy to weed means that allelochemicals are released from crop into the environment to affect weed on growth or development. Allelopathy to weeds is an alternative way for reduce the usage of herbicide and protection eco-environment. Phenolic compounds were earliest found as one of bioactive chemiclas from rice. Cinnamate-4-hydroxylase (C4H) is one of the key enzymes for phenolics synthesis. In this study, four C4H coding genes, CYP73A35, CYP73A39, CYP73A40, and CYP73A38, were cloned from allelopathic rice cultivar PI312777 (PI) and non-allelopathic cultivar Lemont (LE), and then were detected the expression level oafter the treatment of UV-B, SA. The results showed that the 4 genes of PI were up-regulated after treatment of UV-B, while three genes, CYP73A35, CYP73A39 and CYP73A38 weredown-regulated in LE After treatment of SA, the 4 genes of PI were down-regulated expression, while two genes of LE, CYP73A38 and CYP73A40, were up-regulated and the other two CYP73A35 and CYP73A39 were down-regulated. The results of Sequence alignment indicated that there was a little difference in the part of promoter and CDs sequences of the gene CYP73A40, and the gene encoding protein C4H with two amino acids mutation in carboxyl terminal. These results suggested that there was difference in expression regulated mechanism of C4H between allelopathic and no-allelopathic rice cultivar. . This preliminary study provides a new evidence for revealing the regulation of C4H in rice allelopathy, and explains the reason of phenolic compounds difference in rice allelopathic potential.

Keywords: rice, allelopathy, Phenolic acid compounds, Cinnamate, 4, hydroxylase

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