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LC-MS Analysis According to the Combined Treatment of *Paenibacillus yonginensis* DCY84^T and Silicon in Rice

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[Abstract]

We reported in our recent studies that the combined treatment of *Paenibacillus yonginensis* DCY84^T (DCY84^T) and Silicon (Si) promotes initial plant growth and increases resistance to biotic and abiotic stress. To understand the molecular background of these phenotypes, Liquid Chromatography Mass Spectrometry (LC-MS) analysis was performed, and it was confirmed that unsaturated fatty acid metabolites such as oleic acid and linoleic acid decreased in response to the combined treatment of DCY84^T and Si. The stearoyl-acyl carrier protein desaturase (SACPD) introduces the cis double bond into the acyl-ACPs at C9, resulting in the production of unsaturated fatty acid. We identified *OsSSI2* encoding SACPD in rice and found that the expression of *OsSSI2* was reduced under DCY84^T and Si treatment. Furthermore, qRT-PCR analysis revealed that the expression of *OsWRKY45*, which is downstream of *OsSSI2*, was upregulated in response to DCY84^T and Si treatment. These results enable the speculation that activation of the salicylic acid (SA)-responsive gene, *OsWRKY45*, may contribute to enhancing biological stress resistance. Based on this, we propose a probable model for the rice defense pathway following DCY84^T and Si treatment. This model retains a WRKY45-dependent but NH1(NPR1)-independent SA signaling pathway.

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