CITRUS ADVANCED TECHNOLOGY PROGRAM

QUARTERLY & FINAL REPORTS: Control of Citrus Greening, Canker & Emerging Diseases of Citrus

SELECT PERIOD June 2016

(●) *Quarterly Report* ( ) *Final*

Proposal Title

Application of a natural inducer of systemic acquired resistance and engineering non-host resistance in citrus for controlling citrus diseases

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
11/16/16	Citrus Research and Development Foundation	Transgenic/Metagenomic Mediation of Resistance

REPORT UPDATE (500 words-It is not necessary in this public report to disclose your institution's proprietary information or intellectual property.)

The project has two objectives:
(1) Increase citrus disease resistance by activating the natural SAR inducer-mediated defense-signaling pathway.
(2) Engineer non-host resistance in citrus to control citrus canker and HLB.

In order to understand how the SAR inducer activates disease resistance, we tested defense gene induction in the treated plants. Citrus leaves were infiltrated with 0. 0.25, 0.5, 1, 5, and 10 mM SAR inducer and the treated leaf tissues were collected at 0, 4, and 24 hours. Expression of a group of defense genes were analyzed by qPCR. These genes include PAL1,NPR1, PR5, CM1, ICS1, CM1, CM2, and PLDg. Results showed that the SAR inducer activated the expression of several defense genes such as NPR1, PR5, and CM1. We also tested if the SAR inducer treatment enhances pathogen induced defense gene expression. Citrus leaves were infiltrated with different concentrations of the SAR inducer. Thirty six hours later, the infiltrated leaves were inoculated with citrus canker bacterial pathogens. The inoculated leaf tissues were collected at 0, 4, 8, and 24 hours later. Expression of the above defense genes were analyzed by qPCR. We found that the bacterial pathogen induced expression of PAL1, NPR1, PR5, CM1, and ICS1 was significantly enhanced by the SAR inducer pretreatment. This results indicate that the SAR inducer can prime citrus plants for resistance to citrus canker.

We have also started to test if the SAR inducer can elevate resistance or tolerance to HLB. We are currently testing the treatment conditions.

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