CITRUS ADVANCED TECHNOLOGY PROGRAM

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

SELECT PERIOD March 2012

(●) *Quarterly Report* ( ) *Final*

Proposal Title

Rapid and Efficient Delivery of Effective Compounds into Citrus Phloem for Treatment of HLB Bacteria

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
4/7/15	Citrus Research and Development Foundation	Epidemiology and Cultural Control

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

The overall goal of this 3-year research project is to efficiently deliver antimicrobial molecules into citrus phloem against HLB bacteria. This quarter's (From January 2015 to April 2015) research was focused on: 1) continuing to evaluate the effect of antimicrobial compounds and their combinations at different concentration against HLB bacteria using nano formulation by bark-application; 2) investigating agronomic performance and HLB bacterial titer of HLB-affected citrus trees treated with nano-formulations by bark painting and gravity bag infusion in the field; 3) comparing efficiency of different emulsions on capturing insects.

In this quarter, thirty-two treatments from 14 antimicrobial compounds in combination and alone at various concentrations loaded in oil in water nanoemulsion, continued to be evaluated in the greenhouse. The results indicated that, 6 month after initial treatment, Amp and Pen were the most effective chemical compounds against the Las bacterium. Las bacterium titer was significantly reduced by Act, Act+Va, and Va. No phytotoxicity appeared in citrus trees treated with Act and Act+Va at lower concentrations. Other antimicrobial compounds and combinations (i,e, Pround, Al(OH)3, SDX) were not effective against the Las bacterium.

In field trials, Pen and SDX were delivered into citrus phloem by bag gravity infusion and bark-painting. Using bag gravity infusion, Pen can be effectively delivered into citrus phloem against Las bacterium, and Las bacterium titer was kept low (Ct=33.0-38.5) for 12 month. But in HLB-affected citrus trees treated with Pen by bark-painting, Las bacterium was not significantly reduced. In addition, SDX was not effective against the Las bacterium using either application method. Furthermore, agronomic performance (i,e, fruit size, fruit weight, and Brix) of the citrus trees also was investigated in this quarter. The results showed that fruit size and fruit weight under Pen and SDX treatment, were much greater than those in the control. Brix was not significantly different among treatments.

In our previous study, water in oil nanoemulsion (Cre-Nano) has been shown to be an ideal delivery system for enhancing effective compounds to penetrate through citrus cuticles. Effects of three nanoemulsion formulations (Cre-Nano, NanoGreen (business product) and Carv-nano) on capturing insects was also evaluated in this quarter. These three nanoemulsion formulations were applied to citrus trees by foliar spray outdoors. Six days after initial treatment, the citrus tree treated with Cre-Nano captured 10 insects, significantly more than those treated with Nanogreen and Carv-nano.

In the next quarter, we will complete this project by submitting the final report.

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Organization IRREC-IFAS, University of Florida

Project Number 584

Project Duration (years) 3 *Year of Project* 3

Total Funds (current year)

Form PR-12 Quarterly Reports **SUBMIT REPORT**

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