CITRUS ADVANCED TECHNOLOGY PROGRAM

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

SELECT PERIOD September 2013

(●) *Quarterly Report* ( ) *Final*

Proposal Title

Field Deployable VOC Analyzer for Early Detection of Citrus Pathogens

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
9/9/13	California Citrus Research Board	Pathogen/Disease Detection

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

Early detection using cost-effective surveillance techniques is crucial to successfully fighting the spread of HLB. The strategy of early detection of HLB focuses on the analysis of host VOC responses that are triggered early in the infection cycle as part of the plant innate immune responses. Based on previous CRB-funded effort, there is strong evidence that VOC analysis of citrus trees can lead to early detection of the HLB and other citrus diseases. VOC field testing is performed using EZKnowz™ instruments supplied by EZDiagnostix (EZDx), the sensor commercialization arm of Applied Nanotech, Inc. (ANI). The EZKnowz™ trace chemical analyzer uses a gas chromatograph (GC) combined with a differential ion mobility spectrometer (DMS).

Our effort in this program is the following:
• Reduce sampling and analysis time from 10 minutes (currently) to < 1 minute: Several GC columns have been tested. We have achieved about 3 minute analysis time but we are still targeting 1 minute.
• Develop a VOC sampling method to collect VOCs from a significant portion of the tree. We have separated the VOC collection from the analysis, which will lead to reduction in time as collection and analysis can be done in parallel. A hand-held sniffer prototype is under development.
• Develop an algorithm for identification of HLB (Year 1) based on the modified tool: A bread-board instrument with the modifications described above is ready for characterization in the field. We are ready to begin developing a library based on the modified tool.
• Develop software to implement the disease detection algorithms: Analysis is intended to be directly on the device for rapid feedback. We have purchased a Trimble YUMA-2 which will be the platform on which analysis will be performed in the field. This will be the interface to the analyzer, the sniffer and the operator. The UC Davis team is developing the scripts that will perform the algorithm analysis in the field.

We continue to test the VOC algorithm using standard devices in orchard fields in south Texas. We have completed 4 months of orchard testing, about 60 trees/month. We are expanding the libraries of citrus varieties beyond sweet orange.

Expected Outcomes and/or functional product/solution
The potential value of this early-detection solution on the citrus industry is tremendous. By "flagging" infected trees at the asymptomatic stage, eradication would be both more effective, and kept to the minimum necessary, since it would take place well before other trees become infected and enter the latent period. This would interrupt the deadly infestation cycle at the source, significantly reduce the heavy costs of losing trees and citrus produce for a period of three to five years and cut down the costs of planting new trees.

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Organization Applied Nanotech, Inc.

Project Number 5100-148

Project Duration (years) 1 *Year of Project* 1

Total Funds (current year) $347,804.00

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

CITRUS RESEARCH AND DEVELOPMENT FOUNDATION, INC.