Global Summit on
AGRICULTURE, FOOD SCIENCE AND TECHNOLOGY
October 26-27, 2018 | Boston, USA

Shirin Ghatrehsamani

University of Florida, USA

Application of computational fluid dynamics to optimize thermotherapy system for treating citrus greening

The citrus industry in Florida and several other citrus-producing areas in Brazil and China are suffering from the citrus greening disease (known as HLB) and there is no known cure. HLB-infected trees have low production, low fruit quality and could die within about three to four years. This disease has been a fatal disease for the citrus industry in Florida since 2005. Heat treatment (Thermotherapy) is one of the non-chemical methods and it is based on the idea that heating a plant at a specific temperature and for a pre-determined time can kill pathogen microorganisms while minimizing host devastation. In this study, the heat treatment system has been developed for sustaining the productivity of HLB-infected trees. Using steam to treat HLB-infected citrus trees under field conditions requires an enclosure to cover the tree canopy and hold the steam for a certain amount of time. We evaluate a mobile heat thermotherapy system for the appropriate temperature and time combination. The heat distribution inside the canopy cover was monitored and simulated by a mathematical model and computational fluid dynamic (CFD) method to develop and improve the supplementary heat thermotherapy system to generate a uniform temperature. The theoretical predictions are in good agreement with the experimental measurements, which can possibly be described/predicted satisfactorily by the model developed in the present study.

Biography

Shirin Ghatrehsamani is currently a doctoral candidate at the University of Florida, her doctoral dissertation is focused on the needs of Florida's citrus industry due to the spread of the citrus greening disease (HLB) that has sparked concern for the continuity of the citrus industry in Florida. She has developed an integrated model to simulate and analyze heat distribution throughout the tree canopy and improve a supplementary heat thermotherapy system to generate a uniform temperature and treat HLB-infected trees. She has helped to develop a smart automated smart thermotherapy system for this purpose.

sh.samani@ufl.edu

Notes: