Application of computational fuid 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 su ering 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. is disease has been a fatal disease for the citrus industry in Florida since 2005. Heat treatment (ermotherapy) is one of the non-chemical methods and it is based on the idea that heating a plant at a speci c 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 eld 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. e heat distribution inside the canopy cover was monitored and simulated by a mathematical model and computational uid dynamic (CFD) method to develop and improve the supplementary heat thermotherapy system to generate a uniform