Year II, A Comprehensive Eco-Friendly Strategy for Citrus Greening Disease Management: Targeted Delivery of Novel Multi-Compound Formulation Derived From Murraya koenigii in Combination With Steam Therapy Approach and Its Validation Through Precision Agriculture Tools

Aglave, Tanishka (School: Strawberry Crest High School)

Huanglongbing (HLB) or the Citrus Greening Disease (Candidatus Liberibacter asiaticus) is the most destructive citrus disease worldwide. Currently, no pesticide is registered to cure this disease besides Oxytetracyline under Emergency Label Section 18. The curry leaf tree, Murraya koenigii, is highly attractive to the Asian citrus psyllid, Diaphorina citri, which vectors the bacterial causative agent of citrus greening disease, but it is not a carrier of disease. Thermotherapy can be a potential method to suppress the disease and increase the plant transpiration rate, thus enabling for the translocation of the bactericide. The objective of this investigation was to develop a novel biological bactericide using the bioactive compounds from curry leaves and engineer a Localized Thermal Therapy Framework to enhance the uptake of the treatment. The biological bactericide was used to treat the greening-infected trees through trunk injection at 7.5% rate. Steam-therapy wrap (ST) supplemented the biological treatment (NB). The combination of ST and NB resulted in more than 45% improvement in the management of Disease Severity, 50% Increase in Plant Vigor, 53% improvement in Chlorophyll content compared to untreated control. qPCR analysis verified a 26% increase in Ct-value in NB and ST treated trees. In conclusion, ST and NB was able to outperform the industry-standard by 14% and enhance treatment uptake. The Steam therapy wrap emerges as a low-cost, portable, and easy-of-use device to treat thousands of acres. This integrative approach comprising curry-leaves-biological bactericide and steam therapy presents a dual-strategy to eradicate citrus greening disease, emerging as an effective and sustainable solution to bolster the global citrus industry.

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