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Bioprospecting of microorganisms with antagonistic potential against *Candidatus Liberibacter asiaticus* for HLB mitigation

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Among citrus diseases, Huanglongbing (HLB), caused by *Candidatus Liberibacter asiaticus* (CLas), is the most damaging and difficult to control. Its study is limited by the inability to culture CLas in vitro. Therefore, genetically related bacteria such as *Liberibacter crescens* and *Sinorhizobium meliloti* (*Sme*) have been used as surrogate organisms to identify antimicrobial compounds. However, effective screening requires both rapid *in vitro* assays and *in planta* validation. This study aimed to identify rhizobacteria with antagonistic potential against CLas by combining *in vitro* screening using *S. meliloti* as surrogate, with *in planta* assays in CLas-infected citrus plants. Bacterial genera previously reported as antagonistic to plant pathogens were selected from a citrus rhizobacteria collection. In vitro screening identified 18 strains showing inhibition halos against *Sme*, belonging to the genera *Bacillus*, *Burkholderia*, *Chryseobacterium*, *Lelliottia*, *Methylobacterium*, *Serratia* and *Pseudomonas*. For *in planta* validation, these isolates were tested under greenhouse conditions. Bacterial inoculation was performed via soil drenching and direct phloem injection. Plant growth and bacterial load were monitored over 90 days using qPCR. Isolates of *Serratia*, *Lelliottia* and *Methylobacterium* significantly reduced bacterial load, whereas oxytetracycline showed no consistent effect. These results highlight that *in vitro* antagonism does not necessarily translate into *in planta* efficacy, emphasizing the importance of host colonization. Nonetheless, promising candidates were identified, supporting biological control as a potential strategy for HLB management.

KEYWORDS: Huanglongbing, *Candidatus Liberibacter asiaticus*, biological control, *Sinorhizobium meliloti*, rhizobacteria.

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