

## Enzymatic differences between the endophyte *Guignardia mangiferae* (Botryosphaeriaceae) and the citrus pathogen *G. citricarpa*

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**ABSTRACT.** The endophyte *Guignardia mangiferae* is closely related to *G. citricarpa*, the causal agent of citrus black spot; for many years these species had been confused with each other. The development of molecular analytical methods has allowed differentiation of the pathogen *G. citricarpa* from the endophyte *G. mangiferae*, but the physiological traits associated with pathogenicity were not described. We examined genetic and enzymatic characteristics of *Guignardia* spp strains; *G. citricarpa* produces significantly greater amounts of amylases, endoglucanases and pectinases, compared to *G. mangiferae*, suggesting that these enzymes could be key in the development of citrus black spot. Principal component analysis revealed pectinase production as the main enzymatic characteristic that distinguishes these *Guignardia* species. We quantified the activities of pectin lyase, pectin methylesterase and endopolygalacturonase; *G. citricarpa* and *G. mangiferae* were found to have significantly different pectin lyase and endopolygalacturonase activities. The pathogen *G. citricarpa* is more effective in pectin degradation. We concluded that

there are significant physiological differences between the species *G. citricarpa* and *G. mangiferae* that could be associated with differences in pathogenicity for citrus plants.

**Key words:** Citrus black spot; Fungal-plant interaction; Pectinase; Hydrolytic enzymes; Endophyte; Citrus pathogen