



BIOCONTROL OF MAGNAPORTHE ORYZAE BY WAITEA CIRCINATA: INTEGRATION OF BIOASSAYS AND METABOLOMIC CHARACTERIZATION

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Rice blast, caused by *Magnaporthe oryzae*, is one of the most severe threats to global rice production.¹ While biological control offers a sustainable management alternative, the potential of *Waitea circinata* as a biocontrol agent remains largely unexplored². This study presents the first evaluation of the antagonistic activity of three individuals of *W. circinata* (W1, W2, and W3) against *M. oryzae*, combining biological, chemical, and microscopic analyses. In vitro dual-culture assays revealed a high and consistent inhibition rate of the phytopathogen: 95.63% (W1), 93.36% (W2), and 94.68% (W3), with no statistically significant differences among the individuals. For chemical characterization, extracts were obtained using ethyl acetate and chloroform and analyzed by LC-MS/MS. MS data were processed with MZmine 4.0 and submitted to GNPS and RStudio. Principal component analysis (PCA) did not reveal discrimination between extracts according to solvent, suggesting a consistent metabolic profile. Molecular annotation indicated the presence of coumarins, terpenes, terpenoids, and flavonoids, metabolite classes widely reported for antifungal activity. Microscopic observations suggested a direct physical antagonistic interaction between mycelia during in vitro assays, currently under detailed investigation using scanning electron microscopy (SEM). Inhibition zones observed in co-culture also indicated metabolite release, pointing to complementary chemical and physical mechanisms of action. Overall, the results demonstrate that *W. circinata* exhibits strong biocontrol potential against *M. oryzae*, likely mediated by a combination of antifungal secondary metabolites and direct mycelial interactions. The findings suggest that *W. circinata* can be considered a potent antagonist of the rice blast fungus and highlight its relevance as a promising and underexplored source of natural products for sustainable management strategies.

Keywords: biocontrol, *Waitea circinata*, *Magnaporthe oryzae*, metabolites, natural products;

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