

KILLER ACTIVITY AND HYDROLYTIC ENZYME PRODUCTION BY YEASTS AS ACTION MECHANISMS INVOLVED IN THE BIOCONTROL OF *Geotrichum citri-aurantii*

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Abstract:

Sour rot is one of the major post-harvest diseases of citrus fruit and is caused by the fungal pathogen *Geotrichum citri-aurantii*. The lack of chemicals certified for the control of this disease has led to the consideration of alternative methods and strategies, such as the use of yeasts as biocontrol agents. Different yeast species are able to prevent infection, decrease host tissue colonization, and reduce plant pathogen survival and sporulation with varying degrees of efficiency. Some yeast species are able to produce *killer* toxins and other antimicrobial compounds that are lethal to the filamentous fungi. Therefore understanding the modes of action of yeasts is essential for developing more effective antagonistic isolates and may contribute to the improvement of formulations and production methods. The aim of the present study was to assess the modes of action of yeast isolates (ACBL-23, ACBL-42, ACBL-44, ACBL-50, ACBL-52, ACBL-68, ACBL-77 and ACB-K1) that showed to be effective for biocontrol of disease. The action mechanisms assessed were: Production of antifungal compounds (volatile, cell-free and thermostable), nutrient competition, production of hydrolytic enzymes (chitinase and β -1,3-glucanase) and detection of *killer* activity. The most of the eight yeast isolates analyzed did not produce antifungal compounds in amounts sufficient to inhibit the growth of the pathogen. Additionally, the yeast strains were not found to use nutrient competition as a biocontrol strategy. All of the eight yeast isolates, except ACBL-23 and ACBL-44 were able to produce chitinases in the presence of the pathogen cell wall. In contrast, only the ACBL-23 and ACB-K1 isolates were able to produce β -1,3-glucanases. Six of the yeast isolates tested in the present study were able to produce *killer* toxins. Our study suggests that hydrolytic enzyme production and *killer* activity are the major mechanisms involved in the biocontrol activity of the yeasts.

Keywords: *Endomyces geotrichum*, biological control, chitinase, β -1,3-glucanase

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