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Effects of *Cryphonectria parasitica* infection by the Hypovirus CHV1 on cellulase activity


Y. Tayechi[1]


L. Jorge[2,3]


V. Coelho[2,3]


E. Gouveia[2,3]

[1] Instituto Politécnico de Bragança 5300-253 Bragança, Portugal

[2] Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal

[3]Laboratório Associado para a Sustentabilidade e Tecnologia em Regiões de Montanha (SusTEC), Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal

Abstract

Cryphonectria parasitica is the causal agent of *Castanea sativa* chestnut blight, an economically important disease.

Hypovirulence is due to the presence of a virus, the *Cryphonectria hypovirus* 1 (CHV1), that attenuates fungus pathogenicity by reducing the sporulation, and the enzymatic activity of pathogenesis-related enzymes.

In several regions affected by *C. parasitica*, the release of *C. parasitica* hypovirulent strains on chestnut blight affected trees of *C. sativa,* has been used as a biological control.

The objective of this work is to evaluate the effect of hypovirulence by CHV1 on the activity of cellulase, a pathogenesis-related enzyme, in different isolates of *C. parasitica*.

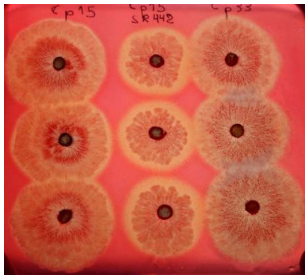
Matherial and Methods

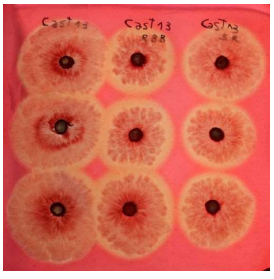
Several *C. parasitica* virulent (Cast 13, Cast 26, Curopos 15, Cp33-PAR), hypovirulent (donors: RBB111, Serra05), and isogenic converted (Cast13RBB111, Cast13SR442, Curopos15SR442) isolates were grown at 25°C in agar media plates containing 0.1% yeast extract and 0.5% Carboxymethyl cellulose (CMC) for five days. The cellulolytic activity was qualitatively evaluated by measuring the ratio degradation halo/mycelium growth (RHG) after flooding the plates for 45 minutes with a 0.1% Congo red solution and discolor with a NaCl 1M solution for 15 minutes. Hydrolysis of CMC was seen as a clear zone around colonies.

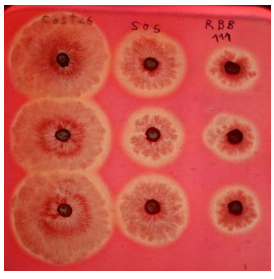
Results and Discussion

Contrary to expected, the hypovirulent donors (RBB111, Serra05) and converted strains showed higher cellulolytic activity than the virulent ones, evidencing higher ratio halo/growth (RHG) (Figure 1)

In the two converted Cast13 isogenic isolates, Cast13 RBB111 and Cast13 SR442, the obtained RHG were significantly different ($p<0.01$), the last presented higher cellulolytic activity. In virulent strains, only Cp33PAR presented a small RHG, significantly different from the other virulent strains ($p<0.05$), without reaction.







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