

Title Reduction of anthracnose infections by a protein inhibitor extracted from ‘Pink Lady’ apple
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Abstract

The majority of fungi gain access to plant cells by breaking the cell wall barrier and secreting enzymes able to degrade cell wall polymers. Cell wall enzymes (polygalacturonase–PG, protease, pectin lyase, etc.) are a wide group which mainly catalyse the hydrolysis of proteins; they are relevant in the “break down” of host cells and are regarded as important pathogenicity factors for soft rot fungi. Evidence shows that the PGs produced by *Colletotrichum acutatum*, a fungal pathogen of fruit, are involved in the hydrolysis of cell walls when grown on pectin or apple cell walls. No data are available on the ability of proteins from stored apple to inhibit the activity of *C. acutatum* hydrolases. An enzymatic inhibitor complex was extracted from healthy apples, cv Pink Lady®, after storage, and evaluated against *C. acutatum* endo-polygalacturonase (EC 3.2.1.15) in *in vitro* and *in vivo* trials. In *in vitro* trials the inhibition determined by radial diffusion assay was over 62% after 24 h while in inoculated fruit the inhibition ranged from 33.9% to 54.4% after 4 days at 20°C. The PG inhibitor extracted from healthy apple skin was a heat-denaturable protein since the halo produced by protein extracted from *C. acutatum* and added to boiled protein extracted from healthy apple skin tissue was 246 mm², significantly higher than the halo produced by protein extracted from *C. acutatum* diluted with fresh protein extracted from healthy tissue (93.6 mm²). More investigations are required to evaluate the possibility of reducing anthracnose infections by manipulating PGIP levels in fruit.