Abstract

Heat shock proteins (HSPs) play a major role in protecting cellular proteins, acting as chaperones, preventing aggregation of partially damaged molecules, and help the protein repack, repair and create its right three-dimensional structure. Their synthesis occurs mainly during the stress state of the cell or the whole plant. Biotic forms of stress induce the expression of pathogenesis-related proteins (PRs), which are often characterized by enzyme activity, such as glucanases, chitinases and peroxidases.

In this work, the effect of infection with fungal pathogens *Alternaria brassicicola* and *Verticillium longisporum* on the content of HSP70, HSP90 and PR-1, PR-2, PR-3 was followed in the tomato plants (*Solanum lycopersicum* L. cv. Micro-Tom) and rapeseed plants (*Brassica napus* subsp. *oleifera*). The seeds were treated with isolates of oomycete *Pythium oligandrum*, which is one of the unique and commercially available biological control agents. HSPs and PRs proteins were detected immunochemically on a nitrocellulose membrane.

Immunochemical analysis showed the interaction of primary antibodies against HSP70 and HSP90 with low relative molecular weight proteins. Infection with *Alternaria brassicicola* and *Verticillium longisporum* increased the representation of 33 kDa - 43 kDa proteins. Seed treatment with *Pythium oligandrum* isolates had a significant effect on the HSPs content.

The amount of PR-1 proteins was on the threshold of detectability in all experimental groups of plants. Infection with *Alternaria brassicicola* pathogen significantly increased the PR-2 content in rapeseed plants and PR-3 in tomatoes compared to *Vericillium longisporum*.

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Keywords

Heat shock proteins, fungal infection, *Alternaria brassicicola*, *Verticillium longisporum*