

Abstract:

Heat stress is one of abiotic stress factors, which fundamentally influences the growth and development of plants. Plants response to heat stress by series of cell and metabolic changes, the specificity of heat stress is synthesis of molecular chaperons, called heat-shock proteins (HSP). The influence of heat shock (in the form of 1 hour application of 40°C from 20°C) on the activity of NADP-dependent enzymes, enzymes of Hatch-Slack cycle, glycosidases and the activity of peroxidase in tobacco plants (*Nicotiana tabacum* L. cv. Petit Havana SR1) was studied in this work. Since HSP are involved in proper folding of immature, misfolded or partly denaturated proteins, in degradation of denaturated proteins and in induction of thermotolerance of plants, the aim of this work was to find out, if the activity of studied enzymes will be maintained or modulated within the plant defense response.

The highest amount of HSP70 detected immunochemically together with higher activities of NADP-malic enzyme, phosphoenolpyruvate carboxylase, β -hexosaminidase and α -mannosidase compared to control plants was found 1 hour after application of heat shock. Peroxidase activity was most increased 1 day after HS compared to controls. Using native electrophoresis the differences in isoform content between control and HS-stressed plants were observed.

Later after application of heat stress (the 3rd, the 5th, the 7th and the 10th day after heat shock), significant decrease of activity of all studied enzymes excepting NADP-ME and partially peroxidase was determined. Next experiments are needed to clarify if the reason of decreased activities is the influence of HSP or the regulation on activity, transcriptional and translational level.

Keywords:

Heat shock, chaperones, heat-shock proteins, NADP-dependent enzymes, enzymes of Hatch-Slack cycle, glycosidases, peroxidase