



**Hungarian University of Agriculture and Life Sciences**

**Buda Campus**

**Institute of Horticultural Sciences**

**Horticultural Engineering master's education**

**Mitigation of Heat Stress by Foliar Application of Chitosan on  
Tomato Seedlings**

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**2024**

Among abiotic stresses, heat stress is one of the main challenges due to climate change and global warming. Heat stress may disturb plant growth and development, leading to a reduction of yield. Using chitosan as a bio-based stimulant could be a potential option to mitigate the adverse effects of heat stress. Therefore, a research study was conducted to evaluate the effectiveness of chitosan application in alleviating the adverse effects of heat stress on the physiological parameters of tomato seedlings at the Department of Vegetables and Mushroom Growing, Hungarian University of Agriculture and Life Sciences, Budapest, using factorial design with Completely Randomized Design (CRD) and four replications. Different types of chitosan (bulk chitosan and nano-chitosan) with 2 different concentrations (100 ppm and 150 ppm) and different temperature conditions (optimal and high) were applied to tomato seedlings in a growth chamber environment.

Results showed that the foliar application of chitosan significantly improved the physiological parameters of tomato seedlings under heat stress. The use of nano-chitosan 100 ppm (NC100) significantly improved chlorophyll a (45.99%), SPAD value (6.46%), and FRAP (15.79%), while reducing the electrolyte leakage (-37%) and transpiration rate (-32.07%). The significant improvement in chlorophyll b (27.8%) and net photosynthesis rate (151.3%) was obtained by the application of bulk chitosan 100 ppm (CH100). The application of nano-chitosan 150 ppm (NC150) was the most effective to significantly improve relative water content (26%). And the most effective treatment to significantly improve the total phenolics content (13.01 mg gallic acid equivalent g/FW) was bulk chitosan 150 ppm (CH150). These findings showed that the application of chitosan can be used as an ecofriendly compound in mitigating the adverse effects of heat stress conditions on tomato seedlings.