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Seed Biopriming with Trichoderma sp. as an Effective Strategy for the Mitigation of Thermal Stress Effects in Food Crops

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According to the projections of the Intergovernmental Panel on Climate Change (IPCC) the impact of global warming would be detrimental for ensuring food security in the 21st century. High temperature stress in different agro-climatic zones uniformly decreases crop yield, primarily due to shortened life cycle and hastened senescence leading to considerable pre- and post-harvest losses. The only available solution for tacking this challenge includes breeding thermal stress tolerant cultivars with equivalent crop yield potential. Though this strategy has many handicaps, the foremost being huge time investments for generating stable cultivars. Hence, exploring all the possible alternatives is a high priority to ensure sustainable crop production. These results demonstrate the role of seed biopriming with a thermotolerant strain of *Trichoderma* sp. capable of surviving at 47^{0}C for the mitigation of thermal stress effects in tomato. Based on these results it was concluded that *Trichoderma* mediated reprogramming of oxidative stress markers and defense network to enhance thermal tolerance in tomato. The results of the aforementioned biochemical analysis were cross validated through histochemical and HPLC analysis. In addition, the complex route of plant-microbe interaction under both ambient and stressed conditions were also mapped using 2D gel electrophoresis and hydroponics approach. During this presentation, the fascinating journey beginning from the isolation, characterization, and identification of this thermotolerant strain of *Trichoderma* sp. to its formulation development will be discussed in detail.

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