



## The CaChiVI2 gene of *Capsicum annuum* confers resistance against heat stress and *Phytophthora capsici* infection

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### Abstract:

Extreme environmental conditions affect crop growth and development seriously, resulting in substantial decrease in crop yield and quality. However, chitin-binding proteins (CBP) family member CaChiVI2 plays a crucial role in eliminating the impact of adverse environmental conditions. For the first time it was discovered that CaChiVI2 (Capana08g001237) gene of pepper (*Capsicum annuum* L.) had a role in physiological processes including resistance to heat stress. The full-length open reading frame (ORF) of CaChiVI2 (606-bp, encoding 201-amino acids), was cloned into TRV2:CaChiVI2 vector for silencing. The CaChiVI2 gene carries the heat shock elements (HSE, AAAAAATTTTC) in the upstream region, thereby showing sensitivity to heat stress at the transcriptional level. The silencing effect of CaChiVI2 in pepper resulted in increased susceptibility to heat and *Phytophthora capsici* infection. It was evident from the severe symptoms on leaves, the increase in O<sub>2</sub> and H<sub>2</sub>O<sub>2</sub> accumulation, higher malondialdehyde (MDA), relative electrolyte leakage (REL) and lower proline contents compared with control plants. In conclusion, the results suggest that CaChiVI2



gene plays a decisive role in heat and drought stress tolerance as well as provide resistance against *P. capsici* by reducing the accumulation of reactive oxygen species (ROS) and modulating the expression of defense-related genes. The outcomes obtained here suggest that further studies should be conducted on plants adaptation mechanisms in variable environments.

### Biography:

Muhammad Ali is currently working in College of Agriculture and Biotechnology, Zhejiang University.