

# Calcium ion improves cold resistance of green peppers (*Capsicum annuum* L.) by regulating the activity of protective enzymes and membrane lipid composition

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Scientia Horticulturae 277: 109789. (2021)

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## Abstract

To study the effect of calcium ion ( $\text{Ca}^{2+}$ ) on chilling injury (CI) in green peppers (*Capsicum annuum* L.), green peppers were treated with calcium chloride ( $\text{CaCl}_2$ ) and chlorpromazine (CPZ) at 4 °C storage temperature. The results showed that two calcium ions exhibited opposite functions. The  $\text{CaCl}_2$  treatment effectively regulated the activity of antioxidative enzymes to promote the AsA-GSH cycle, reduced the accumulation of  $\text{O}_2^-$  and  $\text{H}_2\text{O}_2$  generated from the metabolic cycle, inhibited the accumulation of MDA and proline, and the degradation of membrane lipid components, as well as the increase in relative conductivity to maintain the integrity of cell membrane. The reason that  $\text{CaCl}_2$  can improve the cold resistance of green bell pepper fruit may be attributed by the decreased expression and activity of PLC gene and DGK gene, which delayed the degradation of membrane lipid, thereby maintaining cell membrane stability and reducing the occurrence of CI.