

# Effects of exogenous calcium and calcium chelant on cold tolerance of postharvest loquat fruit

Ziying Li, Li Wang, Bing Xie, Shunqing Hu, Yonghua Zheng and Peng Jin

Scientia Horticulturae 269: 109391. (2020)

---

## Abstract

The effect of calcium chloride ( $\text{CaCl}_2$ ) and calcium chelant-ethylene glycol bis (2-aminoethyl ether) tetraacetic acid (EGTA) on chilling injury (CI) of postharvest loquat fruit (*Eriobotrya japonica* L. cv. 'Changhong') during cold storage was investigated. The results showed that  $\text{CaCl}_2$  treatment significantly prevented CI and maintained the membrane integrity resulting in the reduction of ion leakage and malondialdehyde (MDA) content. The exogenous calcium increased energy charge (EC) and the content of adenosine triphosphate (ATP), adenosine diphosphate (ADP). Meanwhile,  $\text{CaCl}_2$  treatment effectively enhanced the enzyme activities associated with energy metabolism including  $\text{H}^+$ -adenosine triphosphatase ( $\text{H}^+$ -ATPase),  $\text{Ca}^{2+}$ -adenosine triphosphatase ( $\text{Ca}^{2+}$ -ATPase), succinic dehydrogenase (SDH), cytochrome c oxidase (CCO). Furthermore, the activities of  $\Delta^1$ -pyrroline-5-carboxylic acid synthase (P5CS), ornithine- $\delta$ -aminotransferase (OAT), glutamic acid decarboxylase (GAD), diamine oxidase (DAO) and polyamine oxidase (PAO) were enhanced by  $\text{CaCl}_2$  treatment, which contributed to the accumulation of osmotic substances  $\gamma$ -aminobutyric acid (GABA), proline and polyamines (PAs). However, EGTA treatment significantly promoted CI index, increased MDA content and ion leakage. Moreover, low level of EC and GABA were also found in EGTA-treated loquat fruit. These results suggested that exogenous calcium could effectively enhance the chilling tolerance due to the high energy level and promoted accumulation of endogenous osmotic substances proline, GABA and PAs in loquat fruit.