

# Elevated CO<sub>2</sub> alleviates browning development by modulating metabolisms of membrane lipids, proline, and GABA in fresh-cut Asian pear fruit

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## Abstract

Enzymatic browning is a major problem of fresh-cut pear, which severely limits the shelf life. In the current study, elevated carbon dioxide (CO<sub>2</sub>) was applied to investigate its effects on quality maintenance and browning repression. The results showed that 5% and 10% CO<sub>2</sub> treatment maintained quality attributes, including firmness, color, and total soluble solids. Browning development was also inhibited by elevated CO<sub>2</sub>. Elevated CO<sub>2</sub> delayed the decrease of unsaturated fatty acid in membranes by decreasing the activities of lipoxygenase (LOX) and phospholipase D (PLD), maintained the integrity of membrane, and therefore alleviate enzymatic browning. In addition, elevated CO<sub>2</sub> triggered the accumulation of two stress adaptor molecules, proline and  $\gamma$ -aminobutyric acid (GABA), by improving their biosynthesis and repressing their degradation, which finally contributed to browning repression. However, excessive concentration (15%) showed adverse effects because of CO<sub>2</sub> injury. Our current study suggested a potential strategy for browning repression in fresh-cut pear fruit.