

# Effect of high carbon dioxide treatment on reactive oxygen species accumulation and antioxidant capacity in fresh-cut pear fruit during storage

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## Abstract

Fresh-cut pear are popular for their nutritive, fresh and convenience. However, the oxidative stress caused by wounding aggravates quality loss. In the present study, the effects of 10% CO<sub>2</sub> on reactive oxygen species (ROS) metabolism and antioxidant capacity in fresh-cut pear were investigated. The results showed that 10% CO<sub>2</sub> effectively inhibited ROS accumulation during a 5-day storage, accompanied by reducing the content of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) and superoxide anion radical (O<sub>2</sub><sup>-</sup>). Furthermore, non-enzymatic antioxidant properties including free radical scavenging ability (DPPH), total antioxidant capacity (ABTS), and ferrous reducing ability (FRAP) in CO<sub>2</sub>-treated group were increased by 5.5%, 23% and 27% respectively at the end of storage. Additionally, 10% CO<sub>2</sub> treatment enhanced the activities and genes expression levels of catalase (CAT), glutathione peroxidase (GPX), ascorbate peroxidase (APX), glutathione reductase (GR), superoxide dismutase (SOD) and peroxidase (POD), while NADPH oxidase (NOX) were inhibited. The accumulation of ascorbic acid (AsA) and reduced glutathione (GSH) were also accelerated by CO<sub>2</sub>. This study indicated that the generation of ROS was inhibited with inducing effects of genes and enzymes related to antioxidant capacity in response to 10% CO<sub>2</sub>, which eventually alleviated oxidative damage and conserved storage quality of fresh-cut pear.