

# Inhibition effect of super atmospheric O<sub>2</sub> packaging on H<sub>2</sub>O<sub>2</sub>-production and the key enzymes of lignin biosynthesis in fresh-cut Chinese cabbage

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## Abstract

Fresh-cut Chinese cabbage was packaged by super atmospheric O<sub>2</sub>, and held at 4 °C, taking air packaging as control. The contents of lignin and H<sub>2</sub>O<sub>2</sub> and, the activities and transcription expressions of four key enzymes of lignin synthesis, i.e., phenylalanine ammonia-lyase (PAL), 4-coumarate: CoA ligase (4-CL), cinnamyl alcohol dehydrogenase (CAD) and peroxidase (POD), were determined in the cabbage. The results showed that the lignin content of the cabbage packaged by super atmospheric O<sub>2</sub> was markedly reduced ( $p < 0.05$ ) in comparison with control from day 3 to 12 during storage at 4 °C. The H<sub>2</sub>O<sub>2</sub> concentrations in fresh-cut Chinese cabbage under super atmospheric O<sub>2</sub> was lower than that of control during storage at 4 °C and, significantly lower ( $p < 0.05$ ) on day 8 of storage. The activities of PAL, 4-CL, CAD and POD under super atmospheric O<sub>2</sub> packaging were significantly lower ( $p < 0.05$ ) than that of control from day 3 to 12 of storage at 4 °C, except for 4-CL on day 9. Moreover, the transcript expressions of POD genes in the cabbage in super atmospheric O<sub>2</sub> were dramatically reduced compared with control on day 8 of storage at 4 °C. It is suggested that the suppression of lignin synthesis of the cabbage under super atmospheric O<sub>2</sub> packaging was attributed to the inhibition of H<sub>2</sub>O<sub>2</sub>, which feedback-regulated the key enzymes activities directly or indirectly.