

# Ethylene and 1-MCP treatments affect leaf abscission and associated metabolism of Chinese cabbage

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## Abstract

Leaf abscission during storage of Chinese cabbage (*Brassica rapa*, subspecies *pekinensis* and *chinensis*) can result in serious losses. To uncover the effects of the plant hormone ethylene on leaf abscission, harvested cabbages were treated with ethylene and its competitive inhibitor, 1-methylcyclopropene (1-MCP), and with 1-MCP followed by ethylene. Ethylene treatment accelerated leaf abscission, altered cell structure of the abscission zones, and increased activity and gene expression of cell wall-degrading enzymes. Expression of genes related to ethylene receptors and signaling pathways including *BcERS1*, *BcERS2*, *BcETR2*, *BcCTR1*, *BcEIL1*, *BcEIL2*, and *BcEIL3* were also up-regulated. In 1-MCP-treated samples, leaf breakstrength was higher, and the increase of cell wall-degrading enzyme activity and the expression of enzyme-related genes were reduced. Notably, ethylene sensitivity recovered upon subsequent ethylene treatment following 1-MCP treatment. These results indicated that ethylene may constitute an important factor in leaf abscission of Chinese cabbage.