Expression of physical wound stress-responsive genes in *Arabidopsis thaliana* and cabbage (*Brassica oleracea* var. *capitata* L.)

M. Thammawong, T. Kaneta, H. Umehara, N. Nakamura, Y. Ito, T. Shiina

Acta Horticulturae 989: 73-78. 2013.

Abstract

Mechanical disruption of the cell wall results in stress signaling, cellular response, and metabolism changes in plant cells. However, the molecular mechanisms in relation to mechanical/physical stress of fresh produce are still unclear. In this study, we have utilized mechanical wounding as the stress stimulus to study the expression of candidate stress-responsive genes in *Arabidopsis thaliana* leaf (*AtERF#018, CML38, ACS6, PAL1*) and in cabbage (*Brassica oleracea* 'Early Ball') head leaf (*BoCam1, BoCam2*). In *Arabidopsis* leaf, the expression of *AtERF#018* was rapidly induced within 5 min. after the wounding treatment. The increase in the *CML38* and *ACS6* expression levels were observed at 15 min. Although a significant increase of the expression was observed at 60 min. after the wounding treatment, the expression of *PAL1* remained low during the investigation period. For cabbage, the predominant increases in *BoCam1* expression levels in head leaf disks were observed at 30 and 60 min. after treatment. In contrast, the expression level of *BoCam2* was detected at low level and the significant increase in expression of *BoCam2* was found at 120 to 240 min. after the wounding treatment. Expression levels of candidate stress-responsive genes were correlated with the time after stress induction for both *Arabidopsis* and cabbage. Overall, applying a mechanical wounding stimulus clearly affected the expression of stress-responsive genes. The rapid response of these genes may consequently affect the cellular response and metabolism changes in *Arabidopsis* and in cabbage.