

Title Protein degradation and peptidase activity during petal senescence in *Dendrobium* cv. Khao Sanan

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Citation Postharvest Biology and Technology, Volume 52, Issue 1, April 2009, Pages 84-90

Keywords Column; Cysteine peptidase; Flower senescence; Orchid; Peptidase activity; Petal; Protein degradation

Abstract

During ethylene-induced petal senescence in *Dendrobium* cv. Khao Sanan flowers, the levels of water-insoluble protein in petals decreased but the levels of water-soluble proteins were not affected. Total peptidase activity in the petals increased from day 1 of ethylene treatment and showed a peak by day 4. Treatment of excised flowers with E-64, a specific inhibitor of cysteine peptidases, prior to ethylene exposure, almost doubled the time to visible petal senescence. Since the membrane-impermeable form was used, the results might suggest an effect on an extracellular peptidase. Treatment of the flowers with 1,10-phenanthroline, a general metal chelator, also doubled the time to ethylene-induced visible petal senescence. This compound might have several effects other than on metallopeptidases. A partial cDNA encoding a cysteine peptidase gene (*Den-Cys1*) in senescent petals was identified. Its transcript abundance in petals showed a large increase, within one day of the onset of ethylene treatment. Treatment of the flowers with ethylene also resulted in an increase in *DenCys1* abundance, an increase in total peptidase activity, and a decrease of soluble protein, in the column (the organ consisting of fused anthers, filaments, stigma, and style). The results show that senescence, both in petals and the column, is accompanied by increased peptidase activity and degradation of water-insoluble protein. This is the first report to show that a specific inhibitor of cysteine peptidases delays the time to petal senescence.