

Effect of High light Stress in α -tocopherol and Lipid peroxidation Content of *Arabidopsis thaliana*

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Objectives

In general, plants have evolved several mechanisms to protect themselves from stress. Therefore, the objects of this research were to investigate the effect of high light stress in Lipid peroxidation content which is produced by reactive oxygen species and α -tocopherol content which is a kind of antioxidant.

Materials and Methods

- The following *Arabidopsis* mutants have been generated ;
 - Wild type(wt), Vitamin C deficient(vtc 2)
loss of chloroplast ascorbate peroxidase(LAPX, TAPX, SAPX)
Vitamin E deficient(vte2), Double mutant with vtc2
- Condition and Method : Grown at 100 $\mu\text{E}/\text{m}^2\text{sec}$ = LL
Grown at 1000 $\mu\text{E}/\text{m}^2\text{sec}$ = HL
Grown at LL and shifted at HL for 5 days
 - Lipid peroxidation : FOX Assay(ferrous oxidation-xylene orange assay)
 - α -tocopherol analysis
Fluorescence Detector, n-Hexane/Isopropyl ether = 83/17(v/v)
Column : 4.6 x 250mm Lichrosorb Si60A(phenomenex Inc)
Flow rate : 1.8 ml/min, Injection volume : 50ul

Results

- To understand plant response, monitor a number of key physiological parameters; Rosette biomass, diameter and leaves number, Fv/Fm, Lipid peroxidation and α -tocopherol according to high light treatment.
- Upon HL treatment, the rosette diameter of mutants was smaller than wt. but tapx and sapx mutations didn't contribute to a visible phenotype. Especially, vtc and vtc background mutant showed a sensible response than others.
- Fv/Fm decreased sharply first day after high light treatment and then recovered in all mutants. In a case of vtc and vtc background mutants showed more decrease compared with the others.
- High light seems to have a bigger effect on lipid peroxidation and α -tocopherol. lipid peroxidation and α tocopherol were increased upon HL treatment.

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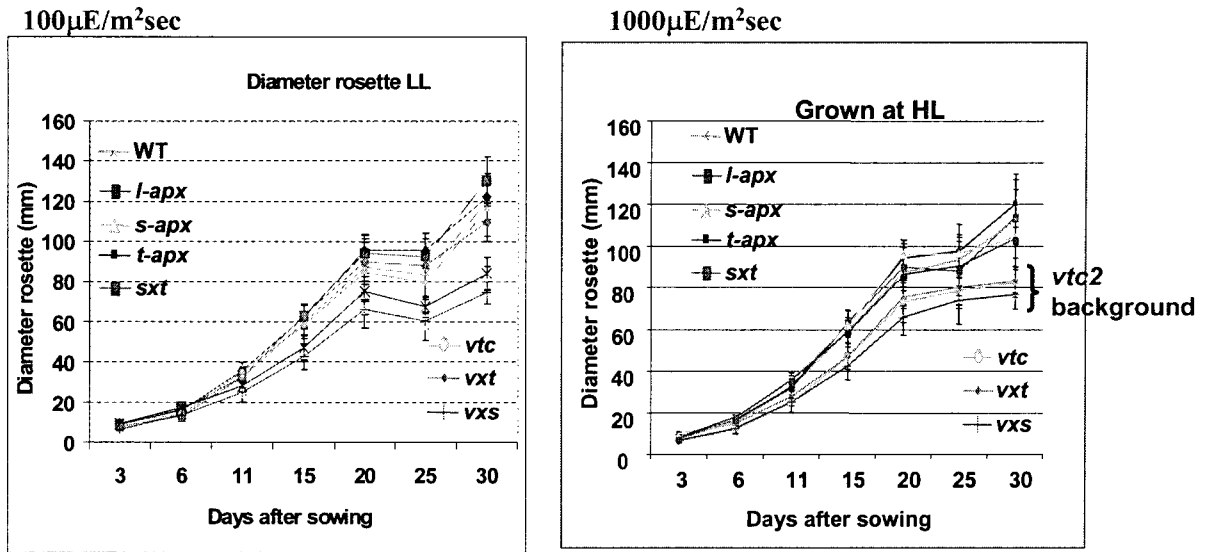


Fig. 1. Rosette diameter and leaf No. of LL- and HL-grown plants.

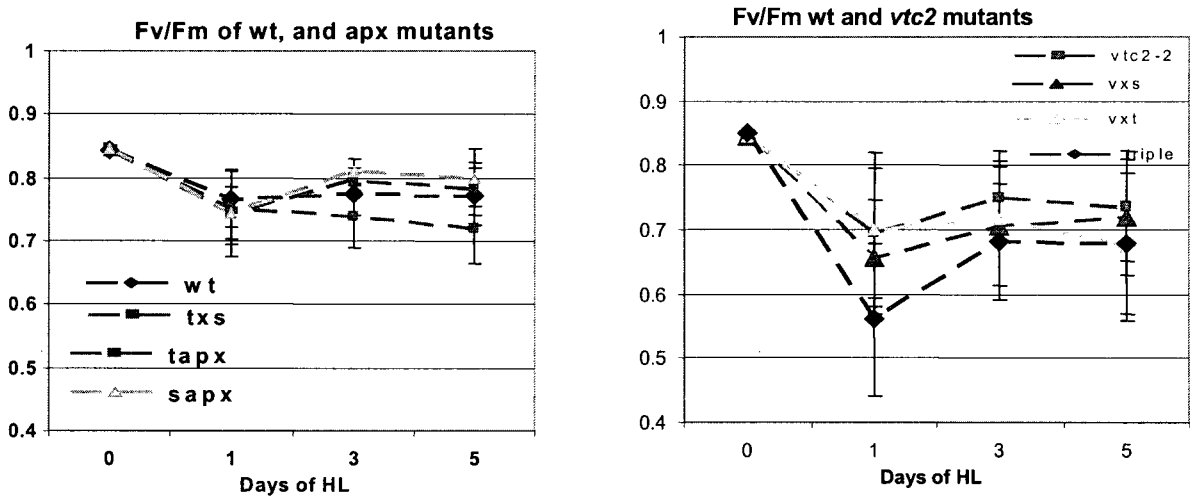


Fig. 2. Photosynthesis parameters of LL- and HL-grown plants (F_v/F_m)

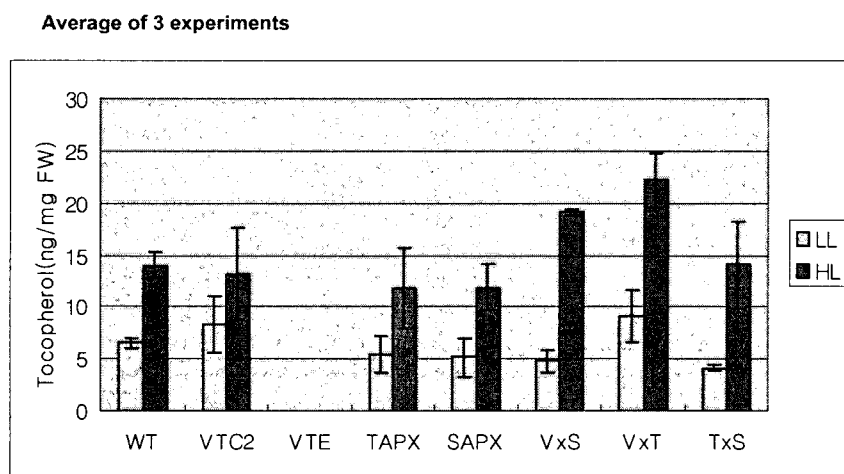


Fig. 3. Tocopherol content of grown plants in LL and HL