

Piyanuch Sornchai 2010: The Expression of Antisense Papaya 1-aminocyclopropane-1-carboxylic acid oxidase and the Physiological Study of Transgenic *Dendrobium* Orchids. Master of Science (Agricultural Biotechnology), Major Field: Agricultural Biotechnology, Interdisciplinary Graduate Program. Thesis Advisor: Assistant Professor Sermsiri Chanprame, Ph.D. 120 pages..

The existence of antisense papaya 1-aminocyclopropane-1-carboxylic acid oxidase (antisense *CPACO*) gene and the physiological characters of transgenic *Dendrobium* ‘Sonia BOM17’ and *Den.* ‘Sonia Earsakul’ were studied. The results revealed that, at 1 year after transplanted, 90% of antisense *CPACO* gene and 100% of selectable marker gene, *hpt*, existed in the transgenic lines as confirmed by PCR technique. The Southern PCR hybridization and dot blot analysis also confirmed the similar results. The genomic Southern blot hybridization revealed the existed of 2-3 sets of genes in ‘Sonia BOM17’ and 1-3 sets of genes in ‘Sonia Earsakul’ transgenic lines as detected by 35S CaMV promoter specific probe.

The expression of antisense *CPACO* gene was studied through the level of ACO enzyme activity and ethylene production in orchid plants. All of the transgenic lines had lower ACO enzyme activity and lower ethylene production than that of the non-transformed orchid plants. In transgenic ‘Sonia BOM17’, the activity of ACO was decreased 41-97% and the ethylene production was decreased 60-76%. Similarly, in transgenic ‘Sonia Earsakul’, the activity of ACO was decreased 41-94.5% and the ethylene production was decreased 42-76%.

The physiological study of transgenic orchid lines, in overall, demonstrated the better growth as compared to the non-transformed plants. The post harvest physiology of flowers from transgenic lines showed similar water uptake compared to the non-transformed flowers. However, the 30% longer vase life than that of the control was observed in flowers of transgenic lines.

---

Student’s signature

---

Thesis Advisor’s signature