Klairung Srikokcharean 2006: *Dendrobium* Orchid Transformation with the *Flavonoid-3′-hydroxylase* (*f3′h*) and *Flavonoid-3′,5′-hydroxylase* (*f3′5′h*) genes by Particle Bombardment Master of Science (Genetics), Major Field: Genetics, Department of Genetics. Thesis Advisor: Assistant Professor Pattana Srifah Huehne, Ph.D. 119 pages.
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Flavonoid-3′-hydroxylase (F3′H) and Flavonoid-3′, 5′-hydroxylase (F3′5′H) are key enzymes in anthocyanin biosynthetic pathway that influence blue and purple formation of color in flower. Thus genetic transformation of *Dendrobium Jaquelyn Thomas* hybrid (*D. phalaenopsis* x *D. gouldii*) and *Dendrobium sonia* 'Earsakul' with *f3′h* and/or *f3′5′h* genes is a strategy to modify flower color. The *f3′h* and *f3′5′h* genes were constructed into plant cassette vectors contaning suitable promoters for gene expression in orchid.

Antisense *f3′h* gene was delivered into orchid protocorms by gold particle coated with pF3′HPEXH2(A) containing flower color *f3′h* gene from *Perilla frustescens* and selectable *hygromycin phosphotransferase*(*hpt*II) gene were driven by CaMV35S promoter and pF3′HTG4(A) consisting of *f3′h* gene under the control of Act-1 promoter was co-bombarded with pMNK1005 containing selectable *hpt*II gene. Furthermore, pF3′5′HTG24(S) containing sense *f3′5′h* gene from *Catharanthus roseus* driven by Act-1 promoter was also co-bombarded with pMNK1005 to the orchid protocorms. After selection on medium containing hygromycin for 14-20 weeks, 29 lines of the hygromycin-resistance *Dendrobium Jaquelyn Thomas* hybrid and *Dendrobium sonia* 'Earsakul' were obtained. The transgenic plantlets gave positive detection of *f3′h*, *f3′5′h* and *hpt*II gene about 0.32-4.8 percentage by PCR and southern blot hybridization techniques.

Klairung Srikokcharean — Pattana Srifah — 29/5/06

Student's signature — Thesis Advisor's signature