Vanunya Rutavepol 2014: Partial cloning of *Alcohol Dehydrogenase* and *Pyruvate Decarboxylase* in Physic nut under Waterlogging. Master of Science (Agronomy), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Mrs. Nonglak Tienseree, Ph.D. 78 pages.

The physic nut water logging stress responses were investigated to evaluate methodologies and parameters suitable for water logging stress indicators. The twomonths old physic nut seedlings , 'Chai-nat', were submerged under 30 cm depth for 15 days. Changes in the total leaf water potential (Ψt), the maximum quantum yield ($\emptyset dark$) and morphological traits were monitored during the experiment. The results show that the total leaf water potential and the maximum quantum yield were decreased along with the water logging duration. The levels of leaf chlorosis, stem cracking and root rot were increased according with the increment of stress duration.

Primers specific to conserve region of *Alcolhol Dehydrogenase (ADH)* and *Pyruvate Decarboxylase (PDC)* were designed and used for PCR with first stranded cDNA template. It yielded the 286 and 337 bp of PCR product, respectively. Nucleotide sequences were analyzed and compared to the NCBI database. It was found that they were similar to *ADH* gene of *Paeonia delavayi* (94%), *Pyrus ussuriensis* (92%) and *Gossypium costulatum* (91%) and similar to *PDC* gene of *Diospyros kaki* (92%) and *Cucumis melo* (91%).

Real-time PCR was performed to determine the expression levels of putative *ADH* and *PDC* genes in leaves and roots of waterlogged physic nut for 6 12 24 48 96 and 192 hr. It was indicated that the highest expression of *ADH* gene was found in leaves and roots of waterlogged physic nut for 12 hr and 6 hr, respectively. For the expression of *PDC* gene, the results revealed that the leaves and roots of waterlogged physic nut for 12 hr and 24 hr showed the highest expression of *PDC* gene.

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