Piyapat Pin-on 2008: Characterization of Two 1-Aminocyclopropane-1-Carboxylate (ACC) Oxidase I and II Flanking Regions and Determination of Their Promoter Activities using Agrobacterium Transient Expression. Master of Science (Genetic Engineering), Major Field: Genetic Engineering, Interdisciplinary Graduate Program. Thesis Advisor: Assistant Professor Ratchanee Hongprayoon, Ph.D. 180 pages.

The *CP-ACO II* 5'flanking region (591 bp) was isolated from Khaek Nuan papaya by ligation-mediated PCR. Sequence comparison of this region and other *ACO* promoters was done using BLASTN program (NCBI). The *CP-ACO I* (1044 bp) and *CP-ACO II* (554 bp) 5'flanking regions were analyzed by PLACE PlantCARE and Plant Prom databases via bioinformatics approach. Several important elements corresponding to seed and endosperm (DOFCOREZM), light responsive (GT1CONSENSUS), hormone responsive (NTBBF1ARROLB), temperature responsive (MYCCONSENSUSAT), dehydration responsive (MYBCORE) and wounding responsive (WRKY71OS) were found in both *CP-ACO I* and *II* 5'flanking regions. However, Antioxidant responsive (ARE1) was found only in *CP-ACO II* 5'flanking region. In order to investigate promoter activity of these flanking regions in plant tissues, seven recombinant expression plasmids were constructed by replacing 35S promoter of pCAMBIA1304 with size and location variation of the flanking regions. They are named CPACOI-SPP, CPACOI-LPP, CPACOI-DOFCORN, CPACOII-SP1, CPACOII-NO-SEboxN, CPACOII-SP3 and CPACOII-SP4. The constructs were transiently transformed using *Agrobacterium* infiltration into flower, leaf, root and fruit tissues. The result indicated that *cis*-acting elements of CPACOI-DOFCORN and CPACOII-SP3 involved with root specific promoter. The 5'flanking region of CPACOI-SPP showed specific expression in flowers. All the constructs drove *GUS* expression in fruit tissue at colour break and ripening stages. The CPACOII-NO-SEboxN showed high *GUS* activity in all tested tissues.

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