Budsarin Imin 2014: Partial Cloning of Betaine Aldehyde Dehydrogenase and Myo-Inositol 1-Phosphate Synthase Genes for Water Deficit Response in Sugarcane. Master of Sciene (Plant Breeding), Major Field: Plant Breeding, Faculty of Agriculture at Kamphaeng Saen. Thesis Advisor: Associate Professor Sontichai Chanprame, Ph.D. 71 pages.

The study of water deficit response of sugarcane cv. Kps 94-13 and Kps 01-11-6 was done. Sugarcane plants were cultured in the medium containing 16 and 28 % PEG for 6, 12, 24, 48, 72, 96 and 120 hrs. It was found that leaf of sucarcane subjected to 28 % PEG were more yellow than leaf in 16 % PEG. At the same PEG concentration and the same duration of stress, sugarcane cv. Kps 94-13 showed less yellow leaf than Kps 01-11-6. The result confirmed that sugarcane cv. Kps 94-13 was more tolerance to water deficit than Kps 01-11-6.

Degenerated primers specific to conserve region of betaine aldehyde dehydrogenase (*BADH*) and myo -inositol 1- phosphate synthase (*MIPS*) were designed and used for PCR with first stranded cDNA template. It resulted the 327 and 402 bp of PCR product. Nucleotide sequences were analyzed and compared to the database. It was found that they were similar to *BADH* gene of corn (90%), sorghum (93%), grass (90%) and rice (86%) and similar to *MIPS* gene of corn (96%), rice (90%), wheat (90%) and grass (89%) respectively.

Real-time PCR was performed to determine the expression levels of putative *BADH* and *MIPS* gene, it was indicated that the highest expression was found in leave and root of Kps 94-13 treated with 28 % PEG for 12 hr while leave and root of Kps 01-11-6 treated with 16 % and 28 % PEG for 12 hr, respectively, showed the highest expression of the gene. For the expression of *MIPS* gene, the results revealed that the leave and root of Kps 94-13 treated with 28 % PEG for 12 hr had the highest expression of the gene. Leave of Kps 01-11-6 treated with 16 % PEG and root of the plant treated with 28 % PEG for 12 hr showed the highest expression of *MIPS* gene.

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