

Analysis of Salt Tolerant Mechanism in Halophyte *Suaeda japonica*

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Summary

*Suaeda japonica* Makino is a halophyte and grows at the shore of Ariake sea in Japan. In this plant, incorporated salts were isolated to vacuoles and high levels of glycinebetaine, compatible solute, were produced in cytosol for maintenance of osmotic balance between vacuole and cytosol. The glycinebetaine is synthesized from betaine-aldehyde by betaine-aldehyde dehydrogenase (BADH). So we tried to isolate the cDNA clone for BADH. The partial cDNA clone for BADH could be isolated, and the nucleotide sequence was determined. The nucleotide and deduced amino acid sequences were extremely homologous to spinach BADH. *S. japonica* and spinach belong to the family Chenopodiaceae. The BADH amino acid sequence in *S. japonica* contained consensus sequence of Val-Thr-Leu-Glu-Gly-Lys-Ser-Pro, which is highly conserved among general aldehyde dehydrogenases. As the results of Southern analysis, *S. japonica* has several copies of BADH genes. The BADH gene was induced by NaCl stress, and expression was stimulated as NaCl concentration increase. The gene also induced by polyethyleneglycol treatment, as substitute for drought stress. Therefore, glycinebetaine was synthesized by both salt and drought stresses and maintained osmotic balance in *S. japonica*. We also tried to create genomic DNA library. Using fragment of BADH as probe, 34 BADH genomic clones could be isolated, these sizes were 16 to 24 kbp. Efforts are directed to obtain more information regarding the mechanism of BADH gene expression, especially cis elements and transcriptional factors, in *S. japonica* under salt stress.