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The Effect of Salinity on Cell Wall Formation in Rices (*Oryza sativa* L. cv. Ilpum-bye and Heukmi)

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Objectives

Salinity is an environmental abiotic stress that involves changes in morphology, physiology and metabolism of plant and limits growth and development in plant. Morphology, cell wall components of salt-treated rice seedlings and peroxidase activity related to the cell wall biosynthesis were compared with non-treated rice seedlings as control in here. This paper discussed the influences of the salinity on the cell wall developing.

Materials and Methods

o The uniformly germinated seeds were selected and transferred to MS medium with 50mM NaCl or without the NaCl supplement. Then rices were grown in growth chamber at 28℃ for 2 weeks.

o Extract free rice seedling residues were used the samples for chemical analyses. Lignin content was determined by an acetyl bromide procedure and neutral sugar composition was performed using an alditol acetate procedure. Peroxidase activities were determined according to the method of Sigma Co.

Results and Discussion

o Although salinity stress in two cultivars (*Oryza sativa* L. cv. Ilpum-bye and Heukmi) inhibits plant growth followed by measuring seedling height about 25.4, and 35.9% respectively, morphology revealed by light microscopy showed almost same pattern.

o In the chemical analyses, the lignin content and neutral sugar of salt-treated rices showed a similar level with control. These results were postulated that the lignification in the cell wall was accelerated by salinity.

o Rice seedling treated with NaCl contained higher levels of POD activity than control sample. Because POD in the cell walls related to the formation of cross-linking among cell wall polymers, NaCl-treated inhibition in height of rice seedling is likely due to the cell wall stiffening process.

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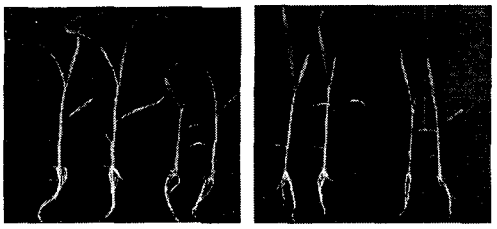

Fig. 1. The phenotypes of Ilpum-bye (left) and heukmi (right) at 2 weeks after sowing.

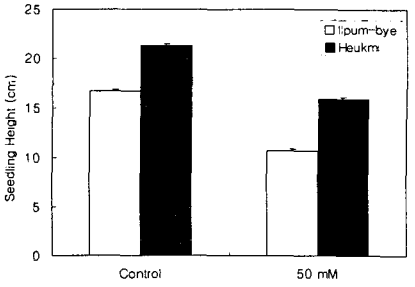

Fig. 2. Seedling height of Ilpum-bye and heukmi at 2 weeks after sowing.

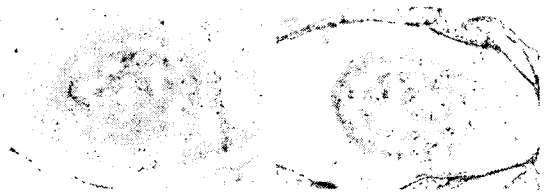

Fig. 3. The cross sections of control (left) and salt-treated rice seedling (right).

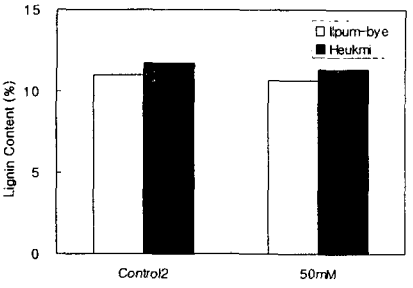

Fig. 4. Lignin content of Ilpum-bye and heukmi at 2 weeks after sowing.

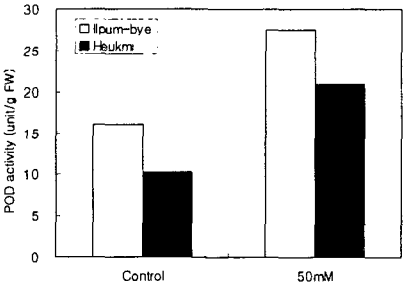

Fig. 5. Influence of NaCl on the level of POD activity in rice seedling.

Table 1. Neutral sugar of cell wall of controls and salt-treated rice seedling

(%)	Ilpum-bye		Heukmi	
	Control	50mM	Control	50mM
Rhamnose	0.06	0.06	0.36	0.05
Arabinose	2.62	2.68	2.90	3.01
Xylose	9.39	9.28	9.50	11.68
Mannose	0.26	0.25	0.67	0.23
Galactose	1.06	1.03	1.09	0.98
Glucose	11.76	14.27	13.70	13.09
Total	25.16	27.56	28.22	29.04