

Chumpunnee Naksiri 2006: Genotypic Evaluation in Eucalyptus (*Eucalyptus camaldulensis* Dehnh.) under NaCl Stress. Master of Science (Agricultural Biotechnology), Major Field: Agricultural Biotechnology, Interdisciplinary Graduate Program. Thesis Advisor: Mr. Suthket Nakasathien, Ph. D. 73 pages.
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NaCl is the predominant salt in most saline environments which is a major limitation to production of plant. Eucalyptus can grow well in moderately salt-affected areas but the yield and survival rate will be reduced when salt concentration in soil gradually increased. The different plant species have developed different mechanisms of salt tolerance. Understanding how the plant responds and adapts to NaCl stress will be one of the key success factors for improving salt-tolerant species. The methods can be further developed to use for NaCl tolerant screening in eucalyptus and with other plant species. Therefore, the objective of this research were to develop screening methods covering the physiological response of eucalyptus under NaCl stress between salt tolerant and salt sensitive clones, an evaluation the genotypic differences by studying expression of Cu/Zn SOD and APX genes, and identification and characterization of unique proteins expressed in eucalyptus leaves corresponding to stress conditions. Six clones of *Eucalyptus camaldulensis* Dehn. (C1, C2, C3, C4, C5 and C6) were grown in Hoagland solution under saline conditions (0 (Control), 100 mM NaCl and 200 mM NaCl). The result showed that growth and development of all clones were affected by 200 mM NaCl treatment, so we will use this level as a criterion for screening. Three clones of eucalyptus were selected, composed of C1 and C5 (as salt-tolerant clones) and C4 (as a salt-sensitive clone). When studies of plant growth under NaCl stress. At 21 days after NaCl treatment, it was found that C5 was more tolerant than those of C1 and C4 when cultured in 200 mM NaCl. Clone 5 showed significantly higher biomass and survival rate when compared with the other two clones. While the Cu/Zn SOD and APX gene expression in leaves of C4 and C5 were increased and greater than that of C1 when increasing NaCl concentration from 0 to 100 and 200 mM, respectively. When comparing the leaf protein profiles of treated plants with control by using 10% SDS-Polyacrylamide Gel Electrophoresis, it revealed that some leaf proteins could express in higher levels when compared to those of control. It was found that the intensity of the 28 and 70 kDa protein bands in treated-clone, C5 were greater than those of control. These two proteins which were increased by salt stress were identified by using Liquid Chromatography-Mass Spectrometry (LC-MS/MS) method. The partial amino acid sequences of 28 and 70 kDa showed similarity to those of ATP Synthase CF1 Beta subunit and Heat Shock Protein 70 (HSP70). This suggested that Cu/Zn SOD gene, APX gene, ATP Synthase CF1 Beta subunit and Heat Shock Protein 70 involved with mechanism of salt tolerance in eucalyptus.

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Student's signature



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