

Phosphoproteomic Analysis of the Response of Rice Leaves to Chitosan under Drought Stress

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Abstract : Chitosan has been proposed as a natural polymer, and it is derived from chitin. The objective of this research was to determine the growth promoting responses induced by chitosan at the molecular physiology level in Khao Dawk Mali 105 (KDML 105) rice (*Oryza sativa* L.) seedlings under drought stress by adding of 2% polyethylene glycol 4000 (PEG4000) to the nutrient solution and after removal of the drought stress (re-water). Oligomeric chitosan at 40 ppm could enhance shoot fresh weight and shoot dry weight during drought stress and re-water. After 7 days of drought stress and re-water, significant increases in chlorophyll a and chlorophyll b contents in KDML 105 cultivar were observed. The 749 phosphoproteins in rice leaf treated with chitosan could be resolved by phosphoprotein enrichment, tryptic digestion and liquid chromatography-tandem mass spectrometry (LC-MS/MS) analysis. They can be classified into 10 groups. Proteins involved in the metabolic process and biological regulation were upregulated in response to chitosan during drought stress. This work will help us to understand protein phosphorylation relating to chitosan response during drought stress in aromatic rice seedlings.

Keywords : Chitosan, drought, phosphoproteome, rice

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