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Functional analysis of Cyanobacterial *groEL*$_2$ in tobacco plants for abiotic stress tolerance

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In order to improve the abiotic stress tolerance in plants, we attempted gene transfer methodology using molecular chaperone like *groEL*$_2$ from Synechocystis PCC6803 and chloroplast transit peptide (CTP) of the small subunit of the Rubisco complex from *Brassica juncea*. Transgenic tobacco plants were generated with and without chloroplast targeting of *groEL2* and they were able to tolerate abiotic stresses induced by sodium chloride, mannitol, cadmium chloride, and methyl viologen. To better understand the role of chloroplast targeting of *groEL*$_2$ (CTP-groEL2) over the normal transgenic *groEL*$_2$ and the non transformed tobacco plants, we compared the performance by subjecting the plants to drought stress and measured their photosynthetic efficiency using Handy Pea. Seedling assays showed that CTP-*groEL*$_2$ plants exhibited enhanced tolerance to abiotic stresses. Damage caused by the induced stress was lower in CTP-*groEL*$_2$ expressing tobacco transgenic plants compared to the *groEL*$_2$ expressing transgenic plants and the wild type as assessed by their higher relative water content, higher total chlorophyll content, lower MDA, reduced super oxide and H_2O_2 accumulation. Enhanced levels of different antioxidant enzymes and molecules were present in the CTP-*groEL*$_2$ plants when compared to the wild type under similar stress. Analysis of chlorophyll a fluorescence using specific energy fluxes, quantum yields and efficiencies along with performance index etc showed that CTP-*groEL*$_2$ plants tolerated drought conditions more efficiently, when compare to other plants.

These attributes in transgenic tobacco ultimately prove the importance of chloroplast targeting of *groEL*$_2$ as a potential approach in alleviating abiotic stress tolerance.

Biography

Ch Jyotsna is pursuing Ph.D. in Plant Biotechnology under the supervision of Prof P B Kirti from Department of Plant Sciences, University of Hyderabad, Hyderabad. She has completed master's degree in Environmental Biotechnology from Jawaharlal Nehru Technological University, Hyderabad, India.

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Effect of planting geometry and seedling density on growth, yield and quality of aromatic rice under SRI based cultivation practices

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A field experiment was conducted to evaluate the effect of planting geometry and seedling density on utilization of solar radiation of aromatic rice under SRI based cultivation practices during *kharif* 2012. The experiment was laid out in randomized block design (RBD) with three replication and fourteen treatments which included six types of spacing and three types of seedling densities.

The result indicated that highest utilization of solar radiation and lowest light transmission ratio was found under the treatment of 25 cm x 25 cm spacing + 1-2 seedlings hill^{-1} (T_1), due to wider spacing and single seedling hill^{-1}. The yield of this treatment was statistically similar with higher producer treatment 25 cm x 25 cm spacing + 2 to 3 seedlings hill-1 (T_2). Therefore, these treatments utilized better solar energy and ultimately help for more yields.

Biography

Damini Thawait has completed her M.Sc. (Agronomy) in 2012-2013 from Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh. She has published more than 8 papers in reputed journals.

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