CHLOROPLAST STRUCTURE, CHLOROPHYLL-PROTEIN COMPLEXES AND POLYPEPTIDE COMPOSITION IN PLANTS WITH DIFFERENT SUSCEPTIBILITY TO DARK-CHILLING STRESS

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The alterations in chloroplast structure, arrangement of chlorophyll-protein (CP) complexes and thylakoids polypeptide composition were investigated in chilling-sensitive bean (*Phaseolus vulgaris* L.) and tomato (*Lycopersicon esculentum* Mill.), as well as in chilling-tolerant (CT) pea (*Pisum sativum* L.) plants. The dark chilling-induced events were studied in isolated thylakoids, intact chloroplasts and leaf discs of control plants grown at 25^{o}C and of detached leaves that were chilled for 5 days in the dark at 1^{o}C. The decrease of fluorescence, recorded at 120^{o}K and 25^{o}C, was observed in thylakoids isolated from chilled bean and tomato leaves but not in thylakoids obtained from pea. Dark-chilling stress seemed to induce the relative increase of LHCII aggregation and disconnection of LHCI from LHCI-PSI complexes in CS plants as were shown by the appearance of characteristic bands in emission and excitation fluorescence spectra, while in pea (CT) the arrangement of CP complexes was not disturbed. Furthermore, the non-denaturing electrophoresis revealed lower stability of LHCI-PSI and LHCII trimers in thylakoids obtained from chilled tomato and bean leaves in comparison with pea ones. In addition, the changes in abundance of particular protein were analyzed in thylakoids prepared from both CS and CT plants. Confocal laser scanning fluorescence microscopy showed, that dark-chilling stress decreased the fluorescence intensity of thylakoid grana and disrupted three-dimensional regular grana arrangement in isolated bean and tomato chloroplasts in contrast to pea chloroplasts. These results suggest that dark-chilling stress induces disassembly and partial rearrangement of CP complexes in tomato and bean (CS) but not in pea (CT). Chl *a* fluorescence measurements from leaves discs confirmed the observation obtained from investigations of thylakoids.

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