

THE EFFECT OF LIGHT-CHILLING ON THE STRUCTURE OF PHOTOSYNTHETIC SYSTEMS IN CUCUMBER LEAVES

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Chilling-sensitive plants are damaged severely by chilling in the light. The activity of photosystem I(PSI) is known to be inhibited by low light-chilling and its iron-sulfur centers are presumed to be its primary target. In this report, the effect of chilling at 4°C in the light was investigated in the level of pigment-protein complexes in cucumber leaves compared with pea leaves. The complexes were separated in a native green gel and an increase in the intensity of a band was observed only in light-chilled cucumber. The 77K fluorescence and absorption spectra of this green band indicated that this band was mainly composed of PS I. Each lane was cut from the green gel and separated on a fully denaturing SDS-PAGE in the second dimension. The polypeptide composition of this band indicated that a 16.5 kDa and two peripheral polypeptides at the stromal side of PS I, PsaD(19 kDa) and PsaE(18 kDa), were missing. These results suggested that light-chilling facilitates the release of two peripheral polypeptides resulting in the inactivation of PS I in cucumber leaves. However, whether the light-chilling causes this loss of polypeptides directly or via the inactivation of iron-sulfur centers is under investigation.