

Effect of Membrane Fluidity on Photoinhibition of Isolated Thylakoids Membranes at Room and Low Temperature

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The relationship between thylakoid membrane fluidity and the process of photoinhibition at room and low (4 °C) temperature was investigated. Two different membrane perturbing agents – cholesterol and benzylalcohol were applied to manipulate the fluidity of isolated pea thylakoids. The photochemical activity of photosystem I (PSI) and photosystem II (PSII), polarographically determined, were measured at high light intensity for different time of illumination at both temperatures. The exposure of cholesterol- and benzylalcohol-treated thylakoid membranes to high light intensities resulted in inhibition of both studied photochemical activities, being more pronounced for PSII compared to PSI. Time dependencies of inhibition of PSI and PSII electron transport rates for untreated and membranes with altered fluidity were determined at 20 °C and 4 °C. The effect is more pronounced for PSII activity during low-temperature photoinhibition. The data are discussed in terms of the determining role of physico-chemical properties of thylakoid membranes for the response of photosynthetic apparatus to light stress.