

The aim of this thesis was to compare the efficiency of triplet excitation transfer from chlorophylls to carotenoids in samples with their various mutual organizations. We have used samples with pigments in photosynthetic complexes in thylakoid membranes and samples with isolated pigments dissolved in a solution or concentrated in micelles. We have measured both time-resolved and steady-state absorption. Time-resolved transient absorption measurements showed that only the organization of pigments in photosynthetic complexes enabled triplet-triplet energy transfer from chlorophylls to carotenoids, and thus prevented production of reactive singlet oxygen. In the solution and in the micelles, a collision mechanism governs this transfer. Even though the total concentration of pigments was comparable with the one in thylakoid membranes, the local concentration was too low to make this triplet-triplet energy transfer efficient. We have also studied the degradation of the samples in time. Steady-state absorption spectra measured in different days showed that pigments in the solution and in micelles exposed to sunlight degraded quickly while pigments in thylakoid membranes decomposed slower and membranes tended to cluster.