The main objective of the thesis is to improve signal-to-noise ratio for pigments' triplet states in photosystem I. The sample was purified from cyanobacterium *Thermosynechococcus elongatus*. Based on the measurements we could deduce that the sample with optimal concentration has an absorbance about 0,7. It is beneficial to remove oxygen for example by nitrogen bubbling. Anaerobic conditions help to increase the lifetime of carotenoid triplet states and to protect the sample from damage. Depending on the time of measurement we choose the maximal energy of the excitation pulse, which does not cause any significant damage to the photosystem. For the measurement, which takes about two hours, we find it is optimal to use the excitation energy from 1,5 mJ to 2 mJ. The relaxation processes in the photosystem are fast during the first 100 ns. It is, therefore, necessary to use the shortest detection time, which is in our case a gate of 2 ns. At the later delays, it is possible to increase the gate to about 10 ns and at the same time to decrease the amplification of the measurement light (gain) so the final intensity of the signal would not change. This will contribute to a significant reduction of noise for the later delays.