pH-induced fluorescence quenching in LHC II complexes - Lessons from *in vitro* studies

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NPQ (Non-photochemical quenching) is an existing photo-protection mechanism in plants and algae that guarantee the good functioning of the photosynthetic process. Many studies place the Light-Harvesting Complex II (LHCII) antenna protein as the main action centre of this mechanism. It is also well accepted that the pH plays a decisive role in the LHCII antenna aggregation process to carry out the photoprotection. On the other hand, Fluorescence Correlation Spectroscopy (FCS) and single photon detection microscopy are very useful tools for the characterization of macromolecules and it´s interaction with the surrounding environment. These single (quasi-single) molecule methods allow the detailed study of phenomena such as diffusion and photophysics of almost any fluorescent compound of interest. In this work, we took advantage of this versatility to characterize the oligomerization process of LHCII in the presence of n-dodecyl-beta-D-maltoside under different conditions of pH and detergent concentration. We found that decrease in pH provoke specific oligomerization of LHC trimers at sub-micellar detergent concentration and the rupture of the salt bridges at the luminal side of LHCII seems to be the cause of the conformational change previous to oligomerization.