IRN-FJFPB

Webinar « Photosynthesis and Metabolism »

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Probing photosynthesis by EPR spectroscopy

Photosynthesis has enormous potential to meet the great challenges of this century concerning alternative energy, food, sustainable agriculture and climate change. One promising approach is to enhance the efficiency of photosynthesis that aims to increase the conversion of light energy into biomass. Understanding in detail photosynthesis and its regulation will as well stimulate the development of efficient photo-catalysts to use in artificial photosynthesis.

The conversion of solar energy into chemical energy of photosynthesis occurs in thylakoid membranes through the concerted actions of several protein complexes. Of these complexes, Photosystem I and II, Cytochrome b6f and Plastocyanin contain organic free radicals and metal transition ions that are responsible of electron transfer reactions and membrane bioenergetics. Together with triplet states, organic free radicals and metal transition are paramagnetic species that can be monitored by Electron Paramagnetic Resonance (EPR) spectroscopy providing detailed information on the structure of key biological molecules and their interaction with the surrounding environment. Here, I will show you how we use EPR spectroscopy to investigate photosynthesis, particularly the water oxidation mechanism in Photosystem II.