Stimulation of Oxygen Evolution in Photosystem II by Copper(II) Ions

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We have found that Copper(II) ions at about equimolar Cu^{2+}/photosystem II (PS II) reaction center proportions stimulate oxygen evolution nearly twofold. This high affinity Cu-binding site is different from the binding sites of Mn and Ca ions. The analysis of the Cu^{2+} content in PS II preparations isolated from wild-type tobacco and a tobacco mutant deficient in light-harvesting complex suggests that Cu^{2+} may be a native component of PS II and may take part in the oxygen evolution process. At higher concentrations, Cu^{2+} ions inhibit oxygen evolution and quench fluorescence.