

化学交联处理对PS II 放氧核心复合物荧光光谱的影响

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选用5种交联剂(EDC、DCC、HMDI、EGS和DTSP),在不同浓度条件下交联处理PS II 放氧核心复合物,测定了交联样品的室温荧光发射光谱和荧光激发光谱。结果表明:交联处理对PS II 放氧核心复合物叶绿素荧光和蛋白内源荧光都有影响,引起682 nm处叶绿素荧光强度的降低、308 nm或328 nm处蛋白质内源荧光强度的增大或减小,并与处理时所用交联剂的浓度、交联剂的亲疏水性和交联臂长相关。亲水性EDC对PS II 的蛋白质中Tyr和Trp残基所处微环境的影响较小;而亲脂性DCC、HMDI、EGS、DTSP对PS II 放氧核心复合物蛋白质中Tyr、Trp微环境和682 nm处叶绿素荧光影响大,可能它们参与了PS II 放氧核心复合物内部的蛋白疏水区域交联。

EFFECTS OF CROSSLINKING ON THE FLUORESCENCE SPECTRA OF OXYGEN-EVOLVING PS II CORE COMPLEXES

Oxygen-evolving PS II core complexes were treated with five crosslinking agents at different concentration, then the chlorophyll fluorescence emission, excitation, and intrinsic fluorescence spectra of these samples were measured in order to know whether crosslinking reaction affect the fluorescence properties of the samples. The results showed that both chlorophyll fluorescence and intrinsic fluorescence of oxygen-evolving PS II core complexes were altered by the crosslinking reaction. The maximum chlorophyll fluorescence peak at 682 nm decreased and the intrinsic fluorescence emission intensity at 308 nm and 328 nm either increased or decreased. These changes were relevant to the concentration, the hydrophilic or hydrophobic nature and the length of arm spacers of crosslinker. Oxygen-evolving PS II core complexes treated with hydrophilic crosslinker EDC showed a slight change in the microenvironments of Tyr and Trp residues. However, Oxygen-evolving PS II core complexes treated with hydrophobic crosslinkers such as DCC, HMDI, EGS, and DTSP showed a distinctly change in both the microenvironments of Tyr and Trp residues and chlorophyll fluorescence spectra, since they could react with the interior target groups in the hydrophobic regions of oxygen-evolving PS II core complexes.

关键词

化学交联(Crosslinking); 放氧核心复合物(Oxygen-evolving PS II core complexes); 叶绿素荧光(Chlorophyll fluorescence); 蛋白质内源荧光(Intrinsic fluorescence)