

去污剂SDS和OGP扰动后光系统 II 的蛋白热稳定性研究

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对去污剂SDS和OGP扰动后的光系统 II (PS II) 的稳定性进行了分析研究。在不同的去污剂条件下, 对PS II 进行了放氧活性和叶绿素荧光参数的测定, 并使用圆二色 (CD) 光谱和差式扫描量热法 (DSC) 进行了分析。实验表明SDS扰动导致PS II 的放氧活性和叶绿素荧光参数 F_v'/F_m' 降低, 但对叶绿素激子相互作用影响很小。而OGP扰动对PS II 的放氧活性和叶绿素荧光参数 F_v'/F_m' 影响不大, 但减弱了叶绿素激子相互作用。结果说明SDS对PS II 的外周蛋白扰动显著, 而OGP主要对PS II 的内在膜蛋白有扰动作用。结合DSC分析的结果, 说明PS II 中外周蛋白受扰动会大大降低PS II 整体的热稳定性, 而内在膜蛋白受扰动对PS II 整体的热稳定性并没有明显的影响。

THERMAL DENATURATION OF SDS- AND OGP-PERTURBED PHOTOSYSTEM II MEMBRANE

Thermal denaturation of SDS- and OGP-perturbed photosystem II membrane was studied using oxygen electrode, variable fluorescence, circular dichroism (CD) spectroscopy and differential scanning calorimetry (DSC). The oxygen-evolving activity and chlorophyll fluorescence parameter F_v'/F_m' of PS II rapidly decreased after the detergent SDS treatment, while the excitonic interaction between chlorophyll molecules showed no obvious changes. The OGP treatment on PS II decreased the excitonic interaction between chlorophyll molecules and had slight effect on the oxygen-evolving activity and chlorophyll fluorescence parameter F_v'/F_m' . The results suggest SDS perturbation can primarily affect the extrinsic proteins and OGP mainly influences the integral membrane proteins of photosystem II. Combined with DSC analysis, the results indicate that the effect of perturbed extrinsic proteins on the thermal stability of photosystem II is different from that of the disturbed integral membrane proteins.

关键词

光系统 II (Photosystem II); Sodium dodecyl sulfate (SDS); n-octyl- β -D-glucopyranoside (OGP); 激子相互作用 (The excitonic interaction); 热变性 (Thermal denaturation)