

园艺—研究报告

高温对北方白黄瓜果实表面光系统II光能利用效率的影响

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摘要:

采用MINI-IMAGING-PAM成像叶绿素荧光仪,测试了高温处理后黄瓜果实表面叶绿素荧光动力学参数,分析探索了高温对黄瓜果实表面光系统II(PS II)光能吸收利用效率的影响。结果表明高温处理后,果实表面初始荧光Fo和非调节性能量耗散量子产量Y(NO)随温度的升高而升高;最大荧光Fm、最大光化学效率Fv/Fm、实际量子产量Y(II)和调节性能量耗散量子产量Y(NPQ)随温度的升高而降低。综合分析表明,温度在46℃以下时,果实表面的光合机构以调节性能量耗散来保护反应中心,维持反应中心较高的光能吸收利用效率;46℃以上的高温使果实表面调节性能量耗散机构失活,过剩能量以热耗散形式散发,破坏了光合机构。

关键词: 北方白黄瓜

The Effect of High Temperature on Light Utilization Efficiency of Photosystem II in Cucumber

Abstract:

The aim was to investigate the effect of the high temperature on the light utilization efficiency of photosystem II of cucumber fruit. The effects of high temperature stress on the chlorophyll fluorescence parameters of cucumber fruit were measured by MINI-IMAGING-PAM. The results showed that the initial fluorescence (Fo) and quantum yield of unregulated energy dissipation Y(NO) of cucumber fruit were raised with the temperature. In contrary, the maximal fluorescence (Fm), maximal photochemical (Fv/Fm), effective quantum yield Y(II) and quantum yield of regulated energy dissipation Y (NPQ) of PS II were reduced. The photosynthetic apparatus were protected by the increased quantum yield of regulated energy dissipation and keeping the higher efficiency of reaction centers when the temperature was under 46℃. With the temperature rising again, the excessive light was dissipated by the regulated energy dissipation apparatus of fruit, and destroyed the photosynthetic apparatus.

Keywords: cucumber fruit

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