应用生态学报 2006 17 (03): 403-407 ISSN: 1001-9332 CN: 21-1253/Q

研究报告

NO_3^-胁迫及恢复对黄瓜幼苗叶片叶绿素荧光参数及ATPase活性的影响

杨凤娟[1],王秀峰[1],魏珉[1],苏秀荣[2],闫童[1]

[1]山东农业大学园艺科学与工程学院，泰安 271018;[2]山东农业大学化学与材料科学学院，泰安 271018

收稿日期 2005-4-1 修回日期 2005-7-11 网络版发布日期 接受日期

摘要

通过水培试验,探讨了不同NO_3^-浓度胁迫及恢复对黄瓜幼苗叶片叶绿素含量、叶绿素荧光参数及ATPase活性的影响.结果表明，胁迫7 d后，高浓度NO_3^-(168 mmol·L^{-1})可极显著提高叶绿素a、叶绿素b、总叶绿素和类胡萝卜素含量,极显著提高初始荧光(F_o)、Mg ATPase和Ca-ATPase活性，而PSⅡ原初光能转化效率(F_v/F_m)、PSⅡ潜在活性(F_v/F_o)和PSⅡ光合电子传递量子效率(ΦPSⅡ)，却随NO_3^-浓度的增加而降低.恢复7 d后，所有处理叶绿素和类胡萝卜素含量均低于对照；初始荧光基本都恢复至对照水平;PSⅡ原初光能转化效率和PSⅡ光合电子传递量子效率在NO_3^-浓度低于126 mmol·L^{-1}时，基本恢复至对照水平，而高于这一水平时，仍显著低于对照;PSⅡ潜在活性在NO_3^-浓度为42和126 mmol·L^{-1}的处理基本达对照水平，其它处理仍极显著低于对照；Mg-ATPase和Ca-ATPase活性均出现先降低后升高的变化趋势.

关键词 NO_3^-胁迫 黄瓜 叶绿素 荧光参数 ATPase

分类号

Effects of NO_3^-stress and recovery on chlorophyll fluorescence parameters and ATPase activities of cucumber seedling leaves

YANG Fengjuan[1],WANG Xiufeng[1],WEI Min[1],SU Xiurong[2],YAN Tong[1]

[1]College of Horticulture Science and Engineering,Shandong Agricultural Univeristy,Tai'an 271018,China;[2]College of Chemistry and Material Science,Shandong Agricultural University,Tai'an 271018,China

Abstract

With water culture,this paper studied the effects of NO_3^- stress and recovery on the chlorophyll contents,chlorophyll fluorescence parameters,and ATPase activities of cucumber seedling leaves.The results showed that under stress for 7 days,the chlorophyll a,chlorophyll b,total chlorophyll and carotenoid contents,intrinsic fluorescence (F_o),and Mg ATPase and Ca-ATPase activities were increased significantly when the NO_3^- concentration was high (168 mmol ·L^{-1}),while the intrinsic photochemical efficiency (F_v/F_m),potential activities (F_v/F_o) and quantum yield (ΦPSⅡ) of PSⅡ were decreased with increasing NO_3^- concentration.After

recovery for 7 days,the chlorophyll and carotenoid contents of all treatments with NO_3^- were lower than CK,while the intrinsic fluorescence,intrinsic photochemical efficiency and quantum yield of PSⅡ were similar to CK when the NO_3^- concentration was ≤ 84 mmol·L^{-1},and the F_v/F_m and ΦPSⅡ were significantly lower than CK when the NO_3^- concentration was>84 mmol·L^{-1}.The potential activity of PSⅡ was similar to CK when the NO_3^- concentration was 42 and 126 mmol·L^{-1},but significantly lower than CK in other treatments.The activities of Mg-ATPase and Ca-ATPase were decreased firstly but increased then when the NO_3^- concentration was>84 mmol·L^{-1}.

Key words NO_3^- stress Cucumber Chlorophyll Fluorescence parameters ATPase

DOI:

通讯作者