

研究报告

一氧化氮对杨树耐旱性的影响

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摘要

探讨了外源NO对水分胁迫下杨树叶片质膜相对透性、叶片光合作用和氧化伤害保护酶的影响.结果表明,NO供体硝普钠(sodium nitroprusside, SNP)能提高杨树叶片的含水率,在水分胁迫(PEG 6000渗透液处理)下,能缓解叶片的水分丢失.NO对杨树叶片光合作用具有双重性,低浓度SNP(200、500 $\mu\text{mol}\cdot\text{L}^{-1}$)能促进叶片的光合,高浓度SNP(1 000、2 000 $\mu\text{mol}\cdot\text{L}^{-1}$)则明显抑制叶片的光合.较短时间水分处理胁迫(1 h)的杨树叶片SOD和POD活性显著高于较长时间(3 h)水分胁迫下叶片的酶活性.经SNP处理后,各处理组POD、SOD活性明显上升.同时,随SNP浓度的增加,POD和SOD活性表现出先上升后下降的趋势.外源NO可通过诱导POD和SOD活性的上升,延缓活性氧的积累,从而减轻水分胁迫对杨树的伤害,增强树木的耐旱能力.

关键词 [杨树](#); [水分胁迫](#); [一氧化氮](#); [氧化伤害](#); [保护](#)

分类号

Effects of exogenous nitric oxide on drought-resistance of poplar

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Abstract

This paper studied the effects of NO donor sodium nitroprusside (SNP) on the photosynthesis and active oxygen-scavenging enzyme activities of poplar leaves under drought stress. The results showed that SNP had a remarkable positive effect on leaf water content. When the SNP level was $>500 \mu\text{mol}\cdot\text{L}^{-1}$, no significant difference in leaf water content was found between SNP treatments. SNP could increase photosynthesis rate, photochemical efficiency of PSII (F_v/F_m), and ratios of F_m/F_o and F_v/F_o , but the effects decreased with the prolongation of drought stress. The SOD and POD activities of poplar leaves were higher in short time (1 h) drought stress than in longer time (3 h) one. The activity of POD was increased by SNP, while that of SOD was changed little. With increasing SNP level, the POD and SOD activities first increased and then decreased. The NO donor could retard the accumulation of active oxygen through inducing POD and SOD activities, alleviate the effects of drought stress on photosynthesis, and increase the drought-resistance of poplar.

Key words [Poplar](#) [Water stress](#) [Nitric oxide](#) [Oxidation damage](#) [Protection](#)

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