

研究论文

等渗水分与盐分胁迫对烟草种子萌发的影响及外源甜菜碱的保护作用

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收稿日期 2004-6-3 修回日期 2004-12-29 网络版发布日期 接受日期

摘要 在烟草 (*Nicotiana tabacum* L.) 种子萌发期, 首先用0.5 mmol/L甘氨酸甜菜碱浸种, 再用等渗的25% PEG-6000和1.6% NaCl溶液进行胁迫处理, 研究了两种胁迫对烟草种子萌发的抑制以及外源甜菜碱对该抑制的缓解作用, 并对其生理机制进行了探讨。结果表明, 两种胁迫处理对烟草种子的萌发均产生抑制作用, 均降低其发芽率、发芽势和发芽指数以及萌发期间的抗氧化酶活性。外源甜菜碱浸种促进了烟草种子的萌发, 提高了萌发种子的抗氧化酶活性, 减轻了膜脂过氧化程度, 保护了膜系统的完整性。等渗的PEG-6000和NaCl溶液比较, 后者使种子萌发时期的外渗电导率增加, 而前者却使外渗电导率降低。

关键词 [甜菜碱](#) [水分胁迫](#) [盐分胁迫](#) [烟草](#) [种子萌发](#) [膜脂过氧化](#)

分类号 [S572](#)

Effects of Isotonic Water and Salt Stress on Seed Germination of Tobacco and Protective Function of Exogenous Glycinebetaine

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Abstract Drought and salt are the two most serious abiotic stresses affecting the yield of crops including tobacco throughout the world. As a good osmolyte and macromolecular-protective substance, there are lots of researches on glycinebetaine (GB). Tobacco can't synthesize glycinebetaine itself and transgenic tobacco is difficult to be extended in the practice, therefore, exogenous GB is necessary to be used to improve the stress tolerance of tobacco. In this study, tobacco seeds were soaked with 0.5 mmol/L GB solution, then the isotonic osmotic stresses were imposed by 25% PEG-6000 and 1.6% NaCl solution during seed germination. The effects of the two kinds of osmotic stresses and exogenous GB on seed germination and their physiological mechanisms were studied. The results showed that seed germination was inhibited by both two kinds of stresses. The lower activities of anti-oxidant enzymes and serious peroxidation of membrane lipid under stress conditions were the important reasons of decreasing the percentage and vigour of germination in tobacco. Exogenous GB could promote seed germination, increase the anti-oxidant enzyme activities, alleviate peroxidation of membrane lipid, and stabilize the plasma membrane. The electric conductivity of the germinating seeds could be decreased by 25% PEG-6000, but increased by 1.6% NaCl.

Key words [Glycinebetaine](#) [Water stress](#) [Salt stress](#) [Tobacco](#) [Seed germination](#) [Peroxidation of membrane lipid](#)

DOI:

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