

外源氮对NaCl胁迫下库拉索芦荟生理特性的影响

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Effects of supplemental nitrogen on physiological characteristics of *Aloe vera* seedlings under NaCl stress

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摘要

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摘要 温室盆栽条件下,研究了外施不同浓度硝酸铵对200 mmol/L NaCl胁迫下库拉索芦荟叶片离子含量、质膜透性、丙二醛含量及脯氨酸和可溶性糖积累的影响。结果表明,外施不同浓度NH₄NO₃ (3.75 ~ 18.75 mmol/L)能够显著增加200 mmol/L NaCl胁迫下植株干重,明显促进芦荟叶片脯氨酸和可溶性糖积累,提高叶片K⁺、Ca²⁺含量,抑制叶片对Na⁺、Cl⁻的吸收;同时促进K⁺和Ca²⁺向相对幼嫩叶片、Na⁺和Cl⁻向相对成熟叶片中的积累。外施氮显著降低盐胁迫下叶片细胞质膜透性和丙二醛含量。各项指标变化表明,外施11.25和15 mmol/L NH₄NO₃对盐胁迫下芦荟生理特性的调控作用较好;外源氮缓解芦荟盐害与氮促进盐胁迫下叶片离子选择吸收、增加有机渗透物质积累及维持植株体内养分平衡有关。

关键词: 芦荟 氮 盐胁迫 离子 渗透调节物质 芦荟 氮 盐胁迫 离子 渗透调节物质

Abstract:

Soil salinization is one of the important factors which adversely affect the crop growth and yield. Recently, use of saline land has become a hot research topic around the world. Our objective is to investigate the effect of supplemental nitrogen on physiological characteristics of aloe under saline conditions, which has both theoretical and practical significance in exploitation of coastal mudflats. In the greenhouse, pot experiment was conducted to study the effects of nitrogen on the electrolytic leakage and the content of ions, MDA, proline, soluble sugar of aloe (*Aloe vera* L.) under NaCl stress. The results showed that plant dry weight, content of K⁺, Ca²⁺ and accumulation of proline, soluble sugar were all increased while Na⁺ and Cl⁻ uptake was restrained in leaves of aloe with application of NH₄NO₃ under NaCl stress. Both K⁺ and Ca²⁺ were mainly distributed in the younger leaves while Na⁺ and Cl⁻ were compartmentalized into the old leaves with supplemental nitrogen function under NaCl stress. In the functional leaves, MDA content and electrolytic leakage decreased remarkably with NH₄NO₃ application under 200 mmol/L NaCl stress. Application of 11.25 and 15 mmol/L NH₄NO₃ showed better regulation on the physiological characteristics for aloe under NaCl stress. In some extent, high salt tolerance of aloe was improved by supplemental nitrogen, mainly caused by the ions compartmentation, accumulation of organic osmoticas in leaves and the nutrients balance in plant.

Keywords:

Received 2007-05-21;

引用本文:

宁建凤, 郑青松, 刘兆普*, 邵晶. 外源氮对NaCl胁迫下库拉索芦荟生理特性的影响[J] 植物营养与肥料学报, 2008, V14(4): 728-733

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[J] Acta Metallurgica Sinica, 2008, V14(4): 728-733

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