



水稻根系细胞膜H⁺-ATPase对缺磷的反应

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Response of plasma membrane H⁺-ATPase of rice roots to the P deficiency

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Table with 3 columns: 摘要, 参考文献, 相关文章

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摘要 用两相法分离了供磷(+P)和缺磷(-P)营养下水稻苗期根系的细胞膜,并测定了细胞膜上H⁺-ATPase的水解活性,以期阐明水稻根系细胞质膜上H⁺-ATPase对不同缺磷的反应机制。结果表明,缺磷的水稻根系细胞膜H⁺-ATPase的水解活性和H⁺-ATPase的V_{max}, K_m均低于正常供磷的植物;缺磷的水稻根系细胞膜H⁺-ATPase最佳pH值为6.0,而正常供磷植物的为pH 6.4左右;Western Blot结果说明,缺磷水稻根系细胞膜H⁺-ATPase酶浓度与正常供磷植物相似。本试验结果还说明,缺磷水稻根系细胞膜H⁺-ATPase活性低的原因并不是因为其单位细胞膜上的H⁺-ATPase酶分子数量小于正常供磷的植物,而是缺磷水稻根系细胞膜上H⁺-ATPase的同工酶的组成供磷植物相比发生了变化。这很可能是缺磷胁迫下水稻根系细胞膜H⁺-ATPase的一种适应机制。

关键词:

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Abstract: Rice plants (Oryza sativa L. Japonica ssp. cv. Wuyujing) were fed with and without phosphate in hydroponics culture experiment. At the seedling stage the plasma membrane vesicles of roots were isolated by two-phase system. The plasma membrane H⁺-ATPase hydrolytic activity was analyzed for elucidating the response of the plasma membrane H⁺-ATPase of rice root to P deficiency. The results showed that: (1) plasma membrane H⁺-ATPase hydrolytic activity and ATPase K_m, V_{max} obtained from P deficient rice root were lower than those from P sufficient rice root; (2) the optimum pH of the plasma membrane H⁺-ATPase of P deficient rice root was 6.2, but was 6.4 for that of P-sufficient root. (3) But the western blot showed that the enzyme concentration of plasma membrane H⁺-ATPase from P deficient rice root was similar to that from P sufficient rice root. The results indicated that the lower activity of H⁺-ATPase from P deficient rice root was not due to the decreased number of H⁺-ATPase units per membrane area. The different H⁺-ATPase isoforms might be induced in the P deficient rice root in comparison with the P sufficient rice root. It could be an adaptation mechanism of plasma membrane H⁺-ATPase of rice root to P deficiency.

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