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[1] 易嘉, 郭传龙, 武孔焕, 等. 壳梭孢素对铝敏感型黑豆铝耐受性的影响[J]. 大豆科学, 2014, 33(03): 389-392. [doi:10.11861/j.issn.1000-9841.2014.03.0389]
YI Jia, GUO Chuan-long, WU Kong-huan, et al. Effects of Fusicoccin on Aluminum Tolerance in Al sensitive Black Soybean[J]. Soybean Science, 2014, 33(03): 389-392. [doi:10.11861/j.issn.1000-9841.2014.03.0389]

点击复制

壳梭孢素对铝敏感型黑豆铝耐受性的影响

《大豆科学》 [ISSN:1000-9841 /CN:23-1227/S] 卷: 第33卷 期数: 2014年03期 页码: 389-392 栏目: 出版日期: 2014-06-25

Title: Effects of Fusicoccin on Aluminum Tolerance in Al sensitive Black Soybean

作者: 易嘉 (KeySearch.aspx?type=Name&Sel=易嘉); 郭传龙 (KeySearch.aspx?type=Name&Sel=郭传龙); 武孔焕 (KeySearch.aspx?type=Name&Sel=武孔焕); 王琳 (KeySearch.aspx?type=Name&Sel=王琳); 赵秀玲 (KeySearch.aspx?type=Name&Sel=赵秀玲); 李昆志 (KeySearch.aspx?type=Name&Sel=李昆志); 陈丽梅 (KeySearch.aspx?type=Name&Sel=陈丽梅)

昆明理工大学 生物工程技术研究中心, 云南 昆明 650500

Author(s): YI Jia (KeySearch.aspx?type=Name&Sel=YI Jia); GUO Chuan-long (KeySearch.aspx?type=Name&Sel=GUO Chuan-long); WU Kong-huan (KeySearch.aspx?type=Name&Sel=WU Kong-huan); WANG Lin (KeySearch.aspx?type=Name&Sel=WANG Lin); ZHAO Xiu-ling (KeySearch.aspx?type=Name&Sel=ZHAO Xiu-ling); LI Kui-zhi (KeySearch.aspx?type=Name&Sel=LI Kui-zhi); CHEN Li-mei (KeySearch.aspx?type=Name&Sel=CHEN Li-mei)
Biotechnology Research Centre, Kunming University of Science and Technology, Kunming 650500, China

关键词: 黑豆 (KeySearch.aspx?type=Keyword&Sel=黑豆); 14-3-3蛋白 (KeySearch.aspx?type=Keyword&Sel=14-3-3蛋白); 质膜H⁺-ATPase (KeySearch.aspx?type=Keyword&Sel=质膜H⁺-ATPase); 壳梭孢素 (KeySearch.aspx?type=Keyword&Sel=壳梭孢素); 铝胁迫 (KeySearch.aspx?type=Keyword&Sel=铝胁迫)

Keywords: Black soybean (KeySearch.aspx?type=Keyword&Sel=Black soybean); 14-3-3 proteins (KeySearch.aspx?type=Keyword&Sel=14-3-3 proteins); Plasma membrane H⁺-ATPase (KeySearch.aspx?type=Keyword&Sel=Plasma membrane H⁺-ATPase); Fusicoccin (KeySearch.aspx?type=Keyword&Sel=Fusicoccin); Al stress (KeySearch.aspx?type=Keyword&Sel=Al stress)

分类号: S565.1

DOI: 10.11861/j.issn.1000-9841.2014.03.0389 (http://dx.doi.org/10.11861/j.issn.1000-9841.2014.03.0389)

文献标志码: A

摘要: 以铝敏感型黑豆(简称SB)为材料,研究铝胁迫下壳梭孢素(FC)对SB根铝耐受性的影响。结果表明:在50 μmol·L⁻¹铝胁迫下,添加1 μmol·L⁻¹ FC处理8 h能够显著缓解铝胁迫对SB根生长的抑制作用,使其根的相对生长率(RRG)增加36.4%。免疫共沉淀分析结果表明50 μmol·L⁻¹铝胁迫下添加1 μmol·L⁻¹ FC增强SB根中14-3-3蛋白与磷酸化质膜H⁺-ATPase的结合,使根尖质膜H⁺-ATPase活性提高约1倍,根泵活性和质子外排能力显著增强,根尖柠檬酸的分泌量增加显著,增加约2倍。这些结果证实铝胁迫下FC用于增强SB根中14-3-3蛋白和质膜H⁺-ATPase的相互作用和质膜H⁺-ATPase的活性,从而增加SB根柠檬酸的分泌作用及其对铝胁迫的耐受性。

Abstract: Effect of FC on aluminum tolerance of Al sensitive black soybean(SB) roots under Al stress were investigated in this research. The results showed that adding 1 μmol·L⁻¹ FC for 8 h, it could significantly release the inhibition of 50 μmol·L⁻¹ Al stress on the root growth of SB, and increase its relative root growth(RRG) by 36.4%. Co Immunoprecipitation(Co-IP) analysis showed that adding 1 μmol·L⁻¹ FC could enhance the interaction between 14-3-3 proteins and phosphorylated PM H⁺-ATPase, which increased PM H⁺-ATPase activity to approximately 1 fold, significantly increasing proton efflux and citrate secretion to approximately 2 fold in SB roots under 50 μmol·L⁻¹ Al stress. These results confirmed FC was used for enhancing interaction of the 14-3-3 protein and PM H⁺-ATPase and the activity of PM H⁺-ATPase, thereby increasing citrate secretion and Al tolerance in SB roots under Al stress.

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备注/Memo 收稿日期:2013-11-06

基金项目:国家重点基础研究发展计划“973计划”(2007CB108901)。第一作者简介:易嘉(1985-),男,硕士,主要从事植物代谢途径基因工程方面的研究。E-mail:yijia013@163.com。

通讯作者:陈丽梅(1963-),女,教授,主要从事植物代谢途径基因工程方面的研究。E-mail:chenlimeikm@126.com。

更新日期/Last Update:2014-08-01