



## 外源松柏醛和芥子醛影响棉纤维苯丙烷代谢途径基因表达及生长

李晓东<sup>1,2</sup>, 杨洋<sup>1</sup>, 李波<sup>1</sup>, 杨家平<sup>1</sup>, 范玲<sup>1\*</sup>

1. 新疆农业科学院核技术生物技术研究所, 新疆 乌鲁木齐 830000; 2. 新疆农业大学农学院, 新疆 乌鲁木齐 830000

### Effect on Exogenous Coniferyl Aldehyde and Sinapyl Aldehyde on Expressions of Genes Involved in Fiber Development in Cotton

LI Xiao-dong<sup>1,2</sup>, YANG Yang<sup>1</sup>, LI Bo<sup>1</sup>, YANG Jia-ping<sup>1</sup>, FAN Ling<sup>1\*</sup>

1. Institute of Nuclear and Biological Technologies, Xinjiang Academy of Agricultural Sciences, Urumqi, Xinjiang 830000, China

摘要

参考文献

相关文章

Download: PDF (708KB) HTML 1KB Export: BibTeX or EndNote (RIS) Supporting Info

**摘要** 利用棉花胚珠离体培养和半定量RT-PCR及数字化图像处理技术, 通过体外饲喂不同浓度苯丙烷代谢途径中间代谢物松柏醛(CA)和芥子醛(SA)来研究在棉花纤维发育过程中苯丙烷代谢关键中间产物对棉花纤维发育的影响。结果表明, 在离体培养棉纤维中, 不同浓度(100  $\mu\text{mol} \cdot \text{L}^{-1}$ 、200  $\mu\text{mol} \cdot \text{L}^{-1}$ )外源松柏醛(CA)和芥子醛(SA)不但诱导了以CA和SA为底物的基因产物表达量增加, 也诱导了苯丙烷代谢途径上游产物的表达量增加, 且高浓度(200  $\mu\text{mol} \cdot \text{L}^{-1}$ )诱导的表达量高于低浓度(100  $\mu\text{mol} \cdot \text{L}^{-1}$ ), 芥子醛高于松柏醛; 对GhExpansin1和纤维生长均有抑制作用, 且高浓度(200  $\mu\text{mol} \cdot \text{L}^{-1}$ )抑制作用更加明显, 芥子醛抑制作用大于松柏醛。

**关键词:** 松柏醛 芥子醛 苯丙烷途径 基因表达 生长

**Abstract:** We determined the effect of applying exogenous coniferaldehyde(CA) and sinapaldehyde(SA) on gene expression and cotton fiber development. The experimental materials consisted of cotton ovules *in vitro*. Change of gene expression and fiber development in response to the various treatments were determined by semi-quantitative reverse transcription-polymerase chain reaction and image digitization analyses, respectively. Compared with the control, ovules treated with CA or SA at 100 and 200  $\mu\text{mol} \cdot \text{L}^{-1}$  showed increased expressions of the genes encoding cinnamyl alcohol dehydrogenase(CAD), which catalyzes phenylpropanoid synthesis. They also showed increased expressions of genes upstream in the phenylpropanoid pathway, including PAL, which encodes phenylalanine ammonia lyase, CHH, which encodes cinnamate-4-hydroxylase, COMT, which encodes caffeic acid O-methyltransferase, CCoAOMT, which encodes caffeoyl-CoA-3-O-methyltransferase, and CCR, which encodes cinnamoyl-CoA reductase. Higher concentrations of CA and SA(200  $\mu\text{mol} \cdot \text{L}^{-1}$ ) induced greater levels of gene expression than did the low concentrations(100  $\mu\text{mol} \cdot \text{L}^{-1}$ ). SA induced higher gene expression levels than did CA. Both CA and SA suppressed expression of Ghexpansin1 and fiber growth; higher concentrations(200  $\mu\text{mol} \cdot \text{L}^{-1}$ ) caused greater inhibition, and SA was more inhibitory than CA.

**Keywords:** coniferyl aldehyde sinapyl aldehyde phenylpropanoid pathway gene expression fiber growth

Received 2013-04-01;

Fund:

国家自然科学基金项目(31060173,U1178305); 新疆自治区高技术研究发展计划项目(2011111116); 新疆维吾尔自治区自然科学基金项目(2011211A085)

Corresponding Authors: fanling@xaas.ac.cn.com

About author: 李晓东(1987-), 男, 硕士研究生, chinalxdong@163.com