



### 赤霉素和缩节胺对转Bt基因抗虫棉铃Bt毒蛋白表达及氮代谢的影响

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### Effect of GA<sub>3</sub> and DPC on Bt Protein Expression and Boll Nitrogen Metabolism of Bt Transgenic Cotton

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摘要

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**摘要** 以泗抗1号和泗杂3号为研究材料, 于盛花结铃期, 应用赤霉素(GA<sub>3</sub>)、缩节胺(DPC)涂抹幼铃, 探讨其对棉铃Bt毒蛋白表达及氮代谢影响。结果表明, DPC能显著提高花后10 d和30 d(DPA)棉铃Bt毒蛋白含量, GA<sub>3</sub>降低10 DPA铃壳和子棉中Bt毒蛋白含量, 但提高30 DPA棉铃Bt毒蛋白含量。DPC提高了硝酸还原酶(NR)、谷氨酸-丙酮酸转氨酶(GPT)、谷氨酸-草酰乙酸转氨酶(GOT)活性并增加了游离氨基酸、可溶性蛋白及全氮含量, GA<sub>3</sub>处理则降低了10 DPA铃壳、棉子中上述酶活性和物质含量。相关分析表明, 棉铃中Bt毒蛋白含量与NR、GPT和GOT活性呈极显著正相关( $r_1=0.8776^{**}$ ,  $r_2=0.7172^{**}$ ,  $r_3=0.7028^{**}$ )。可见, 转Bt基因抗虫棉开花后应用DPC或GA<sub>3</sub>可提高充实期棉铃, 能促进棉铃氮代谢水平, 从而促进Bt毒蛋白的表达。

**关键词:** 转Bt基因抗虫棉 Bt毒蛋白 氮代谢 生长调节剂

**Abstract:** In order to study the effect of the plant growth regulators on Bt protein expression and nitrogen metabolism of the bolls, GA<sub>3</sub> and DPC were used to spray bolls of the two Bt cotton cultivars (Sikang 1 was conventional, Siza 3 was hybrid). The results showed that DPC increased Bt protein contents of bolls at 10 days post anthesis (DPA) and 30 DPA; GA<sub>3</sub> decreased the Bt protein contents of the boll shell and the seeds at 10 DPA, but enhanced the contents at 30 DPA. Bolls with DPC treatment had higher total nitrogen, free amino acid and soluble content, greater in NR, GPT and GOT activity. Bolls with spraying GA<sub>3</sub> had an opposite effect at 10 DPA. There were similar results for the two Bt cultivars with different genotypes. There were significant positive correlation between the Bt toxin content and the activity of the NR, GPT and GOT. The correlation coefficients were 0.8776<sup>\*\*</sup>, 0.7172<sup>\*\*</sup> and 0.7028<sup>\*\*</sup>. The results suggest that spraying DPC and GA<sub>3</sub> during boll nutrient filling may enhance nitrogen metabolism intensity, promote the expression of the Bt protein and increase the ability of the insect resistance.

**Keywords:** Bt cotton Bt protein nitrogen growth regulator

Received 2009-07-03;

Fund:

扬州大学新实际学术带头人基金, 江苏省“青蓝工程”学术带头人培养基金、江苏省“三项工程”项目资助 [S×(200), S×(2008)棉花]

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引用本文:

张 祥, 马爱丽, 房 静, 肖 健, 峦 娜, 王永慧, 陈 源, 陈德华. 赤霉素和缩节胺对转Bt基因抗虫棉铃Bt毒蛋白表达及氮代谢的影响[J] 棉花学报, 2010, V22(2): 150-156

ZHANG Xiang, MA Ai-Li, FANG Jing, XIAO Jian, LUAN Na, WANG Yong-Hui, CHEN Yuan, CHEN De-Hua. Effect of GA<sub>3</sub> and DPC on Bt Protein Expression and Boll Nitrogen Metabolism of Bt Transgenic Cotton[J] Cotton Science, 2010, V22(2): 150-156

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