

1462 Mechanism of the Decrease in Exogenous-Toxin Protein of Transgenic Bt Cotton Grown in Elevated CO₂

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Abstract: In general, significant decrease in exogenous-toxin (i.e. Bt) protein was shown when transgenic Bt cotton grown in elevated CO₂. So transgenic Bt cotton must be faced new ecological risk owing to the decrease in Bt toxin content caused by atmospheric CO₂ level arising. Three aspects can be presumed the mechanism of Bt toxin content decrease for transgenic Bt cotton grown in elevated CO₂, that is, (1) Do increased carbohydrates of transgenic Bt cotton, causing by elevated CO₂, dilute the Bt toxin content in plant tissues? (2) Whether elevated CO₂ enhance the expression silencing of Bt gene and its special 35S promoter causing by methylation? (3) Increased nitrogen uptake by roots may result N-deficiency for transgenic Bt cotton grown in elevated CO₂, which, in turn, limits nitrogen metabolism and Bt gene expression. Moreover, cultivation practices, e.g., spraying special hypermethylation reagents (e.g. 5-azaC) in combination with nitrogen-fertilization supply has been suggested to improve the Bt-gene expression of transgenic Bt cotton effectively to control target-herbivore pests especially in elevated CO₂.

Keywords: Elevated CO₂, transgenic Bt cotton, mechanism