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(54) **TRANSGENIC FIBER PRODUCING PLANTS WITH INCREASED EXPRESSION OF SUCROSE PHOSPHATE SYNTHASE**

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See application file for complete search history.

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(57) **ABSTRACT**

The present invention relates to a method of controlling the cellulose synthesis in plants to optimize the level of production and quality of the products derived from the plant. In particular, the present invention provides a transgenic cotton plant that has higher yields of cotton fiber and seed. The invention also provides methods for increasing the quality of cotton fiber produced from a cotton plant. The invention also provides general methods of changing the ratio of cellulose to other dry weight components of the plant, for changing the thickness of cell walls, for increasing the yield and changing the quality of other plant fibers, for increasing seed yield, and for increasing the tolerance of photosynthetic efficiency to cool night temperatures.