Expression of Ros1/Del Anthocyanin Biosynthetic Gene in Gossypium hirsutum

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Gossypium hirsutum (Cotton) is a significant non-staple crop. Its economic significance is determined by main characteristics of its fiber including fiber tenacity, length, strength and color. Textile industries have established various dyeing processes to dye naturally white cotton in different colors. But, these dyeing chemicals are hazardous to environment and badly affect the fiber quality. So its natural production in a variety of colors may reduce cost of textile dyeing and pollution caused by it. Anthocyanins are major flavonoid pigments responsible for multiple color production in various plants including cotton. They contribute red, blue, orange and purple coloration to fruits, grains, vegetables and flowers of various plants. Dietary anthocyanins have powerful antioxidant capacities with a lot of health benefits. In current research work, anthocyanin biosynthetic gene, Ros1/Del was subjected to molecular cloning after detailed bioinformatics analysis. The construct was chemically synthesized in pUC57 (cloning vector), multiplied in Escherichia coli (Top 10) cells and confirmed through PCR and restriction digestion (using SacI & SalI restriction enzymes). Then the gene was cloned in pCAMBIA1302 (plant expression vector), confirmed by PCR & restriction digestion and transformed in Agrobacterium tumefaciens (LBA4404 strain) via electroporation. Target gene was confirmed in transformed Agrobacterium colonies through colony PCR using gene specific primers for the cotton plant transformation. Production of such naturally colored cotton would eliminate the dyeing expenses and toxic dye waste disposal, thus proving beneficial for human, environment and economy. Moreover, increased yield and improved fiber quality of naturally colored cotton is expected in future.

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