

**METABOLIC PATHWAY
ENGINEERING IN COTTON:
BIOSYNTHESIS OF POLYESTER IN FIBER**

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Abstract

Agracetus, Inc. has made breakthrough discoveries in developing genetically engineered cotton plants that produce natural cotton with superior performance qualities. The targeted characteristics include reduced shrinkage, wrinkle-resistance, greater strength, enhanced thermal properties, and superior dye binding. The specialty fibers under development will provide entirely new product concepts in woven and non-woven markets, in addition to improving the economics of cotton fiber processing.

Agracetus uses its proprietary particle-mediated gene delivery technology (*Accell*[®]) to insert new genes into the chromosome of elite cotton varieties. The introduced gene produces a specific protein or other biological product in the fiber. The resulting fiber retains its original characteristics along with the new traits.

An example of a new generation of fibers under development is the polyester-containing fibers. Bacterial genes responsible for synthesis of "bioplastics" are modified and inserted into DP 50. Bioplastics are naturally occurring polyester compounds produced by bacteria. Many of the physical and chemical properties of these aliphatic polyesters are similar to synthetic plastics such as polypropylenes. The expression of bioplastic genes in cotton results in fibers which contain polyester in the lumen. The modified fibers have superior thermal insulating properties when compared to conventional fibers. Further refinement of this technology is underway. Prototype product testing for various applications is expected within the next two years.